SCOMM

#9:92

PRELIMINARY PROPOSAL FOR:

THE PURCHASE OF

ALASKA STATE ROYALTY CRUDE OIL

AND THE

CONSTRUCTION OF A PETROCHEMICAL REFINERY COMPLEX

IN THE

STATE OF ALASKA

PRESENTED TO THE STATE OF ALASKA

BY

ALASKA PETROCHEMICAL COMPANY

AUGUST 1, 1977

PRELIMINARY PROPOSAL
TO
PURCHASE ALASKA STATE ROYALTY CRUDE
AND TO
CONSTRUCT A PETROCHEMICAL REFINERY COMPLEX
IN
ALASKA

Presented to the State of Alaska
August 1, 1977

Book No. 159

ALASKA PETROCHEMICAL COMPANY

CONTENTS

SUBJECT	PAGE

ALASKA PETROCHEMICAL COMPANY
P. O. Box 6554
HOUSTON, TEXAS 77005

August 1, 1977

The State of Alaska
in care of
Mr. Robert E. LeResche
Commissioner
Department of Natural Resources
and
Chairman of Royalty Oil & Gas
Development Board
323 East Fourth Street
Anchorage, Alaska

Gentlemen:

On June 8, 1977 we, the founders of Alaska Petrochemical Company being: Barbour Oil Company of Houston, Texas, Alaska Interstate Company of Houston, Texas and Alaska Consolidated Shipping, Inc. of Anchorage, Alaska, received a request or solicitation from the State of Alaska for the negotiable purchase of the Alaska State Royalty Oil which is to be produced from the Prudhoe Bay field.

We were informed that the total volume of crude oil available under this solicitation from the State of Alaska would be approximately 150,000 barrels per day on a field production rate of approximately 1.2 million barrels per day. This preliminary proposal is prepared in reliance upon such crude availability.

Please consider this letter and the accompanying preliminary proposal, which is made a part hereof by reference, to be the offer of Alaska Petrochemical Company (also referred to as ALPETCO) to purchase, for a period of twenty-five (25) years, immediately upon contract award, all of such Alaska State Royalty Oil and thereafter to construct a petrochemical refinery complex in the State of Alaska which will utilize such crude oil as its primary feedstock in the production of a broad range of products principally directed to petrochemicals in order to add maximum value in Alaska.

We are prepared to commence detailed negotiations and joint planning and evaluation conferences with you and other representatives of the State of Alaska immediately as was stipulated in your solicitation of proposal letter received by us on June 8, 1977.

Telephones: (713) 621-8710 (713) 627-9621 Telex: 76-2681

Our purpose and intent is to provide a socially and economically attractive proposal for maximizing the benefits to Alaska from the State's 1/8 royalty share of crude oil produced from the Prudhoe Bay field. We believe that the proposal contained herein will add significantly to the economic growth, well being and stability of the Alaskan economy and will provide a foundation for orderly development of industrial ventures in the future which will further benefit the citizens of Alaska.

We look forward to the opportunity of negotiating with the State of Alaska regarding our "value added" concept and proposal.

Very truly yours,

John D. Barbour, Sr.

John D. Barbour, Sr.
President

THE ALPETCO CONCEPT

The State of Alaska has determined to take its one-eighth royalty on the North Slope crude oil "in kind" rather than "in dollars."

There is little justification for the State of Alaska to take its royalty oil "in kind" unless value is added to the crude product before it leaves Alaska. If the State's crude is to be sold to someone "as is," the State may as well take the crude "in value," letting the producing oil companies handle shipping and marketing and the State collect its royalty "in dollars." On the other hand, if value is added **in Alaska** then substantial benefits can be created for the State of Alaska and its citizens. The more value added in Alaska, the better.

Assuming the crude oil to be worth $13 a barrel at Valdez, it will be processed further ---somewhere---until it has an **added value** of $30, $50, $100, $150 or $200 per barrel. Adding such values requires plants and payrolls. These can be in Alaska or on the California or Gulf Coasts. Why not in Alaska?

A plant investment of $1 billion or more is necessary to add such values. The property and revenue taxes on this real property will go to the State in which the plant is located. Why not to Alaska?

The jobs and payrolls created by adding these values are **permanent** jobs and payrolls, not temporary. Why not for Alaskans?

Additional industry will spring up around the petrochemical complex---wherever it is located---to add further value to its wide range of products, thus creating additional permanent jobs and payrolls. Why not in Alaska?

ALPETCO's proposed program will add maximum value to the product, and this value will be added **in Alaska** and **by Alaskans.**

SUMMARY OF PRELIMINARY PROPOSAL

Alaska Petrochemical Company (also referred to as "ALPETCO") proposes to purchase the Alaska State royalty crude from the North Slope at the earliest time such oil is available and deliverable by the State.

ALPETCO proposes to purchase all such available royalty crude at a price yet to be negotiated but not less than the price the State of Alaska would have received for that oil had it taken its royalty "in value." Upon selection by the State, ALPETCO will immediately commence the implementation of its program for the design, construction and operation of a petrochemical refinery complex in Alaska. The facility will be designed to add maximum value to the crude processed and, thus, will focus primarily on the production of aromatics, olefins, and their intermediaries such as polyethylene, polypropylene, ethylene glycol, benzene, toluene, xylenes and some heavy aromatics. The proposed facility will also produce gasoline, arctic diesel and jet fuels as required for consumption within the State of Alaska, being distributed through existing channels. Production of these fuel products for local consumption is planned as back-up capacity and at a planned rate of 30,000 barrels per day which represents a potential supply of 50% more than current needs in Alaska.

ALPETCO's consulting engineers estimate that three to four years will be required to design and construct the petrochemical refinery. During this interim period, ALPETCO proposes to buy, transport and market the State's royalty crude to contractually bound purchasers in Alaska and the "lower 48" states. The net proceeds of such interim marketing would be used to defray costs of this petrochemical refinery program.

The location of the proposed petrochemical facility in Alaska will create opportunities for many new businesses. For example:

Petrochemical Product Manufactured by Refinery		New Business Opportunities
Ethylene Glycol	-	Plastic bottle molding mill for packaging antifreeze and coolant products
	-	Polyester fibers and films
Polypropylene	-	Intermediate chemical pelletized product bagging facility
	-	Series of alcohols, pharmaceuticals and solvents
	-	Wood pallet manufacture
Propylene Glycol	-	Oil drilling chemicals
Propylene	-	Series of alcohols and solvents
Polyethylene	-	Pipe manufacture

There are many other products which can reasonably be produced utilizing the output of this primary petrochemical refinery. Each new venture business and the petrochemical refinery itself will add requirements in the building trades for commerical and residential structures, commercial ventures in consumer product merchandising and in professional services and service industries.

The proposed petrochemical refinery and related shipping activities will add new permanent jobs in Alaska, for Alaskans. It is estimated that ALPETCO's program would provide permanent jobs for over 1,500 Alaskans with an estimated annual payroll of $34 million. Approximately 350 of these permanent jobs would be engaged in the marine transportation of the products. During the three to four years of construction, there would be a short-term employment requirement for approximately 2,000 people at peak work levels with a gross payroll averaging approximately $38 million per year. A recapitulation of the annual payroll to be generated by ALPETCO's proposal is as follows:

ESTIMATED ANNUAL PAYROLLS

	Short-Term 1st through 4th Year	Long-Term 5th through 25th Year
Refinery Construction	$38,000,000	$ -0-
Marine Transportation	10,000,000	10,000,000
Refinery Operation	-0-	24,000,000
Total Estimated Annual Payroll	**$48,000,000**	**$34,000,000**

ALPETCO proposes to conduct extensive formal and on-the-job training programs for Alaskans.

In addition to permanent jobs, ALPETCO's proposal will result in an increased permanent tax base in Alaska. It is estimated that this new facility will generate approximately $100 million per year in local and State taxes, such as corporate income taxes, property and ad valorem taxes and personal income taxes paid by ALPETCO employees. A more definitive tax revenue estimate will be presented during negotiations.

On a preliminary basis, no conclusion has been reached with respect to the exact location of the proposed refinery. On the surface, Valdez appears to be the preferred location because it is the terminus of the pipeline from the North Slope, requires less storage and no trans-shipment to another site. While logistics and economics tend to favor a Valdez location, at this point in time ALPETCO has reached no conclusion and will continue to consider the pros and cons of various sites.

Alaska Petrochemical Company believes it is uniquely qualified to purchase the State's royalty crude and to create jobs and additional revenues for Alaska by constructing and operating a petrochemical refinery. The principals of the companies who founded ALPETCO have many years experience and expertise in refinery engineering, refinery operation, sulfur removal and

pollution control at major refineries, refinery vessel design and fabrication, oil and gas exploration, production and crude conversion, oil and gas process engineering, gas transmission and distribution in Alaska and all phases of marine transportation. But perhaps ALPETCO's best qualification is the involvement of its founders in Alaskan operations and affairs. Further, ALPETCO's owners are represented by Alaskan-based corporations having more than 34,000 Alaskan stockholders.

Key considerations are treated in more detail in the following pages of this proposal, including preferred and alternate site selection, construction cost of the facility, interim crude marketing, overall program financing, organization manning, environmental and socio-economic impact and related new venture development.

We believe that this proposal will result in positive changes in the ability of the State of Alaska to provide for the well-being of its citizens over the long term through the provision of permanent jobs, new opportunities and the beginnings of an industrial base which will attract other desirable business development.

CREDENTIALS

Alaska Petrochemical Company

Alaska Petrochemical Company[1] is an Alaska corporation formed for the purpose of utilizing the State of Alaska's royalty share of crude oil produced on the North Slope to further the orderly development of the State of Alaska and provide better opportunities for its citizens through the construction and subsequent operation of a large petrochemical complex in Alaska.

The Company was formed and is owned by the following corporations, most of which are chartered as Alaska corporations:

	Ownership of Alaska Petrochemical Company
Alaska Interstate Company (NYSE) (an Alaska corporation)	60%
Alaska Consolidated Shipping, Inc. (an Alaska corporation)	20%
The Aleut Corporation	
Bristol Bay Native Corporation	
Calista Corporation	
Chugach Natives, Inc.	
Cook Inlet Region, Inc.	
Koniag, Inc. (all Alaska corporations)	
Seatrain Lines, Inc. (NYSE) (a Delaware corporation)	
Barbour Oil Company (a Texas corporation)	20%
	100%

[1]Please see Functional Corporate Organization Chart attached in Exhibits - Technical Section.

Alaska Interstate Company

Alaska Interstate Company (hereinafter referred to as AKI) is an Alaska corporation, engaged in three lines of business: energy, energy services and specialized manufacturing. AKI was incorporated as a public company in 1966 comprised of several established businesses including Alaska Pipeline Company and Anchorage Natural Gas Company, both headquartered in Anchorage and conducting business in Alaska since 1959. More than one hundred (100) Alaskans own shares of AKI common stock which has been listed and traded on the New York Stock Exchange since 1967. AKI employs approximately two hundred (200) persons in Alaska. At August 1, 1977, total assets were approximately $265,000,000 and net worth was approximately $100,000,000. AKI believes that it is the largest publicly-owned Alaska corporation listed on a major U.S. stock exchange, and the only one listed on the New York Stock Exchange.

AKI's present interests in Alaska include its wholly-owned subsidiary, Alaska Pipeline Company, an intrastate natural gas transmission company which operates 150 miles of pipeline linking the Kenai Peninsula gas fields with the greater Anchorage area. AKI also owns Anchorage Natural Gas Company which provides natural gas distribution services to approximately thirty-one thousand (31,000) residential, commercial and industrial purchasers within the city and environs of Anchorage, Spenard, Soldotna, Eagle River and the "North Road" area of the Kenai Peninsula.

Delta Engineering Corporation, another wholly-owned AKI subsidiary, has considerable experience working in the severe climate of arctic Alaska. Delta and its subsidiary, Pinnacle Construction Company, have constructed gathering systems and a major separation system for ARCO at Prudhoe Bay.

AKI's wholly-owned Anlin Company is engaged in marketing proprietary pollution control and sulfur recovery technology to the petroleum and petrochemical industries. Anlin also markets AKI's proprietary copper and zinc processes. Until February 1977, the Anlin Company of New Jersey was engaged in the recovery of elemental sulfur from hydrogen sulfide in certain sour gas streams from Chevron U.S.A.'s refinery in Perth Amboy, New Jersey. Until April 1976, the Anlin Company of Illinois was engaged in the recovery of elemental sulfur and the manufacture of sulfuric acid at Anlin-owned facilities adjacent to the Shell Oil Company, Clark Oil Company and AMOCO Oil Company refineries at Wood River, Illinois. Anlin's New Jersey and Illinois facilities were sold to Chevron U.S.A. and Shell Oil Company, respectively, under provisions of contracts between Anlin and the oil companies.

In addition to Alaska Pipeline and Anchorage Natural Gas Company AKI's other energy businesses include an effective 21.9% participation in a major oil and gas exploration and production joint venture in Indonesia where the group in which AKI has its interest has developed a 500,000,000 cubic feet per day liquefied natural gas plant. AKI is also active in the exploration and production of oil and gas in the "lower 48" through McAlester Fuel Company, a wholly-owned subsidiary acquired in early 1977. Through its McAlester subsidiary, AKI holds interests in approximately 285,000 gross acres of federal oil and gas lease applications in Alaska, and currently has a working interest in a Susitna exploration drilling venture.

Some of AKI's other energy services and manufacturing businesses include engineering and construction of oil, gas and petrochemical processing facilities, the manufacture of pressure vessels and industrial heat-treating furnaces and furnace lining materials, the manufacture and distribution of agricultural equipment and the manufacture of overhead cranes.

Alaska Consolidated Shipping, Inc.

Alaska Consolidated Shipping, Inc. (hereinafter referred to as ACS) is an Alaska corporation formed in July 1976 for the purpose of participating in commercial developments in Alaska including an offer initially submitted in September 1976 to purchase Alaska "States Royalty Oil." Fifty-one percent (51%) of the stock of ACS is owned by a consortium of six Alaska Native Regional Corporations whose shares are, in turn, owned by thirty-four thousand (34,000) native Alaskans. The Alaska Native Corporations owning control of ACS are:

The Aleut Corporation
Bristol Bay Native Corporation
Calista Corporation
Chugach Natives, Inc.
Cook Inlet Region, Inc.
Koniag, Inc.

Forty-nine percent (49%) of the stock of ACS is owned by Seatrain Lines, Inc., a publicly-owned corporation whose stock is listed on the New York Stock Exchange. Seatrain is a major U.S. flag shipping company engaged in bulk and containerized cargo activities throughout the world. Seatrain has six United States flag vessels available for use by ACS and, through arrangements with other shipping companies, is able to make available on an as-needed basis such additional shipping capacity as may be required in this project. A subsidiary, Seatrain Shipbuilding Corp. (hereinafter referred to as Shipbuilding), operates a shipyard located at the former Brooklyn Navy Yard in New York. Shipbuilding has completed three (3) petroleum tankers of 225,000 deadweight tons (dwt), and one additional 225,000 dwt tanker is scheduled for completion in early 1978.

Through its wholly-owned Pride Refining, Inc. (hereinafter referred to as Pride), Seatrain is involved in the refining and distribution of petroleum products. Pride owns and operates a 36,500 barrel per day refinery at Abilene, Texas and maintains petroleum tankage facilities with a capacity of 900,000 barrels.

Seatrain operates ocean terminals in Charleston, South Carolina; Wilmington, Delaware; Oakland, California; Weehawken, New Jersey; Norfolk, Virginia; Los Angeles, California and every country in Western Europe. In addition, Seatrain is managing agent for two ports in the United Arab Emirates.

Barbour Oil Company

Barbour Oil Company (hereinafter referred to as BOC) is a Texas corporation and is the successor of Barbour Oil Company, a private joint venture formed in 1919. BOC currently owns and operates in excess of 17,000 acres of oil and gas leases in Kansas, Louisiana, Oklahoma and Texas.

The historical progress of this family-owned company includes substantial commercial ventures including but not limited to the following: primary construction responsibility for the original Galveston causeway leading from the mainland to the island of Galveston, Texas. This project was undertaken in early 1919 and completed near the end of 1921; the organization and operation of United Carbon Company which was the first large carbon black production facility in the United States, initially capitalized for $26,000,000 and operated until 1937 when it was sold to Ashland Oil and Chemical Company; the discovery and production of the Monroe, Louisiana gas fields which eventually attained a reserve calculation in excess of 4 trillion cubic feet of gas which supplied the feedstock to United Carbon facilities in Monroe, Louisiana until the mid 1940's; the operation of six gasoline production plants located at Monroe, Louisiana until their divestiture in 1936; the formation and operation of Southern Natural Gas Corporation which operated gathering lines and a gas distribution system serving commercial, industrial and residential users throughout the main south and southeastern coastland of Louisiana prior to divestiture in 1948; and formation and operation of Louisiana-Texas Water Ways Corporation, one of the earliest and largest barge towing operations utilizing the Gulf Coast intercoastal water way system. This company was sold in 1958. BOC also organized and operated the first major refinery complex located on the Houston Ship Channel which was subsequently purchased by Signal Oil Company in 1936 and is now known as The Charter Refinery; introduced the first deep water channel and turning basin at the mouth of the Houston Ship Channel which was dedicated on April 28, 1977 as the Barbour's Terminal Containerized Cargo Complex which is the largest of its kind on the coast of the United States; organized and operated as a one-third owner a 28,000 square mile concession granted by the Kingdom of Libya in 1965 which was expropriated by the current Libyan government in 1969.

BOC is a privately-held corporation.

Co-Investment Bankers

Alaska Petrochemical Company has retained the firms of Kuhn Loeb & Co. Incorporated and E. F. Hutton & Company Inc. as financial advisors and investment bankers. Both firms have distinguished credentials to serve as advisors and bankers for a project of this size. Each firm is experienced in all areas of public and private financing. Each is also knowledgeable and experienced in Alaskan financings. Descriptive literature on each firm is attached to this proposal and made a part hereof by reference.

Kuhn Loeb & Co. Incorporated

(Please see descriptive material submitted with this proposal.)

E. F. Hutton & Company Inc.

(Please see descriptive material submitted with this proposal.)

Ford, Bacon & Davis Incorporated

Ford, Bacon & Davis Incorporated (hereinafter referred to as FBD), established in 1894, is a leading engineering and construction contractor to the petroleum and petrochemical industries. FBD is privately owned by key management personnel. Corporate headquarters are located in New York with major operating divisions located in Dallas, Texas; Monroe, Louisiana; Salt Lake City, Utah; with other subsidiary offices in the United States as well as throughout the world.

FBD employs a permanent staff of more than one thousand engineers. The firm serves the needs of the petroleum, petrochemical, chemical, metallurgical, energy, pharmaceutical, utilities, pulp, paper and transportation industries.

FBD also offers Management Services to the above industries in addition to process technologies made available through in-house expertise and licensing agreements. These Management Services include the following:

Feasibility Reports to ascertain whether proposed ventures are economically and/or technically sound, and in the client's overall business interests,

Site Locations to determine the optimum location for an operation or business,

Marketing Assistance in reaching decisions to realize maximum benefits from the human and financial resources committed,

Appraisals to determine in-depth the price for acquisition or divestiture; to establish tax bases, fix condemnation damages, develop utility rate bases, or establish values or intangible assets,

Energy Studies for gas, oil, hydroelectric or nuclear projects,

Transportation Studies to improve the movement of people and products; to develop new operations or facilities, equipment and techniques,

Maintenance Studies to evaluate and improve existing operations and to develop procedures for preventative and routine maintenance programs,

Industrial Engineering to design and control manufacturing processes and facilities; to achieve optimum financial results from production,

Financial Surveys and reports for S.E.C. registration, private financing or bank loans; valuations and appraisals for financing or for compliance with mortgages, bond indentures, bank loans, etc.

Management and Business Objectives development and planning; organization; management controls; motivation and related sectors of the broad management spectrum,

Materials Handling engineering and design of systems; facility requirements for process flow, size, manufacturing layout, and operational control; productivity improvement designs,

Systems, studies, recommendations and design assistance for cost, production and management controls; organization systems and procedures; studies employing the development and use of mathematical models and data processing of statistical material; computerization and automation of management information systems.

MARKETING

It is the intent of Alaska Petrochemical Company to market the petrochemical products of its proposed Alaskan petrochemical refinery to chemical company customers located within the United States. Markets of a like nature which may develop within Alaska will be given preferential consideration both as to price and deliverability of product. Fuel products manufactured will be marketed only in Alaska when demand arises and then through existing channels of distribution.

It is anticipated that some portion of the overall product mix will be sold to customers outside the U.S.A. as the proposed petrochemical refinery complex's output of certain intermediates will receive the most stable price treatment in foreign markets and because, historically, the sale of such products into foreign markets has been a mainstay of one of the few positive balance of trade categories of the U.S.A. gross national product.

ALPETCO now has underway a definitive study of pertinent markets and prospective customers for its product within those markets, on a world-wide basis. Preliminary indications are that the general product mix selected is marketable in the quantities scheduled to be produced.

Letters of intent to purchase products will be secured from prospective customers prior to contract award and commencement of facility construction.

ALPETCO intends to seek marketing of its products under long-term "take or pay" contracts and reserves the right to select its customers at its discretion as provided for by the operation of law consistent with the intent of ALPETCO to give the Alaskan markets preference.

IMMEDIATE PURCHASE OF ROYALTY CRUDE AND INTERIM MARKETING

It is proposed by Alaska Petrochemical Company that it enter into an agreement with the State of Alaska to purchase its royalty crude and to remarket that crude for the interim period of time between initial contract award and completion of the proposed petrochemical refinery complex.

ALPETCO is aware that the State of Alaska is bound to give six (6) months' notice of its desire to take its royalty crude "in kind" rather than "in value." ALPETCO is prepared to purchase this crude for interim remarketing at a price to be negotiated between the parties but said price shall be not less than that which would have been received by the State of Alaska had it taken its royalty position "in value" rather than "in kind."

It will be the plan of ALPETCO to enter into short-term contractual sales with crude oil users in the other forty-nine states or in Alaska should that be desirable. Alaska Consolidated Shipping, Inc. which is one of the founders of ALPETCO will act as the marine transportation arm of ALPETCO. All shipping by ACS will be at competitive market rates.

ALPETCO is aware that such remarketing of the Alaskan state royalty crude may not be more than a marginally profitable activity for ALPETCO for this interim period and is further aware that the actual procurement of contractual agreements with purchasers will be difficult to attain; however, ALPETCO feels that such purchase agreements can be successfully entered into and that, regardless of the possible marginal profitability to ALPETCO, it is desirable to proceed immediately with this element of ALPETCO's overall proposal in order that the obligation of the State of Alaska to sell its royalty crude and the obligation and right of ALPETCO to purchase such crude throughout the proposed twenty-five (25) year term be clearly established at the onset.

During this interim period any profits derived from the sale of crude oil purchased from the State of Alaska would be employed solely in defraying the costs of such refinery design and development costs.

ALPETCO wishes it to be clearly understood by the State of Alaska that ALPETCO's proposal to construct the petrochemical refinery complex, more fully set forth in other sections of this overall proposal, is dependent upon the granting by the State of Alaska of an agreement which allows for the interim marketing described herein, which agreement is precedent to financing of the program; and ALPETCO does solicit such an agreement because it is believed to be in the best interests of both parties thereto.

Final terms and provisions of a contract mutually acceptable to both parties in implementation of this interim crude marketing portion of the overall proposal of ALPETCO will be clarified in our final presentation on October 15, 1977 as one product of the negotiations with the State of Alaska scheduled to commence immediately after August 1, 1977.

ALASKA'S NEEDS FOR PRODUCTS

Alaska Petrochemical Company has completed a cursory analysis of the market needs within Alaska for energy fuels. While our analysis indicates that current market demand is now fully met by others, it is the plan of ALPETCO to produce on an "as-needed" basis some 30,000 barrels per day (or 1,260,000 gallons per day) in the following products:

- Five grades of gasoline, three of which would be suitable for automobiles, snowmobiles, trucks, motor homes, etc.; i.e., premium grade, no-lead grade and regular grade.
- At least two aviation grade gasolines.
- As many jet aircraft fuels as are required, including JP-4 and Jet-A.
- Various turbine fuels will be produced as needed.
- Arctic diesel and other low pour point fuels including stove oils and home heating fuels.

These products would be made available as required through existing distribution channels. The petrochemical products produced will be available as market demand indicates; and over time, the availability of these products may see the development of ventures producing oil chemicals, pipe, plastic consumer products, commercial plastic containers, fibers, films for packaging, treated wood panels for furniture and wall coverings, floor coverings and so forth.

While ALPETCO believes that the local availability of these petrochemicals will result in new venture formations within the State of Alaska, we cannot at this time specify the extent of any such theorized new organization in terms of number of employees, construction requirements, capital tooling, land requirements, supporting service industry, etc.

ALPETCO intends to solicit the support of the various concerned agencies of government within the State of Alaska in the development of an overall plan directed toward defining the types of ventures which would be most desirable.

THE REFINERY COMPLEX
(A Preliminary Technical Proposal)

The preliminary technical proposal presented herein has been constructed under a set of ideas relating to markets, economics, technical "state-of-the-art" and human values in a manner calculated to produce, in end result, a revised set of real-life circumstances in the State of Alaska which both parties might look to with justifiable pride over the long term.

Alaska Petrochemical Company believes the refinery design concept presented herein is particularly flexible and will be successful economically when brought to the operating level.

REFINERY SITING

Refinery Siting - Preferred - In or Near Valdez, Alaska

The selection of a site for this proposed petrochemical refinery in or near Valdez, Alaska will require the cooperation and input of all Federal, State and local agencies. While ALPETCO will endeavor to select and acquire a site which will require the least modification and preparation, the principal concern will be to locate as near as possible to the Valdez pipeline terminus. This location should also be as near as is practicable to potential or existing shipping facilities.

It is our intent to examine and evaluate as possible sites the existing facilities and areas in or near Valdez which were used during the construction of the Trans-Alaska pipeline - some of which we understand may not now be in use. Other as yet unidentified sites at Valdez will also be considered. We would much prefer to use a site which has been prepared, at least partially, because of the economics involved in site preparation. Also such a site would require less disturbance of the surrounding environs than would a wholly new site. An existing site would also be near to the crude oil line which is very desirable.

We are cognizant of many, if not all, of the problems attendant to siting in or near Valdez. The most important and immediate answer, as yet not obtained, is related to what the cost of siting at Valdez will be. The cost of siting is disproportionately important to this project compared to the importance it would hold were the facility being planned for construction in the lower 48 states, in the southern coastal area of Europe, or in any generally warmer climate and more generally industrialized area. If we were directed or otherwise constrained in this case to locate in an area characterized by soil conditions reflective of unstabilized tundra and permafrost, then it is apparent that the cost of site preparation might be so high as to generally make uneconomic the commencement of a project of this kind.

ALPETCO is prepared to immediately, post August 1, 1977, commence detailed site evaluation, selection and purchase negotiations in order that this particular point of overall program requirements be firmly resolved prior to final proposal presentation on October 15, 1977.

Alternative Sites

Sites available or to be chosen as alternative to the preferred site at Valdez are presumed to be distant from that location. The normal site considerations will be complicated in any alternative by the cost of crude oil delivery to the site plus the cost of a duplication of crude tankage (one at Valdez and one at the remote site.) ALPETCO has determined that the following appertain to the general cost requirements of two (2) methods of crude delivery to a site other than Valdez.

Delivery by Pipeline: It is not possible at present to estimate the costs of construction of a crude oil pipeline from Valdez to any other site. The route such a pipeline might take would need to be studied for feasibility and costs. Experience gained by Alyeska in construction of the 800 mile Trans-Alaska pipeline suggests that the costs of a 12 to 18 inch crude oil transmission line from Valdez to a remote site would represent an additional cost that could not be supported by the petrochemical complex proposed herein.

Delivery by Ocean-Going Tanker or Barge Tows: It is estimated for example that the cost of delivery from Valdez to a Kenai Peninsula site by tanker or barge would approach $20,000,000 on an annualized basis. This overall cost estimate was derived from a cost of $0.37 per barrel exclusive of extra tankage costs of $26,000,000.

Any other coastal site remote from Valdez would have the same additional cost ingredients although varying in absolute dollar import.

The following section is applicable to several siting requirement insights generally applicable to all prospective locations.

Considerations in Selection of Any Site

(1) Location near to the crude oil supply will permit:

- (a) Reduction of tankage required to maintain continuous operation.
- (b) Shorter crude oil pipelines to the refinery.

(2) Location near the Valdez Harbor will:

- (a) Simplify and shorten the product pipelines.
- (b) Reduce solid products handling difficulties.

(3) Services presently available which will be evaluated will include:

- (a) Access roads. These roads must be suitable for transporting heavy loads from the staging area to the refinery site.
- (b) Temporary facilities for construction which will include a large staging area.
- (c) Permanent facilities such as housing, water, roads, waste disposal.
- (d) Docking facilities which could be used to receive construction material.
- (e) The availability, if any, of electrical power which would be used initially until the refinery could generate its own supply.

(4) Manpower consideration will include:

- (a) Construction workers - supply.
- (b) Permanent personnel - availability of indigenous work force.

(c) Training and educational institutions in the state which can be utilized as now structured or augmented.

(5) Local condition evaluations will include:

(a) Present air quality and climatic conditions.

(b) Flora, fauna and terrain in the vicinity of the site. These will be studied so that the best system technologically available will be used to minimize any adverse effects.

(c) Factors that will control the methods of disposal for liquid, solid and gaseous streams. Such wastes will be minimized and thoroughly treated consistent with all regulations and available technology.

(d) Definitions of systems to control noise.

(6) Construction problems which will be anticipated and resolved include:

(a) Soil conditions and mechanics.

(b) Weather - temperature, precipitation.

(c) Access roads and transportation for heavy equipment.

(7) Operations analyses will encompass:

(a) Disposal of solid and liquid waste.

(b) Air quality, emissions' control and waste heat containment.

(c) Distance from inhabited areas.

(d) Climate.

(e) Service facilities available and necessary.

Offsite

(1) Medical facilities will include the following:

(a) A clinic will be provided and staffed by trained medical personnel. The clinic will give physical examinations, treat minor illnesses and injuries. It will have sufficient equipment to diagnose major illnesses and injuries and arrange for further medical treatment in more serious cases.

(b) This clinic could also provide some service to families of workers and be part of the area medical facilities.

(c) Operating personnel at the refinery will be given advanced courses so that people skilled in first aid procedures will be at the refinery at all times.

(2) Fire Fighting will encompass:

(a) The refinery facilities will have an installed fire water system with hose reels, hydrants, monitors, reservoir and fire pumps. This will incorporate the latest equipment for fire fighting and protection of personnel. Also, there will be portable equipment provided.

(b) The layout of the refinery and tank farm will incorporate sufficient spacing between equipment in order to minimize and control the situation should a fire occur.

(c) Personnel will be trained in fire fighting and rescues.

(d) Any housing, temporary or permanent, will be designed and equipped to reduce fire hazard. A hydrant system will be provided and the trained personnel from the refinery will be available for fire fighting.

(3) Drinking Water and Sanitary Facilities

It is assumed that provisions will have to be made to provide potable water and waste disposal for refinery personnel and their families during construction and operation. This can consist of adding to existing facilities or by a complete new system. This determination cannot be made until site selection is completed.

(4) Steam and Power

The refinery will use 10-15% of its input as fuel to produce refined products.

PRODUCTS

The petrochemical complex as presently planned will have a great deal of flexibility with respect to the products which can be manufactured. It is planned to manufacture, as required, up to 30,000 barrels a day of fuels. This amount represents an increase of some 50% of the present Alaskan requirement. The fuels will be manufactured only as the demand arises. It is not the intent of ALPETCO to manufacture fuels in competition with the existing refineries in Alaska.

It is planned to make approximately five grades of gasoline, up to three gasolines which are suitable for automobiles, snowmobiles, mobile homes, trucks, etc. These three would be a premium grade, no-lead grade and a regular grade. It is also planned to make at least two aviation gasolines which could be expanded to additional grades should the demand warrant such manufacture. It is also planned to make as many jet aircraft fuels as are required, such as JP-4 and Jet-A. The various turbine fuels will be made available as required.

In addition to these products, the complex will manufacture arctic diesel and other low pour point stove oils and home heating fuels, consistent with demand and weather conditions.

The complex is presently planned to make an array of aromatic chemicals; namely, benzene, toluene, xylenes and other heavier aromatics as the demands and economics would allow. The plant will also make varying amounts of ethylene, ethylene glycol, polyethylene, and polypropylene. The complex will also have the flexibility of making an array of products from the foregoing petrochemicals as demands require. These could include such things as ethylene dichloride, butadiene, styrene, polybutylenes and many, many others which could be made because of the flexibility of the plant design.

In addition to the foregoing, the complex will generate electricity, manufacture steam, and manufacture a gas very similar to natural gas. These products could be made available to other industries or the citizens of the area in which the plant would be located.

PRODUCT QUALITY

The gasolines manufactured from the complex will meet all ASTM (American Society for Testing and Materials) standards and other applicable Federal standards. The octane numbers will range from about 90 to 100. Tetraethyl lead levels, Reid vapor pressures, etc., will all meet the foregoing standards and will be specifically blended for the locations in Alaska in which these fuels would be marketed. The quality of the gasolines would be changed consistent with the varying weather conditions which would be experienced in the locale in which the gasolines would actually be marketed.

The jet fuels will meet all the ASTM standards, aircraft companies' specifications and commercial airline companies' specifications. The State of Alaska would benefit from having these jet fuels especially blended to fit the climatic conditions. In addition, if regulations permit, the refinery could make available a bonded turbine fuel system which would benefit airlines flying to foreign destinations.

The diesel fuels and home heating oils will meet all specifications required. The home heating oils would be manufactured to pour-point specifications which would preclude these fuels from solidifying in extreme weather conditions; these fuels will have heating values consistent with quality fuels. Also, these diesel fuels and home heating oils would contain only trace quantities, if any, of malodorous sulfur compounds and other impurities. These fuels can be of this high quality due to the treating facilities which are planned for the complex.

The aromatic streams, benzene and toluene, will be of a nitration grade quality. The xylene stream, if the economics warrant, will be separated into orthoxylene, metaxylene and paraxylene which are the basic building blocks for many chemicals. It is likely that the aromatics heavier than xylene may also be separated and utilized as economics warrant.

Initially the plant is planned to make large amounts of extremely pure ethylene as an intermediate only. This ethylene will be used to manufacture polyethylene which will be either high or low density depending upon market conditions. A portion of the ethylene will be converted to ethylene oxide which will be hydrated and converted to ethylene glycol. Ethylene glycol is the prime base for antifreeze, cooling system fluids, etc. Since ethylene glycol requires only an antioxidant-anticorrosion agent additive to convert it to commercial antifreeze, an attractive business could be based on this conversion and the addition of a proper packaging facility. Subsequent demands may allow usage of ethylene to manufacture ethylene dichloride which is one of the largest intermediate basics for the chemical industry.

Also, as the market place will allow, polymer grade propylene will be manufactured. Between the polyethylene and polypropylene products many applications and uses could be established. These include plastic containers and many types of clear films which have multiple applications. These plastics can also be utilized to manufacture wall panels, luggage and furniture to mention but a small portion of the potential.

The electricity which will be manufactured will be of sufficient voltage to allow efficient transmission if warranted. The steam that will be manufactured could be distributed over areas adjacent to the complex. The gas stream which will be manufactured will probably have a heating value no lower than 900 BTUs per cubic foot. Within the flexibility of the complex, this heating value and quantity of gas could be adjusted as local requirements would dictate. It should be emphasized, however, that the complex would not, within its flexibility, adjust its production out-turn and quality to supply potential industrial users of gas but would prefer to supply the demands of the private sector only in the immediate vicinity of the refinery site. It is not planned that the refinery complex enter into the gas distribution business except as a service to the community if the authorities request such a service.

PROCESS DESCRIPTION

The Alaska Petrochemical Company plant will be directed toward the production of aromatic chemicals, benzene, toluene, and mixed xylenes, and to the production of merchantable end products from the light olefins, ethylene, and propylene. A small amount of motor, turbine, and diesel fuel will be produced for local markets.

To accomplish this, the incoming crude oil will be desalted and fractionated into various straight-run cuts. Those from which aromatics can be produced will preferentially be sent to a straight-run aromatics unit. Those of proper boiling range for feeding to the olefins unit will go directly there. Those oils too heavy for the type of olefins plant to be used, will go to hydrocracking facilities where they will be broken into lighter components. Those hydrocracker product streams capable of producing aromatics will be sent to the straight-run aromatics unit. The others will be fed to the olefins unit.

Products from the olefins unit will be converted into polyethylene, polypropylene, and ethylene glycol in appropriate process units. A side product from the olefins unit will have a high concentration of aromatics, so it will be sent to a hydrotreating unit for cleanup, then to a second aromatics unit.

Various supportive units are incorporated within the plant. Among these are hydrogen manufacture for the various hydrotreating and hydrocracking units, and gas treating and sulfur recovery for pollution control.

Attached under the Exhibits-Technical section is a block flow diagram showing the main features of this Preliminary Processing Plan. Each unit is more fully described below.

Crude Oil Desalting

Crude oil as received at the refinery contains salt and other undesirable water-soluble materials which come from the underground producing formations. These must be removed prior to processing the oil in order to avoid plugging and scaling of the downstream process units. Within the desalting unit, the oil is heated and washed with water. Any emulsions formed are resolved by chemical and electrostatic means.

Crude Oil Distillation

Desalted crude oil is partially vaporized by heating and is passed into a fractionation column operating at essentially atmospheric pressure. This separates the crude oil into its various constituents. Light components of the crude oil pass out the top of the tower, and various heavier streams are withdrawn from the side of the tower. The heaviest material leaves the bottom of the atmospheric tower as a hot liquid and is further fractionated in another tower operating under vacuum.

The very lightest materials from the crude distillation operation are fed to a light ends unit for further separation. The next heavier component (naphtha) contains hydrocarbons from which aromatic chemicals will be produced. Portions of side streams heavier than naphtha are used in blending finished jet fuels and arctic diesel fuel. The remainder is fed to the hydrocracker.

The very bottoms material from the vacuum unit contains almost all the metals and sulfur contained in the original crude oil, and is cleaned in other process units.

The various constituents from the crude distillation operation are referred to as "straight-run" products, a term which is used elsewhere in this plant description.

Light Ends Unit

This unit receives the lightest materials from the crude distillation, removes any sulfur, and removes the light gases, butane and lighter. A portion of the remaining light straight run liquid will be used as a gasoline blending component, while the remainder is used as a part of the feed for the olefins unit.

Naphtha Desulfurizer

Naphtha from the crude distillation unit contains traces of sulfur and other compounds which would be harmful to the aromatics unit. This stream is desulfurized by heating the stream until it is fully vaporized at high pressure and reacting the vaporized naphtha with hydrogen in the presence of a solid catalyst. This converts sulfur compounds into hydrogen sulfide which is removed by a solvent. The remaining naphtha flows to the aromatics unit.

Straight-Run Aromatics Unit

Aromatics, or aromatic chemicals, refer to the pure compound benzene and its derivatives, toluene and xylenes. Straight-run naphtha contains small amounts of these compounds but also contains other compounds which can be converted into aromatics.

The aromatics unit consists of two steps. First is a chemical reaction which converts certain hydrocarbons into aromatics. The second step is a solvent extraction and distillation operation which removes the aromatics as pure compounds, leaving behind the non-aromatics. Although not shown on the Processing Plan, the non-aromatics are added to the feed for the olefins unit.

Bottoms Desulfurizing and Solvent Separation

The bottoms liquid from the vacuum distillation unit is treated with hydrogen and a catalyst in a manner similar to that described above for naphtha desulfurizing. This removes most of the sulfur and metals contained in the oil.

The oil is then extracted with a special solvent, which separates it into a light oil to be fed to the hydrocracker and a heavy oil to be used as low-sulfur refinery fuel.

Hydrocracker

Many of the various oil streams within the plant are too heavy to be desirable feeds to the olefins unit. These are gathered and fed to the hydrocracker unit where they are reacted with hydrogen at high temperature and high pressure in the presence of a catalyst. This causes the heavy hydrocarbons to break down into lighter materials. A portion of these lighter materials is capable of being converted into aromatics, so it is sent to the straight run aromatics unit. The remainder is fed to the olefins unit.

Olefins Unit

This unit is a large and expensive unit, although its operation is quite simple. The feedstock, primarily a blend of light straight-run from the light ends unit and light hydrocrackate, is mixed with steam and heated to very high temperatures in special heaters. Heat and steam cause the hydrocarbons to break down (crack), producing primarily ethylene and propylene. Gas and a small amount of liquid high in aromatics content are also produced.

Cracked Product Aromatic Unit

Aromatics liquid from the ethylene unit will be hydrotreated in a unit similar to the naphtha desulfurizer described earlier. In this case, however, the reaction with hydrogen is not for removing sulfur (which has already been removed), but instead it is for conversion of unsaturated hydrocarbons which, if not removed, would affect the performance of the aromatics separation step.

The hydrotreated liquid is separated into pure aromatic chemicals and non-aromatic products in a process similar to that described for the straight-run streams described above.

Polyethylene, Polypropylene, and Glycol Units

A portion of the ethylene and all of the propylene produced in the olefins unit will be converted to their respective polymer forms in separate process units. The products from these will be pelletized and packaged for shipment in bags or drums or will be shipped in bulk.

That part of the ethylene which is not consumed in the polyethylene unit is fed to an ethylene glycol unit. There it is reacted with oxygen and water to produce liquid glycol.

Various Supportive Units

A process unit is required to furnish hydrogen for the various hydrotreating, desulfurizing, and hydrocracking operations. In this unit, steam is reacted with light hydrocarbons to produce hydrogen and carbon dioxide. After solvent treatment to remove the carbon dioxide, the hydrogen is compressed for use in several places within the process.

At various places within the facility, sulfur compounds have been converted to hydrogen sulfide. This plant will include a solvent system for absorbing the hydrogen sulfide and for concentrating it into one stream for recovery. This hydrogen sulfide will be reacted with air in a sulfur recovery unit to produce water vapor and pure sulfur for sale. The residual gas from the sulfur recovery unit will pass through a tail gas treating unit to remove traces of sulfur so that the final vent gas will be non-polluting.

Also, within this plant will be product blending facilities to produce various grades of gasoline, jet fuel, and diesel oil. These will be compounded by blending portions of select internal streams to the proper product qualities.

ALPETCO, of course, reserves the right to amend this described process,in light of advances in process discovery and as principal end use of products within markets is identified.

PLANT LAYOUT

The preliminary plant layout or plot plan attached hereto under the Exhibits-Technical section has been presented in a generalized modular manner because ALPETCO was unable at this time to present the configuration of a specific and available site.

The final plant layout and plot plan may be significantly different; e.g., the final site may be a strip of land not wide enough to accommodate the efficient grouping of tankage and main processing facilities as shown in our current layout.

POLLUTION CONTROL REQUIREMENTS

It is ALPETCO's intent to control air, water, noise, and thermal pollution by using the latest technology available to meet all federal, state and local regulations. The following are ALPETCO's approaches to these areas.

Air Quality Control

A. Sulfur Control

Various hydrocarbon streams containing compounds of sulfur will be hydrotreated to convert the sulfur to gaseous hydrogen sulfide which will be absorbed at several refinery locations and regenerated at a central point to produce a concentrated hydrogen sulfide stream.

Hydrogen sulfide will be converted to elemental sulfur in a Claus sulfur recovery unit (SRU). The SRU tail gas will be treated to reduce sulfur emission to the atmosphere. Final gas will be incinerated to convert traces of residual sulfur to environmentally acceptable levels of sulfur dioxide.

B. Hydrocarbon Emissions

Evaporation loss from tankage will be controlled by inert gas blanketing. Breather dome tanks will be used if product conditions require them. The tank farm will be diked to contain any spills.

For emergency control of overpressure in equipment, relief valves will open to allow hydrocarbons to flow into a safety relief flare system from which they will be burned to harmless carbon dioxide. The flare facility will be located remote enough from operating units to provide safety for operating personnel as well as equipment. Vapors will be freed of liquid droplets before entering the flare stack, and smoke will be prevented by injection of steam into the flame. The flare system will be purged with inert gas to prevent flame flashback.

The latest technology in vapor recovery systems and inert vapor blanketing will be used to prevent losses during tank loading and unloading operations. Spill control will be the same as the present terminal system.

C. Water or Ice Fog

Air cooling will be used as much as possible in order to reduce amount of vapor release. Those cooling towers which must be built will be of latest design to minimize water or ice fog.

D. Particulate Emissions

Particulates from combustion operations will be minimized by burning hydrocarbon fuel. Cyclone separators and fabric filters will be utilized to control dust in the polyethylene and polypropylene facilities.

E. Carbon Monoxide

Carbon monoxide emission will be prevented by utilizing the latest burner firing control technology to prevent incomplete combustion of fuel.

Water Pollution Control

Water pollution control will require three separate systems, one for sanitary waste and separate systems for clean storm water and oil-contaminated water.

A. Sanitary Waste System

The sanitary system will include waste from all personnel washrooms, toilets, showers, wash basins and from company lunchroom facilities. These wastes will be processed in the main plant treatment unit along with the contaminated process waters.

B. Clean Storm Water System

The clean storm water system will include only water drained from non-oily areas such as clean diked areas, building roofs, sidewalks and roadways, and clean yard parking and storage areas. This water will be collected by a storm sewer and discharged to natural run-off.

C. Storm Water and Water from Contaminated Areas

1. Diked Areas

Tank farm areas will be dike-enclosed. Where soil is impervious, storm water will collect and will be drained periodically. If a diked area is not clean, drainage will run to the oily water sewer for treatment.

2. Nondiked Areas

Storm water, boiler blowdown, desalter effluent, water-treating blowdown, and washings or drips from process areas or other areas where spills can be expected will drain directly to an oily water sewer and thence to the main waste treating unit. Any tank water drawoffs will be disposed of in the oily water sewer system through piping.

3. **Waste Water Treating Unit**

The waste water treating unit will be of the latest tertiary treatment type designed specifically for the effluents of this plant. Although there are many options for each of the treatment sequences, they fall into the following general categories:

(a). Primary treatment for the removal of free oil and solids.

(b). Intermediate treatment consisting of acidity/alkalinity adjustment, aeration to reduce immediate oxygen demand, and coagulation and filtration to reduce oil, chemical oxygen demand, and biological oxygen demand.

(c). Secondary treatment via an activated sludge process to remove dissolved organic compounds and ammonia, which maximizes reduction in oxygen demand.

(d). Tertiary treatment to remove suspended solids and threshold odor causing substances. Effluent from this step will meet all guidelines for water effluent quality.

Noise Control

Most noise in a hydrocarbon processing plant stems from furnaces, flares, air coolers, electric motors, control valves, centrifugal compressors, gas turbines, gears and engines. The latest design and technology will be used to control noise emissions from these and other sources to protect the workers and to avoid an impact on areas surrounding the plant.

Thermal Pollution

Waste waters leaving the plant will be of proper temperature to avoid extreme temperature changes within the receiving waters.

TANKS, PUMPS AND PIPING

Tank Farm Layout

The tank farm size and layout shown on the plot plan has been estimated from the projected crude yields, production forecast, sales estimate, crude storage, inventory required and shipping schedule.

Sales tanks may be located at the Valdez Terminal if the refinery is some distance away. Such details are dependent upon final site selection.

The design of the tank farm will be guided by the following:

(1) Ease of expansion.

(2) Safety and insurance requirements.

(3) Ease of access for maintenance.

(4) Type and amount of products produced.

(5) Prevention of contamination of products.

(6) Fire and spill prevention by use of dikes, inert gas blanketing, foam and other firefighting equipment.

(7) Containment or recovery of fumes and vapors.

(8) Climatic conditions.

(9) Earthquake exposure.

Three variables control the design of refinery storage tanks, pumps and miscellaneous items. They are crude yields, the sales estimate and the production forecast. The final refinery configuration will be selected to best satisfy the sales estimate. The production forecast for a year at design capacity and inventory requirements will be determined from the refinery yields and sales estimate.

Tanks

Storage tanks are divided into the following categories of service: run-down, component, sales, feed, multiple service or swing and miscellaneous—or a combination of two or more of these. The bulk of the storage tanks will be fixed-roof tanks with inert gas blanketing. Butane and propane will be stored in high pressure storage tanks.

Run-down Tanks

These are relatively small tanks that receive product from the process units or serve as intermediate charge tanks. They can be used to check the product "on" condition—test specification and then pumped to component tanks. If a stream goes "off" specification, the product may be blended out or rerun.

Component Tanks

These tanks are for storing separate process products such as naphtha reformate and arctic diesel. For distillates (diesel fuel) these tanks may be used as sales tanks as well. It is desirable to have the bulk of the storage in component storage because of the varying composition of finished blends during the various seasons and because of the varying amounts of individual components produced.

Sales Tanks

These tanks are finished product tanks and will be located close to the harbor.

Feed Tanks

These are unit charge tanks. Current estimates call for storage of sixteen (16) days supply of crude or some 2,400,000 barrels.

Tanks of similar service are grouped in rows with allowance for future expansion, pipe ways outside the dikes are kept to a minimum, pumps are located near the tanks they serve, and run-down lines and transfer lines are run through dikes.

Tanks containing flammable liquids are located in diked areas. The volume of the diked area will be equal to the volume of the largest tank in a group plus the volume of the remaining tanks above the height of the dike. Larger tanks are individually diked. The dikes surrounding the tanks are intended to impound oil spills; therefore, piping passing through dikes will be sealed in the dike to contain oil.

Pumps

Nearly all tank farm pumps will be centrifugal except for heavy oil applications in such services as crude unloading, heavy fuel oil, etc., in which latter case the pumps will be gear or reciprocating positive displacement types. To reduce suction lines, pumps will be located inside dikes close to the tanks from which they are pumping. Each sales service will have its own pump. Normally it will not be spared, but means will be provided that by using a simple spool piece another pump can spare it easily. One transfer pump for same components will be used for approximately four component tanks. This pump will be centered in the four tanks. For heavy fuel oil service, at least one pump for every two tanks will be used.

Piping

Piping networks for component storage and transfer will be designed to be dike instrusive (through the dike rather than over) and will be fully coated and protected against destructive climatic forces.

Safety

Tanks will be equipped with the latest design of safety equipment, including pressure/vacuum vents for over-pressure. Permanently installed connections will extend through the dikes for application of fire-fighting foam.

UTILITIES AREA

The refinery complex derived from the process specification set forth herein will require large amounts of electricity, steam, water and fuel in order to carry out the physical and chemical changes necessary.

Steam and Power

The refinery will have a power house for the generation of steam and electricity larger than many public utility installations.

Process requirements are 16 million pounds of high pressure steam per hour. Some of this steam will pass through steam turbines driving electric generators to produce the 150,000 kilowatts of electricity per hour required to operate the facilities. This amount of electricity is equivalent to the requirements of a city of 50,000 people.

The use of topping turbines for generation of electricity is a very efficient method of producing electricity and at the same time supplying the lower pressure steam for process operations.

The total steam generated, if passed through topping turbines, will thus be capable of generating about 700,000 kilowatts per hour. Additional turbines and generators to those planned for satisfying only refinery needs would be required to do this. The excess power could be sold to a public utility system if and when desired by the community.

Water

Fresh water will be required for boiler water makeup, cooling tower makeup, potable water, process water and fire protection. On the order of 10,000 gallons of water per minute will be required, part of which can be recycled. The source of this will be dependent upon site selection. If the site is at the coast, salt water can be used for fire protection and for process cooling.

Equipment and process selection will stress efficient use of water. The water used for cooling will be recycled through cooling towers. Most of the cooling will be done with air cooled units. Reuse and recovery of water will be emphasized.

Facilities will include a large water reservoir which will maintain the necessary reserve for fire protection as well as provide for process water requirements.

Fuel

The boilers and furnace heaters will be fueled with hydrocarbons from the refinery utilizing about 10% of the feed to the refinery. Long-range considerations may require the use of coal in the boilers when an adequate supply is available. Steam generation would consume about 13 million tons of coal per year. If coal source steam generation should become mandatory then substantial revision in current design concept would be required as would modification in capital costs of this facility (such costs would be additive to the current design).

FIRE FIGHTING

It is recognized that a major danger of plant loss and possible accompanying loss of human life stems from an ever present threat of fire.

ALPETCO will provide the most modern fire detection systems and control equipment available. The fire fighting forces will be taken from permanent plant personnel and will be intensively trained so that their response lead time will be the lowest attainable.

Complete backup systems of fire fighting equipment and support personnel will be provided to meet extraordinary needs of the plant and surrounding community in the event of force majeure catastrophe such as might be occasioned by earthquake.

As stated earlier in the refinery siting section, the fire fighting forces and equipment of this plant facility will be available to the surrounding community.

The plant equipment complex will include hose reels, hydrants, monitors, reservoirs and fire pumps in addition to the latest vehicle mounted equipment and protective clothing and other personnel safety devices.

All personnel will be trained in rescue techniques and resuscitation practices.

MEDICAL FACILITIES

ALPETCO recognizes its obligation to employees to furnish medical facilities equal to the task of providing such services as will be more than adequate to meet ordinary day-to-day needs of employee illness and injury and major force majeure illness/injury incidents. ALPETCO also believes that it should make such medical supports available to the surrounding community in emergency situations.

ALPETCO will, as stated earlier in the refinery siting section, build and equip a modern medical clinic which will be staffed by trained medical and paramedical personnel. The clinic will give physical examinations and treat minor illnesses and injuries as a matter of course. The clinic will have sufficient equipment and trained medical personnel to diagnose major illnesses and treat major injuries and will be capable of instituting immediate transfer by air to larger medical institutions throughout the State.

ALPETCO solicits participation in the final planning of this facility from both local community and concerned State agencies.

This facility will, of course, operate on a twenty-four (24) hour a day basis.

OFFSITE IMPROVEMENTS

Area Classification

All plant areas will be reviewed and classified in accordance with best refinery practice as described in API RP-500A "Recommended Practice." Selection of materials and equipment will comply with the classification so established.

Buildings and Support Facilities

ALPETCO will establish a unity of building design which will consider such factors as cost, function, visual impact and the requirements of all applicable codes and authorities having jurisdiction.

The materials and methods utilized in the design of buildings and mechanical systems will conform to current technology and best architectural/engineering practices recognizing the climatic and seismic conditions in the area.

Plant building requirements as listed below should not be construed to indicate individual buildings, since many of the functions may be combined in the final analysis.

A. Office Building

This building will contain the administrative offices required for the daily operation of the plant. Departments and staff personnel to be officed will include: the plant superintendent, assistant superintendents, communications center, computer facility, accounting department, purchasing department, engineering department and plant security.

B. Spare Parts Warehouse

In order to minimize downtime as a result of equipment failure or programmed maintenance, a large inventory of spare parts will be maintained and stored in this building.

Office space for a warehouse supervisor will be provided.

C. Finished Product Warehouse

This building will house the bagging and/or drumming equipment, pallets, and packaged product awaiting shipment. Office space for a warehouse supervisor will be provided.

D. Maintenance Shop

This building will house the machinery required by maintenance personnel to permit in-house equipment repair capability as previously noted. Office space for a shop supervisor will be provided.

E. Change Building

This building will contain showers,toilets and lockers for all operating and maintenance personnel. Separate facilities will be provided for each sex based on estimated ratio of representation.

F. Central Laboratory

This building will contain facilities for product research and testing. Office space for chief chemist will be provided.

G. Process Control Laboratories

These laboratories will be strategically located throughout the plant, convenient to the respective process units.

Normally process control laboratories are located in control buildings.

H. Control Buildings

These buildings will be located adjacent to the process unit to be controlled.

I. Steam Generating Plant

This building will be centrally located within the plant complex and sized to house the boilers and related equipment required to provide steam for heating, process, and electric power generation. Space allocation will be made for future expansion.

J. Process Buildings

Selected process units will be enclosed to provide weather protection and permit year round operation of the plant.

K. Support Facilities

The following support facilities will be included within this plant:

1. Clinic
2. Cafeteria
3. Guard Houses
4. Water Treatment and Waste Disposal
5. Fire Houses

HARBOR LOADING FACILITIES
(IF VALDEZ IS THE SITE)

The refinery finished products will be shipped from the new harbor loading facility at Port Valdez near the recently constructed facilities for the tankering of North Slope crude. This site has been selected in order to be near the Trans-Alaska pipeline marine terminal and to utilize existing harbor development that is required for the Valdez crude terminal.

Two types of ship berths will be required. One will be utilized for loading of dry cargo and the other for loading liquid products. These can be either new berths or existing berths equipped to load the variety of products from this refinery. Capital cost estimates included the provision for two new berths. Final design will depend upon traffic forecast and special requirements by Coast Guard and other agencies governing loading practices. Approximately 30,000 BPD of liquid products will be loaded onto barges to be shipped to local markets.

Existing facilities will be used to treat ballast water discharged by ships entering the harbor. The refinery operations will not increase the total volume of material shipped, so there should be no additional quantity of ballast water.

Additional facilities will be required to clean some of the tankers to prevent contamination of finished products.

Sales tankage with finished products, loading pumps and warehouses may be located at the terminal if the refinery site is remote from the harbor. Liquid products from the refinery will be contained in sales storage tanks at the refinery.

Finished product storage will utilize storage tanks with inert gas blanketing for environmental protection which will prevent the escape of volatile hydrocarbons to the atmosphere.

ENVIRONMENTAL IMPACT – A STATEMENT OF INTENT

Summary

Implicit in Alaska Petrochemical Company's proposal is its aim to honor the intent and letter of all required environmentally-related constraints imposed by legislative act or regulations. Within reasonable economic parameters, the required constraints will be honored based upon sound business practice.

ALPETCO's view is that environmental planning is an important and intrinsic part of overall project planning, which begins with the initiation of the project itself and continues through its development and operation over time.

Approach

ALPETCO intends to minimize the impact on the environment occasioned by the creation of its facilities; and this intent will be translated into active performance beginning with site selection through the acquisition of sufficient acreage to provide reasonable perimeter screening of the plant's activities. Most significantly, being in the position to design and construct a new plant from "scratch" affords environmental planning opportunities unavailable to existing refineries. Respect for environmental considerations will be demonstrated after start-up of the operations of the petrochemical complex by continuously monitoring and controlling all intermediate processing activities to insure desired design levels are achieved. This responsible philosophy will be continued through the design of the final plant effluents.

ALPETCO will, in its initiating set of control design parameters, provide for the use of reliable surveillance instrumentation and controls, supported by properly trained operational and maintenance staffs, which provide the basis for confidence that the planned facilities will successfully control effluent emissions well within projected legal levels.

Backup systems designed to function on a "fail-safe" basis will be installed and will serve to contain any plant emissions which might occur due to primary equipment failure, impounding contaminants on site for subsequent processing and mitigation.

The basic design of the facilities will employ the latest proven environmental technology to meet the legal environmental standards and criteria as imposed by the Environmental Protection Adminstration ("EPA") and the Occupational Safety and Health Administration ("OSHA") and other federal, State of Alaska and local agencies.

Procedures

ALPETCO will have a staff of technically qualified personnel reinforced by consultants with special expertise who will monitor the design, construction and operation phases and will investigate all proven methods of pollution control.

An exhaustive environmental reconnaissance or review will be performed as an initial step in the overall identification and solution of potential problems in the environmental conservation process. Data will be gathered to establish the basic conditions presently existent at proposed sites and an assessment of the concerns of the community and governmental agencies will be made. Using this data base, the ALPETCO Environmental Impact Statement (EIS) will be developed and prepared with the aid of the State agencies. It will be essential that the State be wholly committed to, in good faith, expedite this EIS as a partner rather than an adversary. It is particularly emphasized that State support will be necessary in gaining timely federal level approvals.

The EIS will report the potential intrusive impact on the surrounding ecology and the consequences of control containment to the proposed facilities; adverse effects estimates and alternative solutions and their cost and resultant minimization of environmental impact; thence, the long- and short-term planned effects and use of the environment for the purposes of the facilities, and those areas of desirable future technological activities which would further enhance the conservative management of the environment.

In order to produce the EIS, the proposed processing plant construction and its subsequent operation must and will be viewed with regard to the sociological, hydrological, meteorological and ecological aspects of the region.

It is essential that ALPETCO and the various federal, state and local agencies having jurisdiction over the project act promptly in outlining any questionable areas. Good lines of communication with the permitting agencies will be developed and maintained so that the EIS and the public hearing which will take place during the course of the permitting process will result in full and complete explanations of the program to both the public and the governmental agencies.

Achieving satisfactory resolution of these requirements within a reasonable and practical time period is mandatory if this program for the creation of a petrochemical complex of the scope contemplated by ALPETCO is to be realized. The enthusiastic aid and support of all state and federal agencies in order to expedite the entire permit process is absolutely required in order that financing of the project not be delayed (please refer to letter to ALPETCO from co-investment bankers, Kuhn Loeb & Co., Incorporated and E. F. Hutton & Company, Inc.).

The work progress in environmental reconnaissance and in preparation of the EIS must be well advanced since final engineering design cannot be completed until all the required permits are granted. Commencement of procurement and field construction will also be delayed until permits are obtained.

Normal Effluent Streams

The normal effluent streams for the proposed petrochemical complex will be in three (3) phases: gaseous, liquid and solid. These effluent streams, composed of diverse material emanating from specific facilities of the complex, will be managed so as to meet required environmental constraints. For all such materials in each physical state, three (3) specific evaluations will be undertaken:

(1) Determination of existing environmental concentrations and conditions.

(2) Estimation of emission rates from the petrochemical complex.

(3) Evaluation of effect of plant operation upon existing environmental conditions.

Determination of Existing Concentrations and Conditions

The initial environmental reconnaissance will provide the basis for determination and analysis of existing concentrations of gaseous, liquid and solid materials along with special attention to conditions present in the region of the petrochemical site. This initial determination will be continuously "tracked" and updated as the petrochemical development process proceeds.

Estimation of Emission Rates from the Petrochemical Complex

The estimation of the emission of the gaseous, liquid and solid effluents from the petrochemical complex will be determined from the specifications of the various processes and off site units and the treating facilities to be installed in the plant. This data will be refined and developed so that all effluents will be placed well within the required constraints.

Evaluation of Effect of Plant Operation upon Existing Conditions

The physical placement and presence of the facility in an area which previously was not so used will present new conditions of an intrusive nature to the environment -- their impact will be minimized, but they will exist. In addition, the effluents resulting from plant operations will also require a minimal accommodation from the environment when added to existing conditions. Determining the extent of both such accommodations will be chief among the primary objectives of the EIS report. The intent of ALPETCO is to minimize the effect of such environmental intrusion through maximum attainable containment of emissions and effluents. The idea of zero emissions and effluents must be discarded -- there will be some, though minimal, impact on the environment.

Site Development Factors

Revegetation of areas within and surrounding the site which will be disturbed by the construction of the facilities will be undertaken on a continuing basis. Soil mechanics and sub-surface stabilization requirements and impact will be rigorously studied and resolved.

Air Factors

Particulate matter is not expected to be a major problem area at the plant since any source of particulate matter will be designed to bring such concentrations to within allowable limits.

Gaseous effluent streams when properly mixed and dispersed can lead to lowered concentrations in the surrounding atmosphere. The local meteorological conditions, effluent gas temperatures, the height of stacks and the pollutant concentrations will affect the dispersion characteristics. These factors will be considered in design of any stacks. Detailed meteorological monitoring and measurement of effluent concentration will be conducted continuously.

Process and Cooling Water

The use of process cooling water will be minimized by resorting to air cooling to the maximum attainable extent. Careful control will be required for wintertime conditions. Waste water treatment of an advanced nature along with maximum reuse and/or recycle will also serve to reduce fresh water requirements. If indicated ALPETCO will undertake the development of an independent fresh water supply for the petrochemical complex, which could also serve as back-up supply for water requirements of the local areas' population.

Wildlife Factors

The various insect, bird, fish and animal species native to the site area will be studied for the EIS report purposes. Habits of such fauna will be analyzed and determinations will be made as to whether any problems could occur as a result of the plant's location.

PROJECTED SOCIAL IMPACT

Visible Social Impact

The construction and operation of the world-scale petrochemical complex proposed by the Alaska Petrochemical Company will require the mobilization of about two thousand construction personnel for three (3) to four (4) years. The operation of the completed facility will require about one thousand two hundred permanent employees.

It is clear that the addition of a working force of this magnitude will produce a major impact on the Valdez, Alaska community. ALPETCO will work closely with local, state and federal agencies in order to minimize this impact and to direct the forces innate in such toward a most favorable end result.

Input to the community will be by public hearings conducted by the state and federal agencies involved in issuing permits for the construction and operation of the facility. In addition, under its own sponsorship, ALPETCO will conduct well publicized public information meetings to encourage the participation of the community in its planned development.

ALPETCO will assist the authorities in the development of the additional plans, requirements and specifications for utilities and other facilities that will be required.

The areas that will be impacted are discussed in more detail in the following. These comments can be only general in nature prior to the selection of a site and an inventory made of existing facilities and conditions; however, ALPETCO will assist state and local level authorities in the development of a rigorously planned community.

Electric Power

Power requirements for the construction and the operation of the refinery will be self-generated with backup emergency facilities provided. ALPETCO hereby states its willingness to supply emergency power to the community through a tie-in from the refinery to the local power company. Precise levels of additional power requirements for the housing of permanent employees will be assessed after site selection is made and a determination made as to what assistance will be required from ALPETCO under the tenets of a general community development plan.

Water Supply

It is anticipated that fresh water requirements will be developed and provided by ALPETCO independent of the community's water supply. A reservoir, pumps and treating facilities will supply potable, process and fire water for the facility. In the event of an emergency, the local community could utilize available water from the refinery.

Water use will be kept to a minimum by use of air-cooled condensers and coolers where practical and by the use of closed loop water cooling.

Fire Fighting Force

The petrochemical complex will provide its own fire fighting force drawn from its employees. This force and its mobile equipment will be made available for emergency service to the community to back up the local fire fighting force. The layout of the refinery and the fire fighting facilities installed will be designed so as to minimize fire and explosion hazards.

Medical Facilities

The plant's first-aid facilities will include a fully equipped emergency room staffed full-time by trained medical personnel. These personnel and facilities could be made available to the community on an emergency basis upon request of the civil authorities. ALPETCO will assist any organization established to recruit doctors and other medical personnel.

Access Road

An access road is planned to be constructed from the plant and will be designed to meet local specifications. Road requirements within the plant complex will be provided by the plant to meet operating and maintenance requirements, local codes and insurance and fire underwriting specifications.

Plant and Wildlife Protection

It is recognized that the ecology of the area must be protected insofar as is practical. ALPETCO will cooperate fully with agencies involved in the protection of the environment in order to identify flora and fauna that could be affected. The siting and arrangement of facilities will be designed to minimize effects on the plant and wildlife. The best technological procedures will be used.

Sites and facilities that were used for the Trans-Alaska pipeline construction will be used if available and suitable so that further changes to the ecology will be at a minimum.

Visual Impact

The plant site will be provided with reasonable perimeter screening of the plant's activities to minimize visual impact and mitigate any potential noise impact. Consistent with practical economic factors, the design will use strategic equipment layout, painting and coloring schemes, and arrange plans to provide a pleasing view of the petrochemical complex.

Local Service Support

Local suppliers, construction contractors, distributors and firms offering transport services will be used by the petrochemical facility wherever possible to encourage their growth.

Construction materials will be drawn from native Alaskan sources wherever practical.

Solid Waste Disposal

The petrochemical facility will require the disposal of solid waste in the form of packaging materials, paper and incombustibles. Combustible solid waste will be consumed in the complex's own incinerator designed to meet legal effluent requirements. However, scrap metal and junk will be sold or given away for recycling purposes.

If compacting and landfill are required, the site will be designed and managed to meet all applicable standards.

Industrial Park Factors

The broad scope of the Alaska Petrochemical Company could catalyze the development of a significant packaging industry. Later on, other ventures could be expected to utilize chemical intermediates to manufacture a variety of finished products.

Types of packaging which may take place include an antifreeze canning plant, polyethylene and polypropylene bag plant and a wooden pallet factory for shipping bags of solids and bottled or canned products.

Health and Safety Factors

All effluents for the petrochemical facility will be monitored and will be contained within the complex until properly treated to meet all standards and regulations.

Health and safety of employees in the refinery will be a major consideration in the design and operation of the refinery. Exposure to hazardous materials and noise will be carefully monitored and controlled to meet levels consistent with allowable tolerance levels.

Design of all structures will be predicated upon earthquake requirements and practice using historical magnitudes of Alaska earth and seaquakes as input data.

Storage tankage and processing facilities layout will follow accepted practices and requirements of fire underwriters, property insurance, and state and local agencies having jurisdiction. These practices will serve to minimize danger from all hazards.

Increase in Community Population Due to Plant Location

It is anticipated that a permanent staff of about one thousand two hundred (1,200) people will be required for the petrochemical facility's operations. Possible community increase in population would range between three thousand five hundred (3,500) and four thousand (4,000).

Plant Operations

The refinery will be an around-the-clock operation requiring about four hundred fifty (450) operators for the power plant and petrochemical facilities.

Prior to start-up, a training program for operators will be established for the purpose of developing a large percentage of the operators from local personnel.

Plant Maintenance

The need for working the petrochemical facility in a completely self-contained manner and being able to function reliably dictates that the facility's maintenance staff should be virtually capable of total in-house maintenance. Along with the policy of adequate spare systems adopted during its construction phase, the petrochemical complex must have a maintenance staff capable of minimizing downtime of equipment. It is estimated that about three hundred fifty (350) people will be required for maintenance with all crafts required.

Although the maintenance manpower personnel will be especially trained in their specific skills, they are considered technically as multi- craft personnel.

Major turnaround activities will require reinforcement of labor by an estimated seven hundred fifty (750) additional personnel to perform the required rapid turnaround on a preplanned basis. This will be contract labor.

Maintenance positions will be open to all personnel who complete the required training and safety programs of instruction on the basis of experience and performance.

Plant Operating Supervisory Staff Personnel

The number and type of personnel required for the petrochemical facility for supervisory, technical and staff purposes are estimated to total two hundred (200) people.

The estimates do not include any personnel for the industrial park supportive industries or offshoots, nor any additional community personnel to meet the needs for supportive services because of the impact of the influx of an estimated twelve hundred (1200) full-time personnel.

Summary Statement

ALPETCO will on its own initiative carefully and deliberately evaluate those events within and without its own control boundaries for the purpose of early recognition of both problems and opportunities likely to affect the local, regional and/or state wide social and economic index.

NEW BUSINESS OPPORTUNITIES

The development of new ventures in the private sector of the overall Alaskan economy which might be directly or indirectly attributed to the impetus provided by the creation of the proposed petrochemical refinery complex cannot be specifically identified or sized at this time.

It seems reasonable, however, to believe that this proposed petrochemical manufacturing facility will serve as a magnet attracting new business and related capital over the long term. When theorizing about the possible configuration of such new ventures, the immediate prospects would seem to include a significant bagging, packaging and bottling/canning support group of companies (bagging and packaging of polypropylene pellets, canning or bottling antifreeze, palletizing for marine shipment, etc.). Oil drilling chemicals, pipe, various fibers and films would also be possible products.

ALPETCO is aware of the "need to know" posture of the State of Alaska when considering the various impacts caused by a project of this size, and ALPETCO will work with the State of Alaska through its Department of Commerce and Economic Development and any other departments to help in clarifying such possible future commercial events.

TRAINING OF INDIGENOUS WORK FORCE

Alaska Petrochemical Company recognizes and herein states its deep commitment to furtherance of the idea that training of the individual human beings who are now citizens of the State of Alaska is a fundamental building block of its corporate responsibility to the community in which the Company will reside. It is a trust and so seen by ALPETCO.

It is the intent of ALPETCO to plan for and realize the development of a broad program of training not only for job opportunities in the area of technical operation, the crafts, clerical and supervisory positions in the petrochemical refinery, but for job opportunities in the marine transport area as well.

Alaska Consolidated Shipping, Inc. which is a founding shareholder in ALPETCO will assist in the development of training for ship crews and terminal operation personnel. Arrangements have been made with the Harry Lunberg School at Piney Point, Maryland to train Alaskans for unlicensed crew ship duty at no cost to the applicant. Additional training for ship's officers is currently being arranged.

ALPETCO will survey, in-depth, the existing and proximate educational facilities in order to determine the degree of their current utility toward implementation of this planned activity in job training. ALPETCO will lend all reasonable support to the development of such other facilities as may be needed and will assist in the recruitment of persons with the necessary teaching skills.

ALPETCO considers this aspect of the overall program requirement to be both a responsibility owed to the community and an opportunity to enhance the productivity of its operations.

ECONOMIC ADVANTAGES TO THE STATE OF ALASKA

Alaska Petrochemical Company believes that its proposal to purchase the royalty crude oil owned by the State of Alaska and to thereafter build and operate a 150,000 barrel per day rated capacity petrochemical refinery complex will result in substantial economic benefits to the State of Alaska and to its citizens.

Tax generation to the account of the State will approximate $100,000,000 per year. A more definitive evaluation of tax yield will be presented in our final proposal to be presented on October 15, 1977.

The availability of permanent jobs for residents of Alaska will approach one thousand five hundred in number (one thousand two hundred refinery workers plus three hundred onshore marine-related jobs) and an estimated additional one thousand marine transportation jobs for personnel residing, perhaps, throughout Alaska, will have a stabilizing effect on the State economy.

The prospect of new venture development throughout the State might be catalyzed by the creation of this proposed petrochemical refinery and the availability of its product cannot be predicted in detail at this time; however, ALPETCO believes that these prospective new ventures might easily become as significant as the refinery itself as to economic stabilizing effect and tax yields to the State.

ESTIMATED CAPITAL COST OF FACILITY

Alaska Petrochemical Company has diligently analyzed the probable capital cost of the petrochemical refinery complex proposed herein in a manner calculated to provide a reasonable and reliable basis for evaluating the economic feasibility of this program.

Our best estimate of total capital cost of facility under the principal design and product parameters set forth herein indicates an aggregate dollar amount of $1,502,960,000.

ALPETCO has worked very closely with its engineering management firm, Ford, Bacon & Davis, Incorporated (hereinafter referred to as FBD), in the accumulation and evaluation of these prospective costs and is satisfied that the assumptions made and conclusions drawn are reasonably accurate at this preliminary design stage.

ALPETCO and FBD were confronted with the fact that only one comparable grass roots refinery development has been completed in the U.S.A. over the past ten years and that no such program has ever been completed or seriously contemplated in Alaska, with its attendant cost problems.

Overall the capital costs anticipated for this Valdez, Alaska located petrochemical refinery are approximately one hundred twenty five percent (125%) of those which would be entailed in a like facility on the Gulf Coast, U.S.A.

Other assumptions made included reduced yields in labor productivity, premium time cost (another productivity diminishment) and an extraordinary spares provision made necessary because of Alaska's present lack of supporting metal fabrication and conversion industry.

Cost estimates were based on refinery site location at Valdez. Should another site be chosen then cost estimates would have to be reviewed and tested accordingly.

ALPETCO feels that its work in the development of precise cost parameters for this program represents a proprietary work product achieved at substantial cost to itself and hereby respectfully requests that the confidentiality of the detailed cost sheets attached be reasonably maintained.

ESTIMATED CAPITAL COST SUMMARY

	Millions of Dollars
PROCESSING PLANT	
Crude Oil Desalting	
150,000 Barrels per Day Feed	$ 1.15
Crude Oil Distillation	
150,000 Barrels per Day Feed	24.15
Light Ends Unit	
2,100 Barrels per Day Product	5.17
Naphtha Desulfurizer	
14,300 Barrels per Day Feed	4.14
Straight-Run Aromatics Unit (Step 1 - Reformer)	
66,900 Barrels per Day Feed	47.15
Straight-Run Aromatics Unit(Step 2 - Extraction)	
61,600 Barrels per Day Feed	51.75
Bottoms Desulfurizer	
31,000 Barrels per Day Feed	39.10
Solvent Separation Unit	
31,000 Barrels per Day Feed	12.65
Hydrocracker	
87,300 Barrels per Day Fresh Feed	120.75
Olefins Unit	
1,800 Million Pounds per Year Ethylene	117.30
Aromatic Concentrate Hydrotreater	
23,000 Barrels per Day Feed	9.89
Aromatic Concentrate Separation Unit	
23,000 Barrels per Day Feed	28.75
Polyethylene Unit	
1,000 Million Pounds per Year Product	115.00
Polypropylene Unit	
2,360 Million Pounds per Year Product	184.00
Glycol Unit	
138 Million Gallons per Year Product	138.00
Hydrogen Unit	
300 Million Cubic Feet per Day Product	57.50
Hydrogen Sulfide Absorbing System	
203 Long Tons per Day Hydrogen Sulfide Absorbed	8.28
Sour Water Stripping Unit	
200 Gallons per Minute Feed	1.26
Sulfur Recovery Unit	
190 Long Tons per Day Product	5.75
Tail Gas Treating Unit	
22 Million Cubic Feet per Day Gas	5.17
Total Processing Plant	$ 976.91

	Million of Dollars	
PLANT UTILITIES		
Water Supply, Treating and Storage		
10,000 Gallons per Minute Treated	$ 10.00	
Steam, Power Generation Power Distribution		
16 Million Pounds per Hour Steam		
150 Megawatts Electric Power	238.50	
Cooling Water System		
100,000 Gallons per Minute Circulation	2.78	
Fire System	2.80	
Waste Treatment	6.75	
Total Plant Utilities		260.83
TANK FARM		
Tankage		
10 Million Barrels Total Capacity	150.00	
Transfer, Blending, Slop System	1.00	
Total Tank Farm		151.00
CRUDE OIL SUPPLY LINES		2.64
PRODUCT SHIPPING		
Harbor Loading	22.00	
Product Lines	2.64	
Spill Control	0.30	
Total Product Shipping		24.94
IN-PLANT BUILDINGS		
Administrative		
24,000 Square Feet	1.00	
Stores Warehousing		
65,000 Square Feet	3.90	
Product Warehousing		
10.22 Million Cubic Feet Capacity	20.44	
Shops		
30,000 Square Feet	1.80	
Laboratory and Medical Clinic	2.00	
Total In-Plant Buildings		$ 29.14

	Millions of Dollars
SITEWORK	
Clearing, Grading, Fencing, Guardhouse, Access Roads, Area Lighting, etc.	$ 10.00
TEMPORARY CONSTRUCTION FACILITIES	
Including Housing, Power, Water, Sanitary, Fuel Storage, etc.	25.00
PERMANENT HOUSING	10.00
MUNICIPAL FACILITIES	5.00
ALL-RISK INSURANCE	1.00
LAND	5.00
SPARE PARTS	1.50
GRAND TOTAL CAPITAL INVESTMENT	$1,502.96

PROGRAM FINANCING

The petrochemical refinery development program addressed in this proposal is of great size as to financial requirements. Initial cost of the facility is currently estimated to be $1.5 billion, and it is further estimated that operating capital requirements will require an additional $400 million.

Rather than ask the State of Alaska to use such a large amount of its credit for this project, ALPETCO plans to procure its total debt and equity capital requirements through the sale of securities to be managed by ALPETCO's co-investment bankers. (See co-investment bankers' letter.)

PRELIMINARY CONSTRUCTION SCHEDULE

It is recognized that a project of this magnitude will require careful planning and that all aspects of all tasks must be completely determinable in theory and fact. In order to do this final level of planning, a site must be selected, environmental standards must be defined, and a timetable on approval of permits determined and adhered to. With this information available, the scheduling of support facilities, equipment deliveries and manpower can be done realistically. Since such detailed information is not available now, this must be considered a preliminary schedule.

Schedule

The attached bar chart schedule is based on the following assumptions:

(1) Approvals will be expedited by all agencies involved and final approvals will be obtained prior to December 1978.

(2) Progress on approvals will be favorable enough so that the finalizing of engineering design and specification can be carried out concurrent with the approval process.

(3) The construction work force averaging one thousand five hundred (1,500) and peaking to two thousand (2,000) can be obtained for the time required.

(4) A minimum of temporary facilities will be installed. Permanent facilities that can be used by construction forces will be installed first.

(5) Previously used facilities from the pipeline construction may be available for use on relocation.

Support Facilities

The first phase of construction will require temporary facilities for offices, change houses, warehousing, personnel housing, etc. These facilities, insofar as is possible, will be surplus from the pipeline construction. A preferred site would be one that already had much of such housing installed.

Initially, power for the construction phase would be from either existing sources or from diesel-driven electric generators. One of the early priority items will be to secure and install the standby electric and steam generation facilities for the permanent plant. This equipment will be used during construction and then become part of the final installation. Gas turbines with waste heat boilers for steam generation is one method that will be considered.

Potable water, plant water, fire water and sanitary facilities will be either temporary or supplied from existing sources during the initial construction stages. These services will be another of the early priority items so that permanent facilities can be used as early as possible.

Other permanent facilities that will be installed in the initial phase of construction are:

(1) Access Roads

(2) Warehouse

(3) Shops and Stores

(4) Fences and Gates

(5) Office Building

(6) Change House

(7) Lay Down Areas

(8) Plant Roads as Required

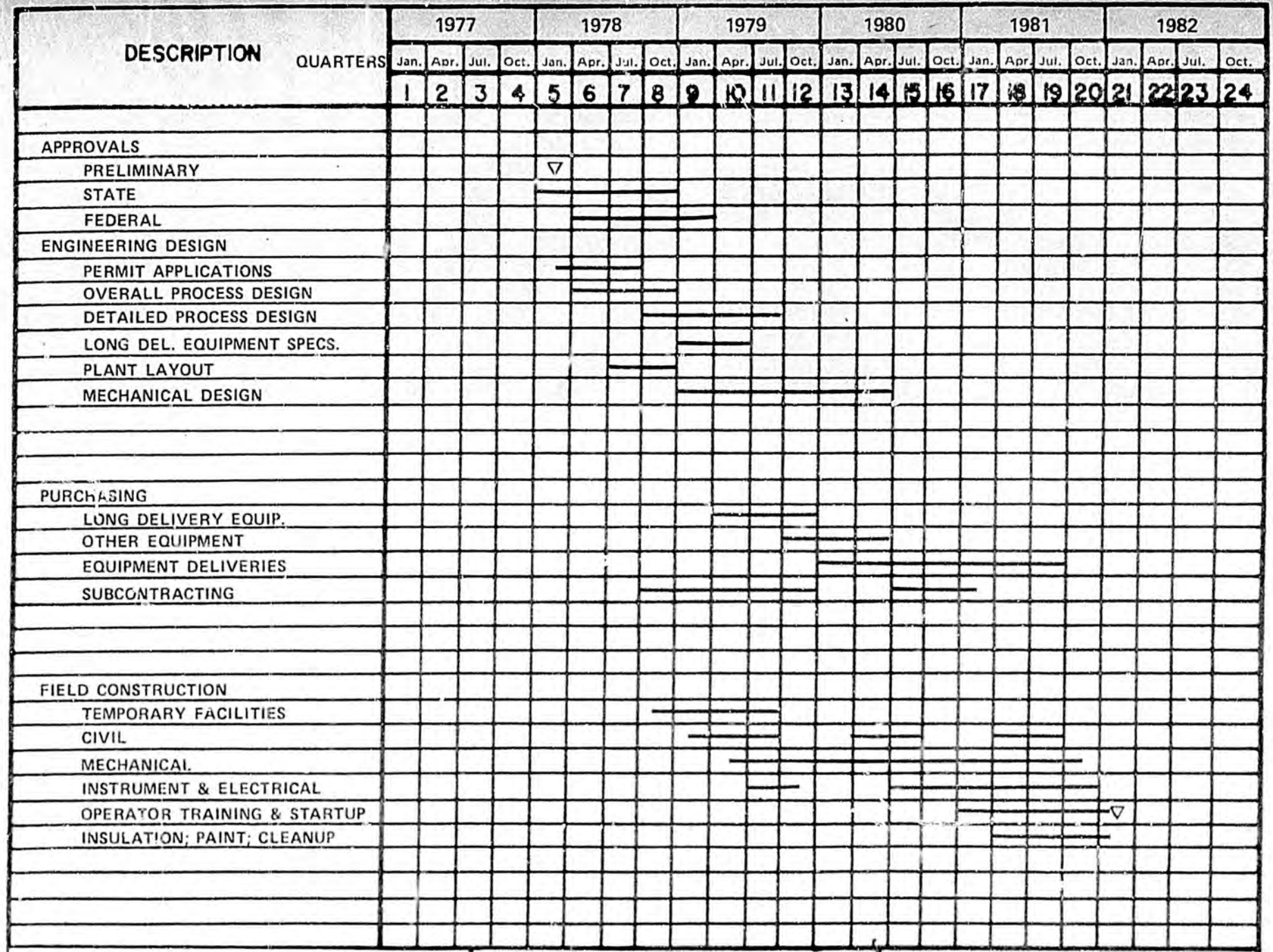
(9) Permanent Housing

It is recognized that an adequate number of skilled craftsmen will be difficult to obtain in this area. In order to lessen the impact on the area, ALPETCO plans to:

(1) Schedule construction under "smoothed" work loads as much as possible so that rapid build-up and layoff of workers will be kept to a minimum.

(2) Provide housing for construction personnel.

The attached Gantt chart schedule is only a preliminary.



PROJECT SCHEDULE

ALASKA PETROCHEMICAL CO.

August 1, 1977

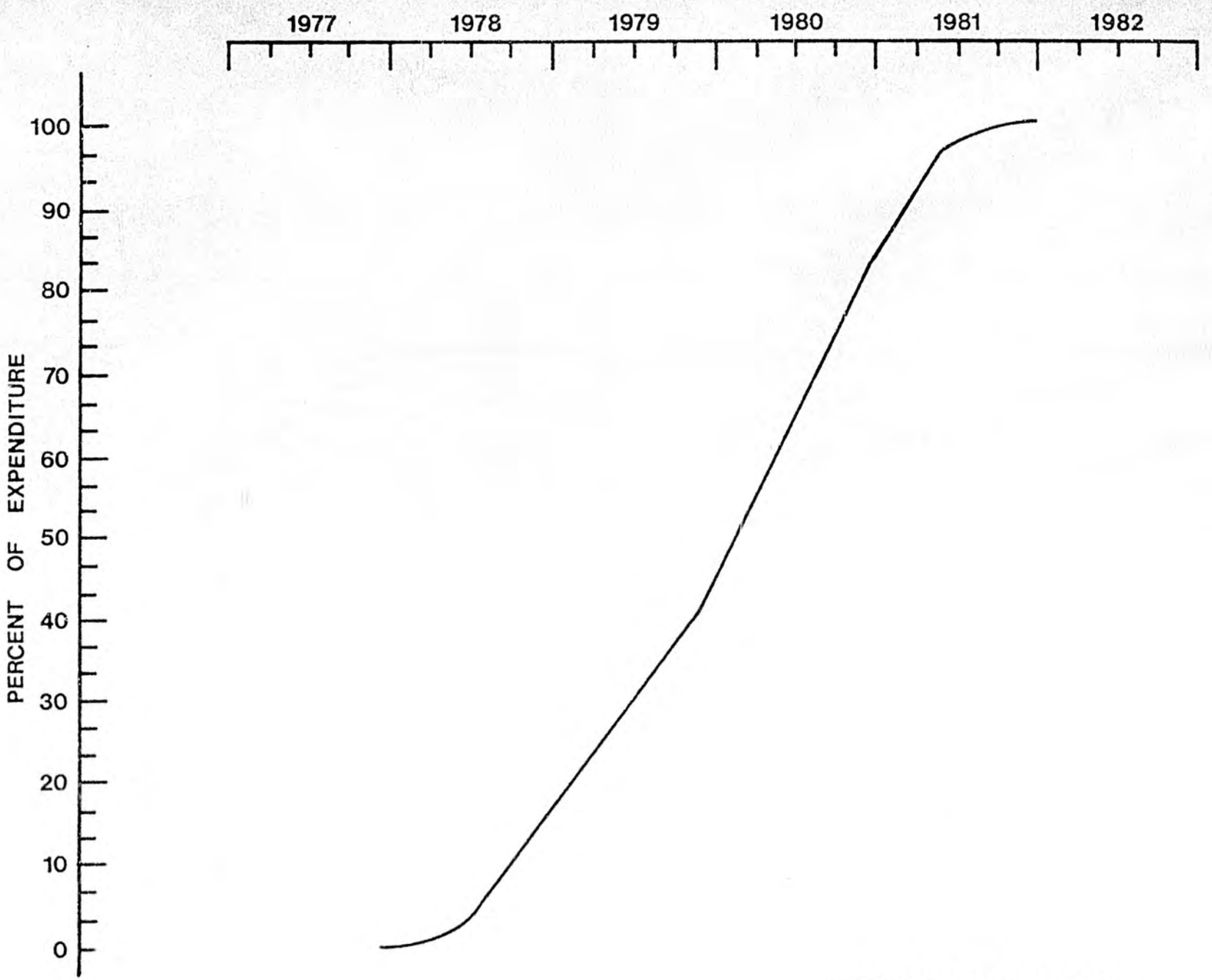
EXPENDITURE CURVE

ALPETCO is particularly concerned with the earliest possible development of precise plans and schedules for completion of engineering design, vendor fabrication of major components and construction erection. These inputs are required before a clear evaluation of an overall expenditure plan can be made.

The attached Expenditure Curve is, therefore, preliminary but is based on industry experience standards.

No attempt has been made at this time to present a manpower employment curve; however, it can be stated that the manpower curve will generally possess a profile common to the Expenditure Curve.

For purposes of capital procurement and utilization of such capital funds, it is believed by ALPETCO that funds availability should lead funds consumption at any point on the Expenditure Curve by a minimum of 50% on a quarterly time frame; e.g., if the Expenditure Curve calls for a 5% consumption of total funds during the first quarter of program activity then immediate fund availability should be planned for at the 7.5% level, etc.



EXPENDITURE SCHEDULE

ALASKA PETROCHEMICAL CO.
August 1, 1977

FINANCING PLAN

Alaska Petrochemical Company has retained the services of Kuhn Loeb & Co. Incorporated and E. F. Hutton & Company Inc., two of the largest and most experienced investment banking firms in the United States, to assist the company in the structuring and procurement of financing for the project herein proposed.

ALPETCO has been advised by its investment bankers that the financing of a project of this scope is feasible through a variety of means. (Please see letter from co-investment bankers.)

KUHN LOEB & CO. INCORPORATED
40 Wall Street
New York, New York 10005

E.F. HUTTON & COMPANY INC.
One Battery Park Plaza
New York, New York 10004

July 21, 1977

Alaska Petrochemical Company
P.O. Box 6554
Houston, Texas 77005

Attention: Mr. John D. Barbour, Sr.
President

Gentlemen:

We have had preliminary discussions with Alaska Petrochemical Company ("Alpetco") regarding the feasibility of financing a high value-added, world-scale, 150,000 barrel per day petrochemical refinery complex (the "Project") at or near Valdez, in the State of Alaska. We understand that, under the proposed terms for the Project, the feedstock for the refinery project will be the State of Alaska's royalty share of the oil produced on the North Slope and Alpetco will own and operate the refinery project and will enter into a firm twenty-five year purchase contract with the State of Alaska to purchase all of Alaska's North Slope royalty oil at prevailing market prices. We further understand that the engineering firm of Ford, Bacon & Davis has been retained as engineering manager for this Project, that Alaska Consolidated Shipping Inc. will be the shipping arm of Alpetco and that responsibility for planning and operating management of the refinery project will be performed by Alaska Interstate Company, Barbour Oil Company and Alaska Consolidated Shipping Inc., the shareholders of Alpetco. Formation of Alpetco by a founder group with active and successful operations ranging from oil exploration, production and crude conversion through ship building and ocean transportation to world markets appears to us to be a sound business plan in that the essential management skills required for the Project's operations are present in the stockholder group.

We understand that a detailed engineering design, construction plan and economic forecast flowing from definitive market data will not be completed and available to us until negotiations have been completed with the State of Alaska and your firm is awarded the subject crude purchase contract; however, based on our conversations with you and having reviewed the materials to be submitted by you to the State of Alaska on August 1, 1977, we are of the preliminary opinion that the Project can be financed, subject, of course, to economic and market conditions existing at the time the financing is undertaken. The assurance of a twenty-five year supply of crude feedstock from a politically stable domestic source such as Alaska will be, we believe, particularly significant in accomplishing such financing.

We believe that it is also essential that this project receive the wholehearted support of the State of Alaska, and that the State of Alaska help in overcoming problems which might extend the financing period beyond a reasonable time limit. It is our experience that such delays can result in unnecessary additional costs which can destroy financing credibility to sophisticated investors as well as cause deferrals on the part of other projects, thereby possibly diminishing the positive and long-term value of the venture to the State of Alaska.

We are most pleased to become associated with you in the development of this important Project which will contribute significantly to the economy of Alaska. In light of our experience in project financing, we feel that we are well qualified to act in your behalf in this instance. Attached is descriptive material relating to our respective firms.

We look forward to the work program ahead of us.

Sincerely yours,

Kuhn Loeb & Co. Incorporated

By: _____
Managing Director

E.F. Hutton & Company Inc.

By: _____
Executive Vice President

/cc
Att.

CONTRACT PROVISIONS – A PRELIMINARY PRESENTATION

Alaska Petrochemical Company (hereinafter referred to as "Buyer") has prepared and hereby presents a preliminary checklist of contract terms and provisions which taken in whole describe some of the points of negotiation between itself and the State of Alaska (hereinafter referred to as "Seller"):

- Representations of Seller as to ownership of royalty crude and its rights to enter into an irrevocable sale of such crude.

- Representations of Buyer as to its ability to purchase said crude and its intent to construct a petrochemical refinery.

Article I – Construction and Operation of a Petrochemical Refinery in the State of Alaska

1.1 Restatement of mutual obligations; agreement to refinery project start date; necessity of securing all third party approvals; reiteration of cooperative posture between the parties – advocacy.

1.2 Certification of program progress by Buyer to Seller.

Article II – Seller's Royalty Oil

2.1 Warranty from Seller as to rights of crude ownership and the effect of third party impairment of such rights.

Article III – Quantity

3.1 Stipulation of minimum quantity to be delivered at 150,000 barrels per day.

3.2 Maximum "short fall" in quantity delivered which could be accepted.

3.3 Seller's obligation to repair "short fall" by assisting Buyer to procure elsewhere.

3.4 Consequences of failure to deliver minimum quantity.

Article IV – Delivery Point

4.1 Seller's point of delivery and Seller's storage arrangement and obligation.

4.2 Buyer's obligation to lift crude during interim remarketing.

4.3 Buyer's obligation to take crude during refinery operation.

Article V – Quality

5.1 Crude assay minimum for royalty crude.

5.2 Price adjustment for crude assay changes.

Article VI – Price

6.1 Prevailing price to other producers in the field; third party price regulation.

6.2 Price escalation and decline parameters.

Article VII – Arbitration

7.1 Terms of arbitration should controversy or claims between the parties arise.

Article VIII – Term

8.1 Date effective.

8.2 Term shall be for twenty-five (25) years.

8.3 Effect of drastic declines in production.

8.4 Failure of Buyer to honor refinery development commitment – right of termination to Seller.

8.5 Failure of Seller to honor advocacy in obtaining permits – right of termination to Buyer.

8.6 Third party induced estoppel – right of termination.

8.7 Failure to realize profitability – right of termination to Buyer.

8.8 Rights of assignability to Buyer.

Article IX – Notices

9.1 Acceptance of U. S. Postal Service as depository of notices.

9.2 Delivery of notices; acceptance.

Article X – Conditions Precedent

10.1 Obligation of Buyer to act with dispatch in overall project start-up post legislative approval of contract

10.2 Necessity for legislative approval.

Article XI – Exhibits and General Terms and Conditions

11.1 Definitions.

11.2 Responsibilities between the parties.

11.3 Measurement of crude quality.

11.4 Billing and payment.

11.5 Rights of audit.

11.6 Title to royalty crude.

11.7 Force majeure events.

11.8 Rules and regulations.

11.9 Successors and assigns.

11.10 Miscellaneous.

11.11 Lease exhibits.

11.12 Buyer performance contracts.

Alaska Petrochemical Company is prepared to commence detailed negotiations and detail drafting of the proposed contract immediately after August 1, 1977 as was stipulated in the request for proposal received from the state of Alaska on or about June 8, 1977.

GOOD FAITH ADVOCACY BETWEEN THE PARTIES

ALPETCO is deeply committed to the successful development of the program set forth in this preliminary proposal. Accompanying this sense of commitment is an awareness of the uniqueness of the opportunity and the breadth of complexity and difficulty in its actual successful completion.

ALPETCO is aware that there are various opinions among citizens of the State of Alaska in all walks of life, including those individuals who hold responsible offices in State government, as to the desirability of permitting the creation in Alaska of an industrial venture such as the petrochemical complex proposed herein.

ALPETCO anticipates that a final resolution of these opinions into a single resolve to accomplish this program will be forthcoming as a result of the negotiations of the contract as stipulated to take place during the period between August 1, 1977 and October 15, 1977.

Such negotiations toward development and presentation of a final proposal on October 15, 1977 will be at "arm's length" as between the parties, and ALPETCO recognizes and accedes to the necessity for the State to exercise its own unrestricted judgment as to selection of the winning bidder.

It is the deep feeling of ALPETCO that this program can be successful only if, after the time of arm's length negotiation of contract terms, the parties then join together as advocates to jointly seek program realization.

A deliberate effort on the part of the State of Alaska to provide its maximum assistance on a good-faith basis to ALPETCO in resolving problems of siting, environmental impact and permitting is felt by ALPETCO to be mandatory, not only in favorably resolving the lead time problems that are normally associated with such efforts at the state level, but in resolving like problems at the federal government level as well.

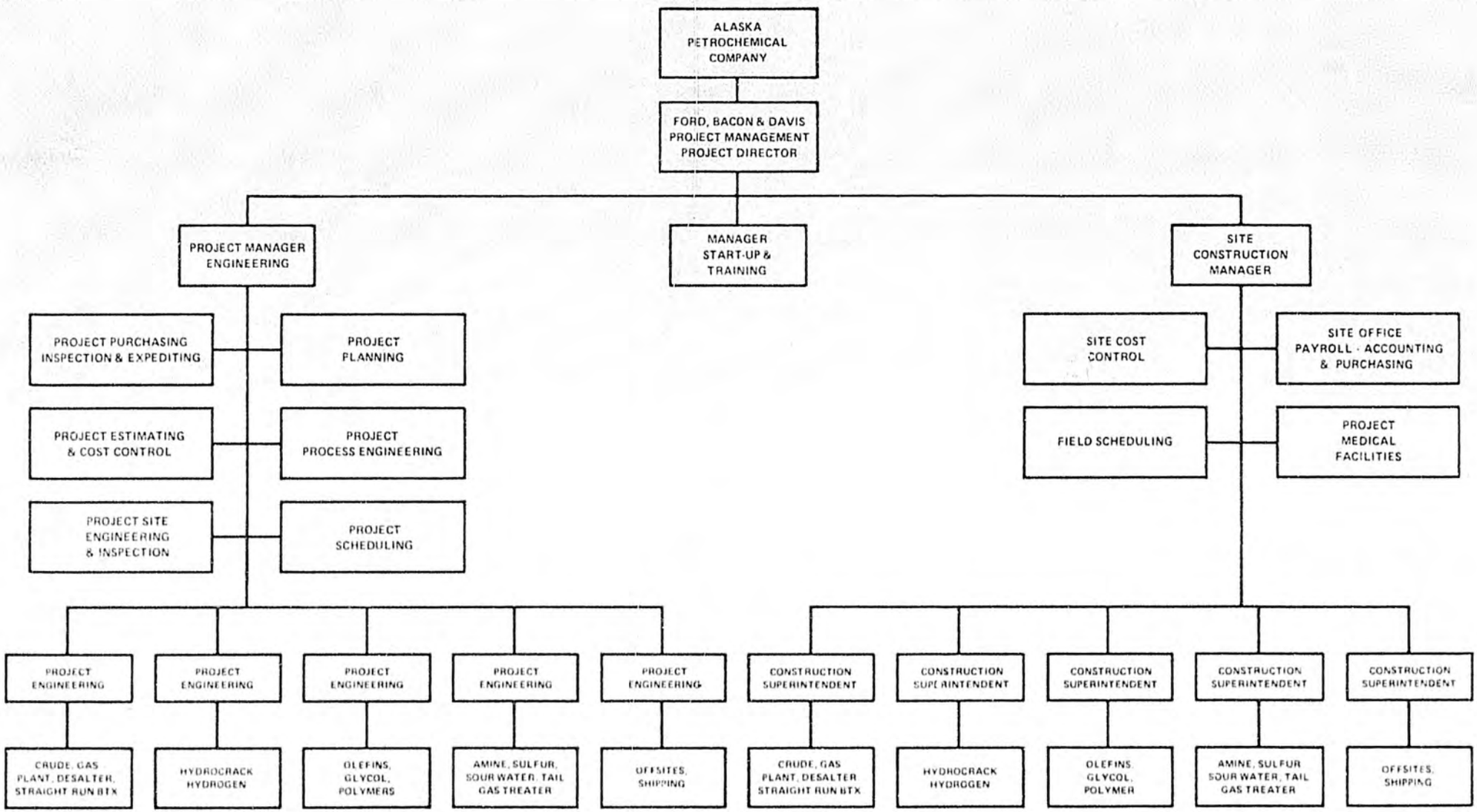
PREVIOUS PROPOSAL – A REVIEW

On June 8, 1977, a Letter Proposal was submitted to the State of Alaska by the predecessor group to Alaska Petrochemical Company, which proposal set forth an elective option to the State of Alaska which would conceptually have had the State of Alaska consider financing and owning the proposed petrochemical refinery complex through the issuance of State of Alaska development bonds; which bonds were theorized as being tax-exempt securities not tied to any State revenue generating capacity.

Since the above date, Alaska Petrochemical Company has been formed and incorporated in the State of Alaska; and while the general purpose and intent to purchase Alaska State royalty crude and thence to create a petrochemical refinery in Alaska remains unchanged, the idea of utilizing the above-referenced development bond concept has been discarded as being too difficult of attainment and, therefore, impractical of use to either party.

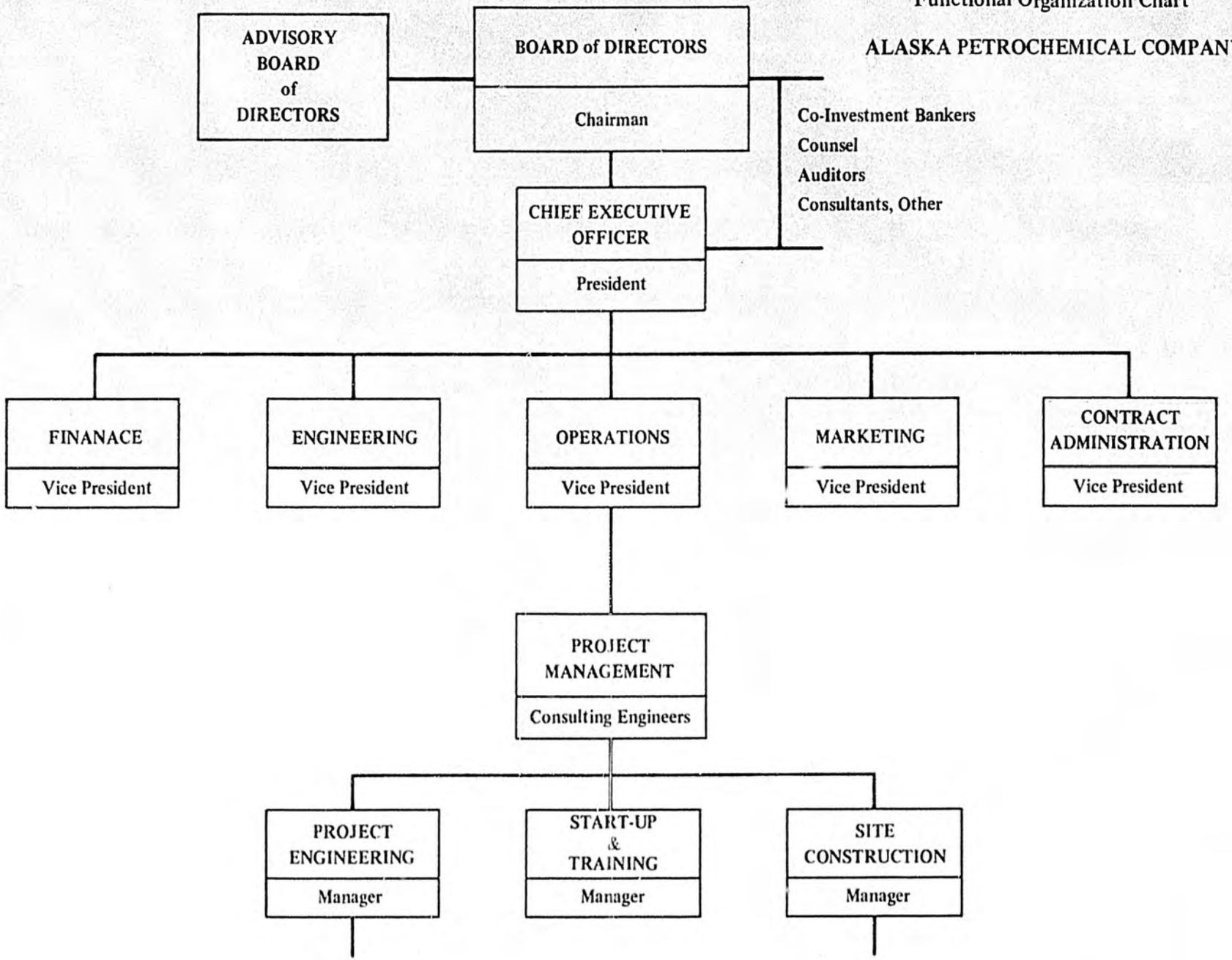
Alaska Petrochemical Company is most appreciative of the assistance received from the Commissioner of the Department of Natural Resources, Dr. Robert LeResche; and from the Executive Director of the Alaska Royalty Oil & Gas Development Advisory Board, Mr. Don Wold. Their advice and assistance has been instrumental in clarifying many of the problems encountered.

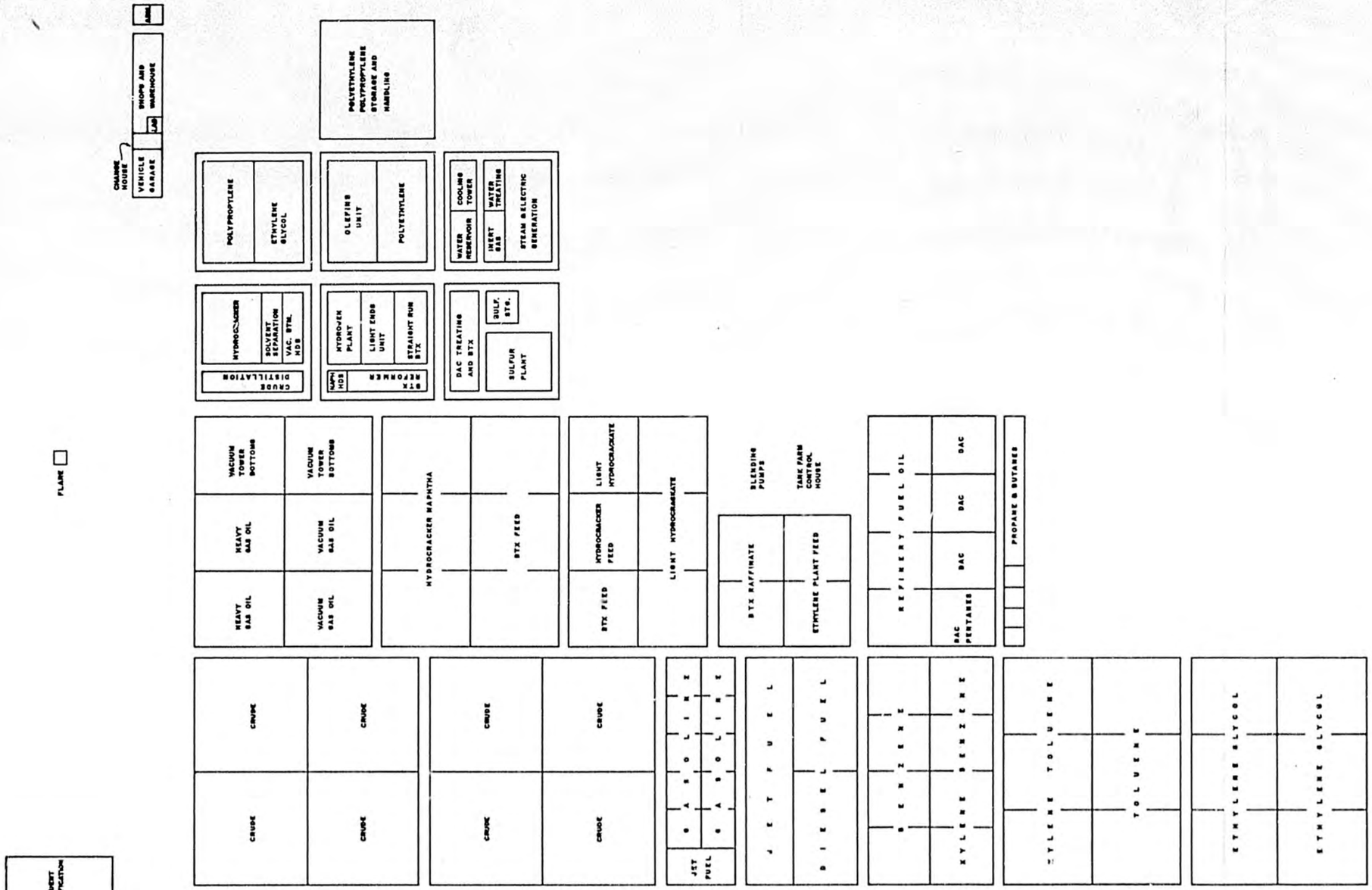
PROJECT ORGANIZATION CHART



Functional Organization Chart

ALASKA PETROCHEMICAL COMPANY

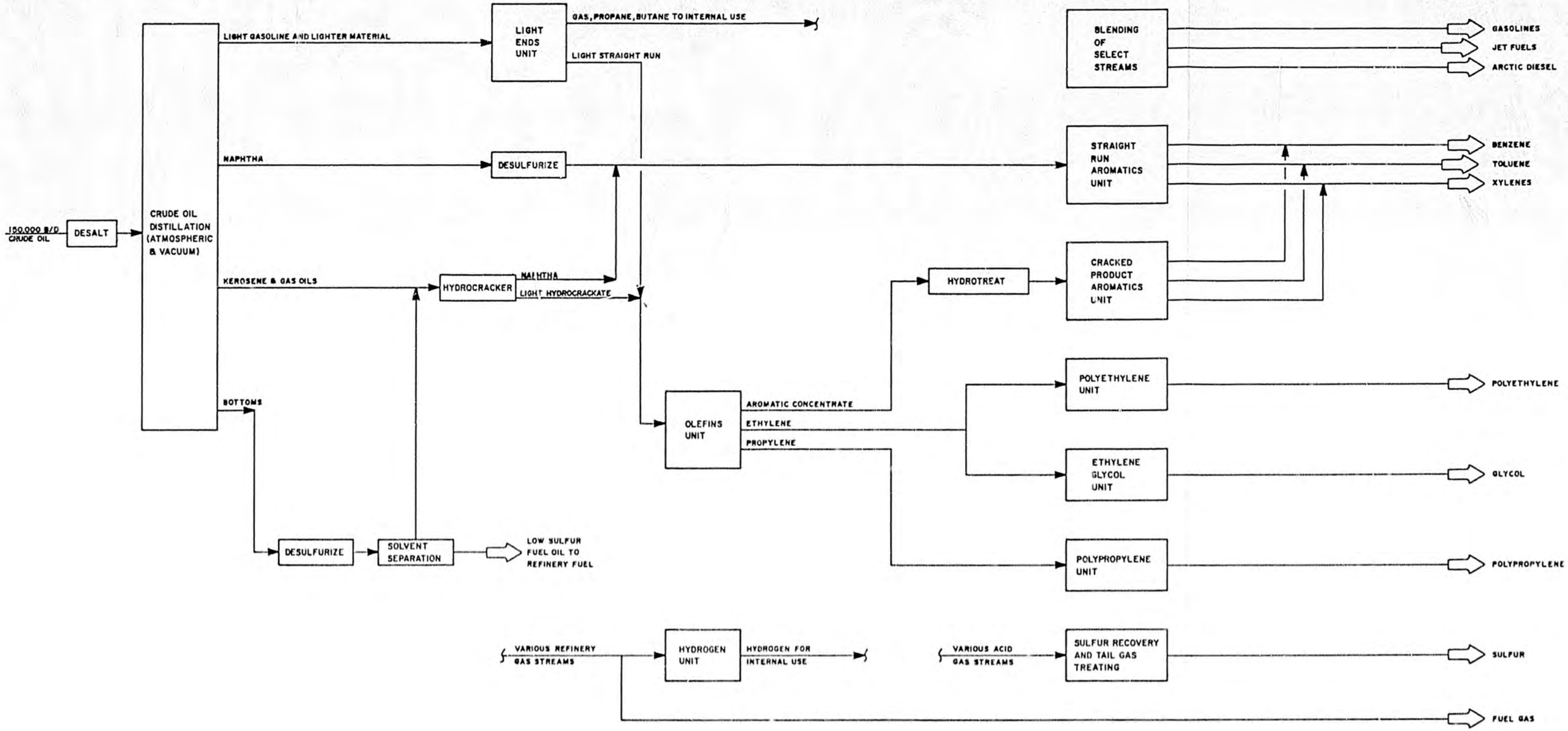




ALASKA PETROCHEMICAL COMPANY

PRELIMINARY PLANT LAYOUT

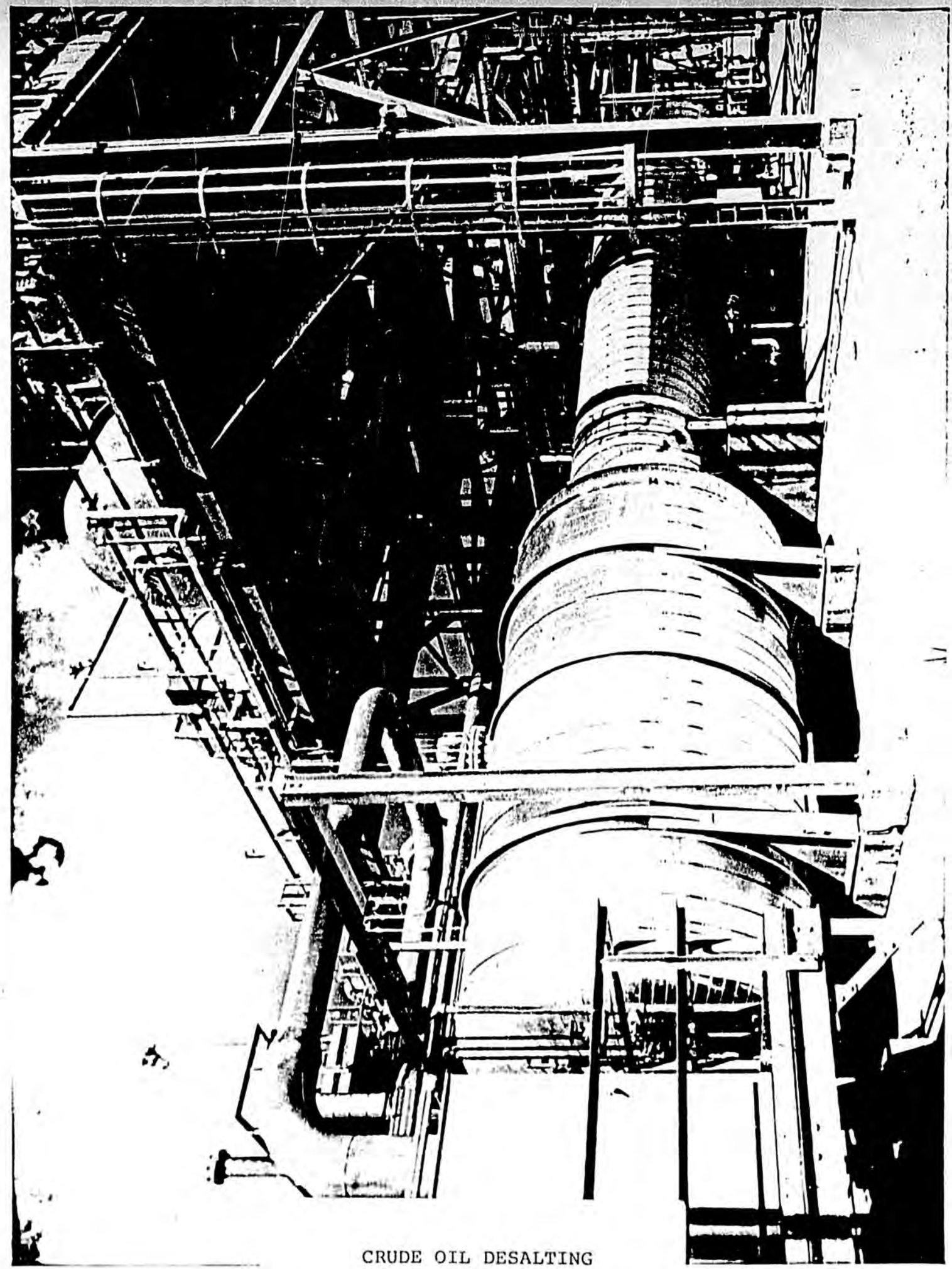
AUGUST 1, 1977



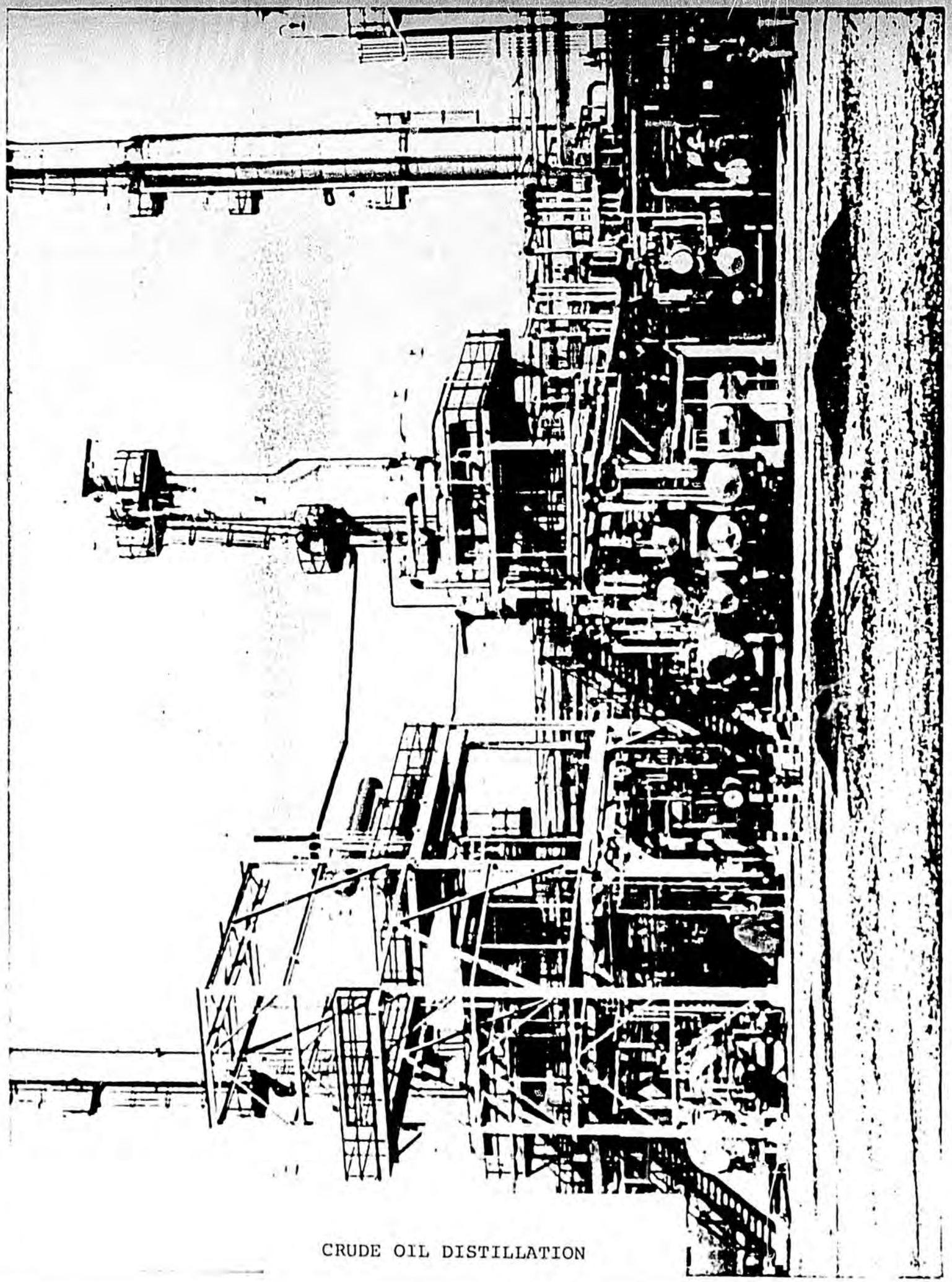
ALASKA PETROCHEMICAL COMPANY

PRELIMINARY PROCESSING PLAN

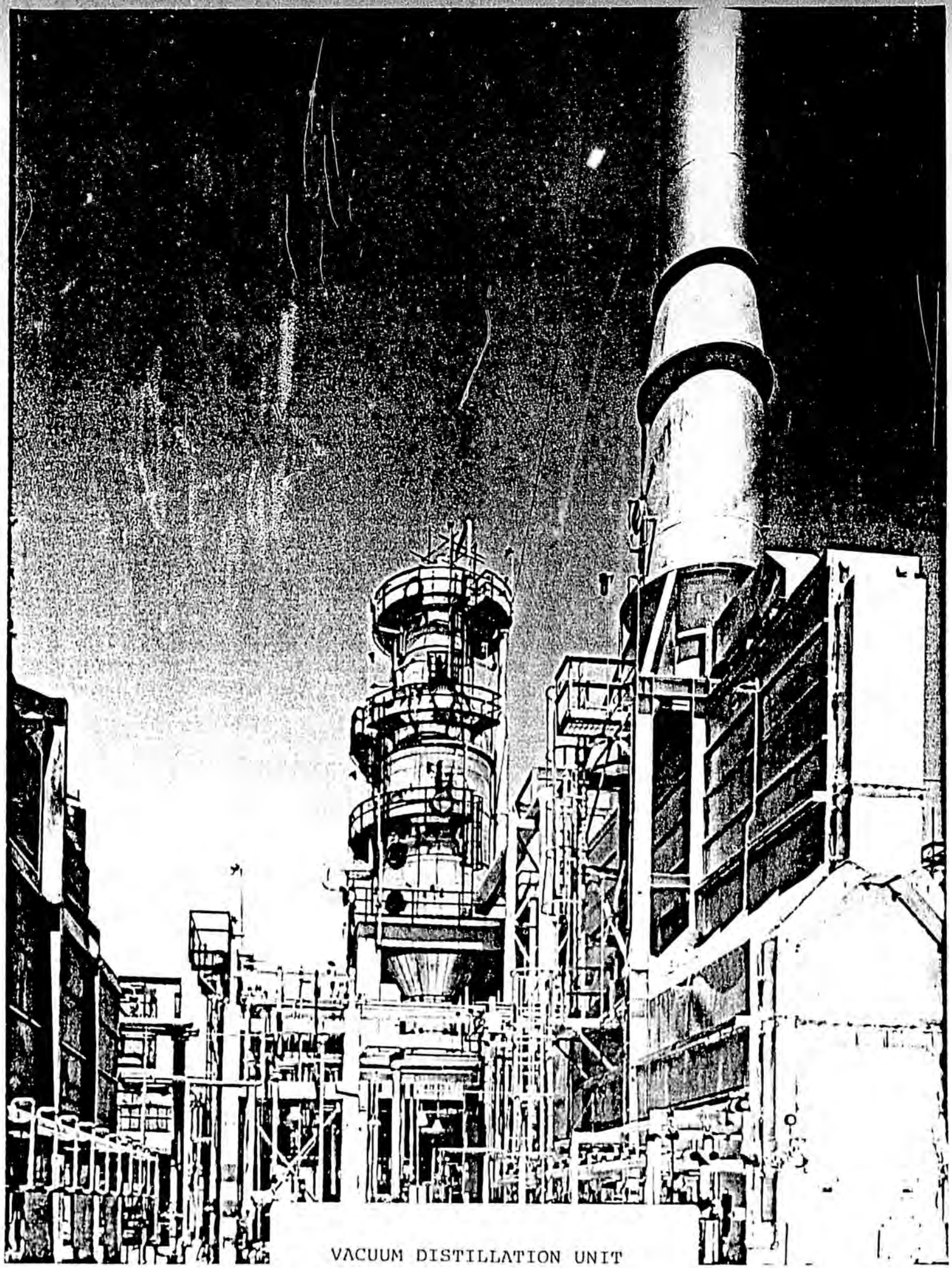
AUGUST 1, 1977



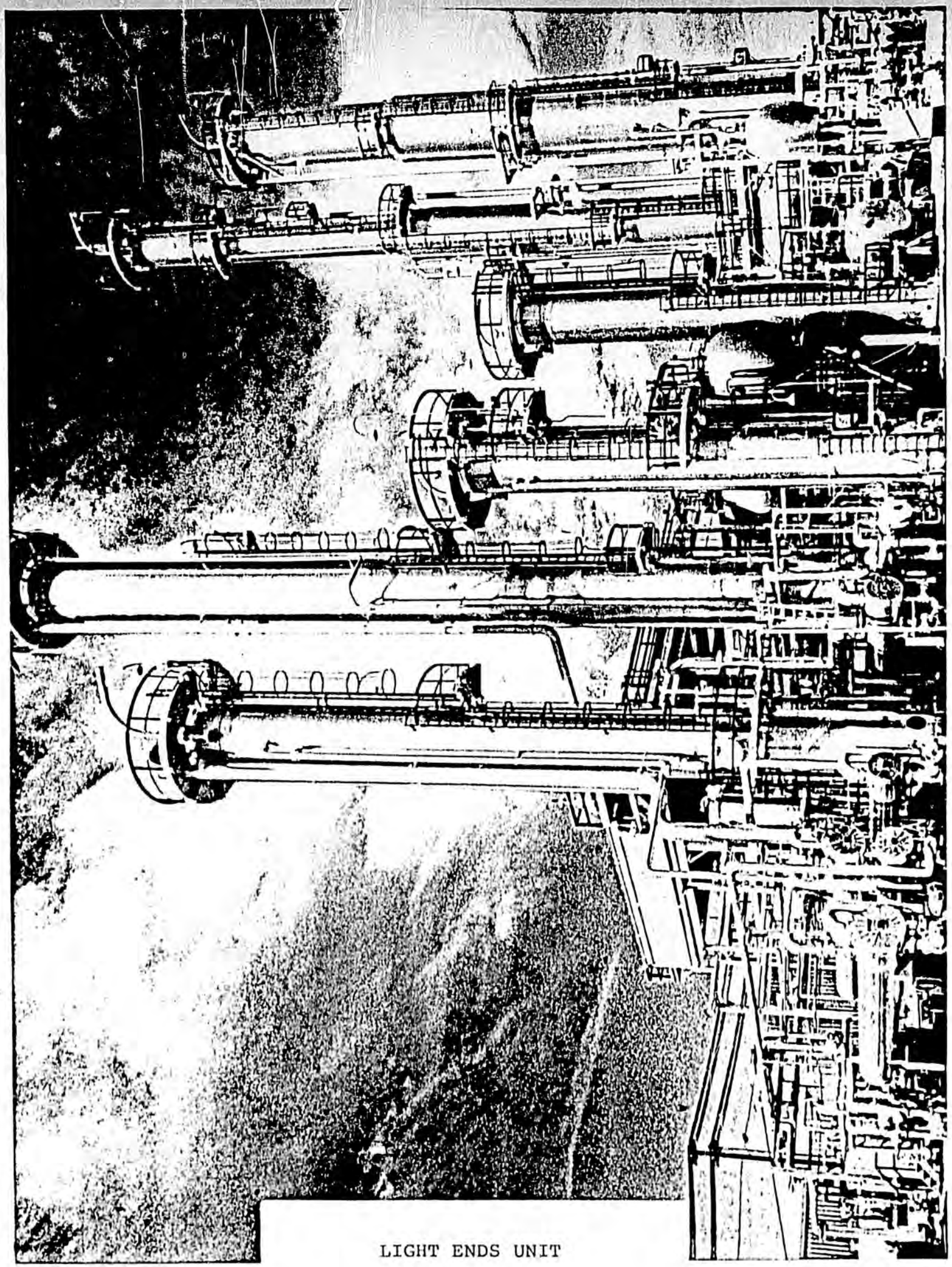
CRUDE OIL DESALTING



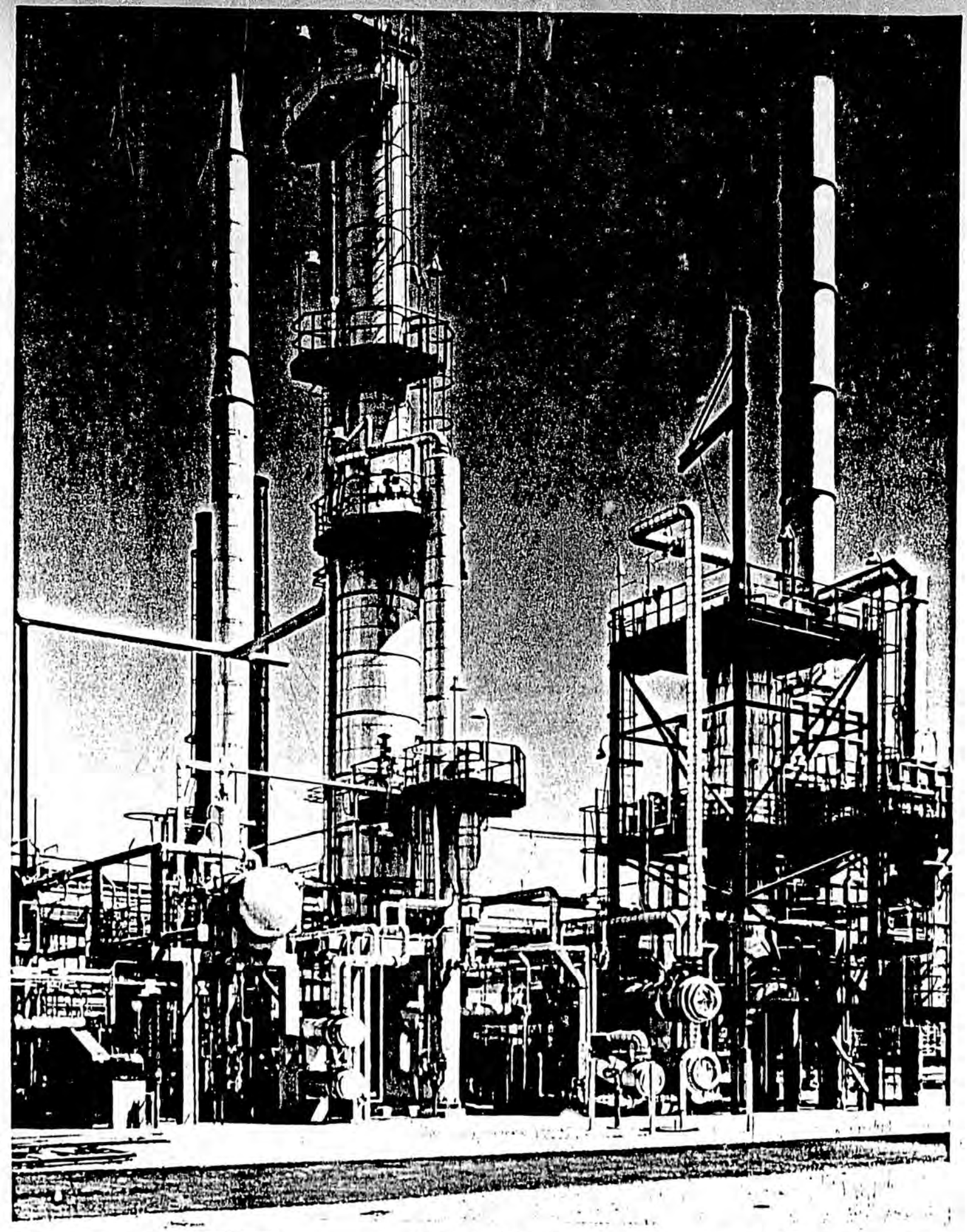
CRUDE OIL DISTILLATION



VACUUM DISTILLATION UNIT

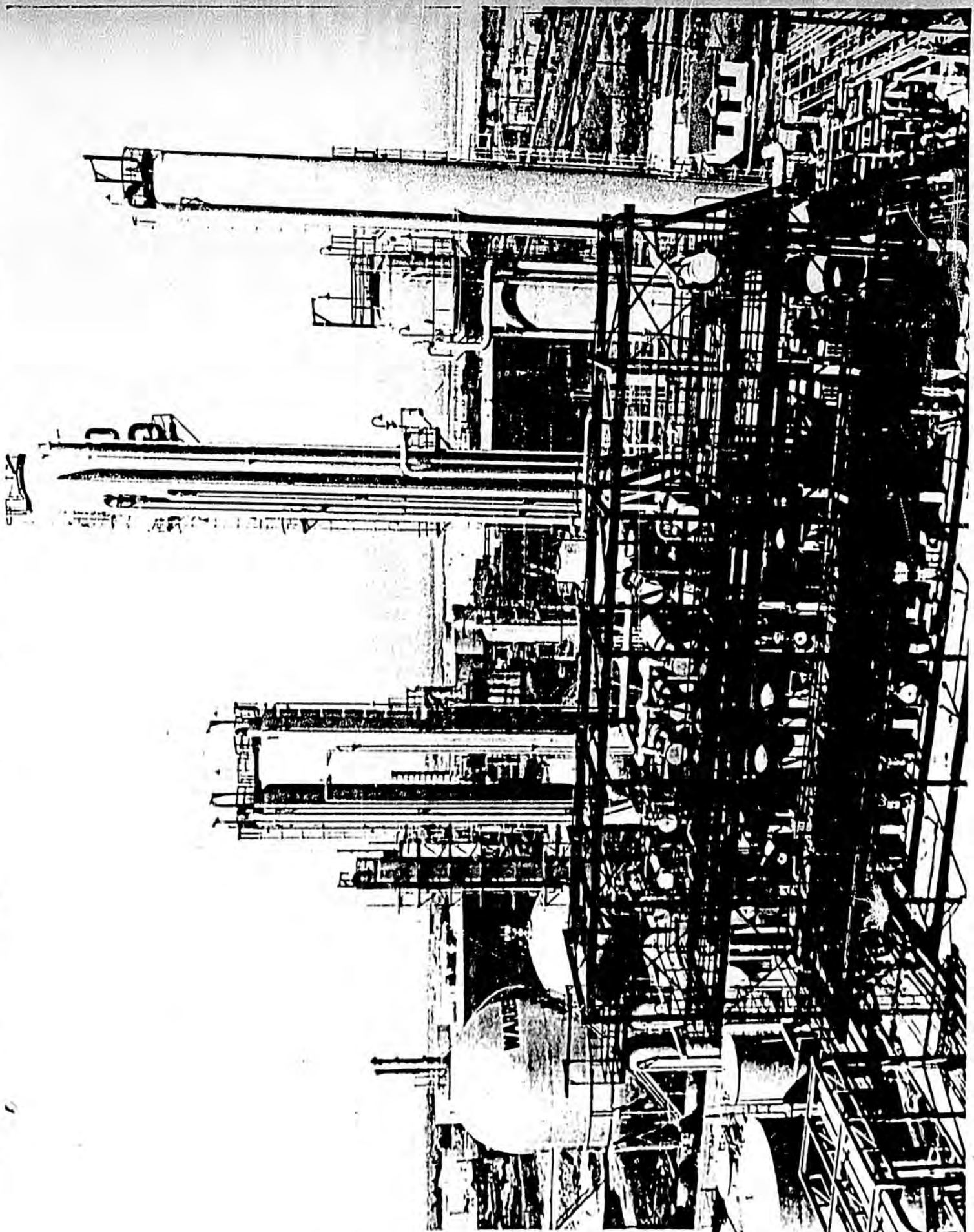


LIGHT ENDS UNIT

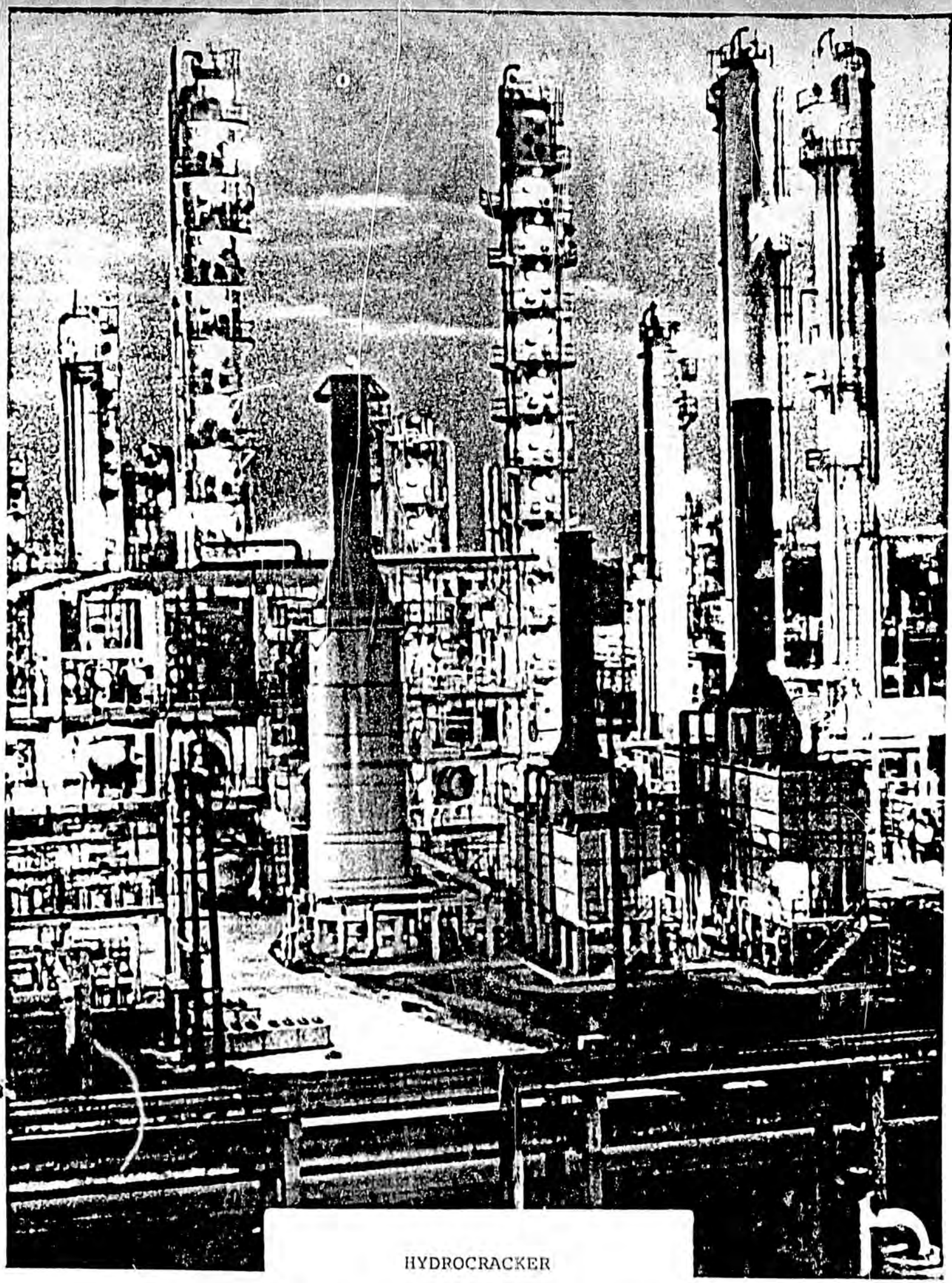


DESULFURIZER

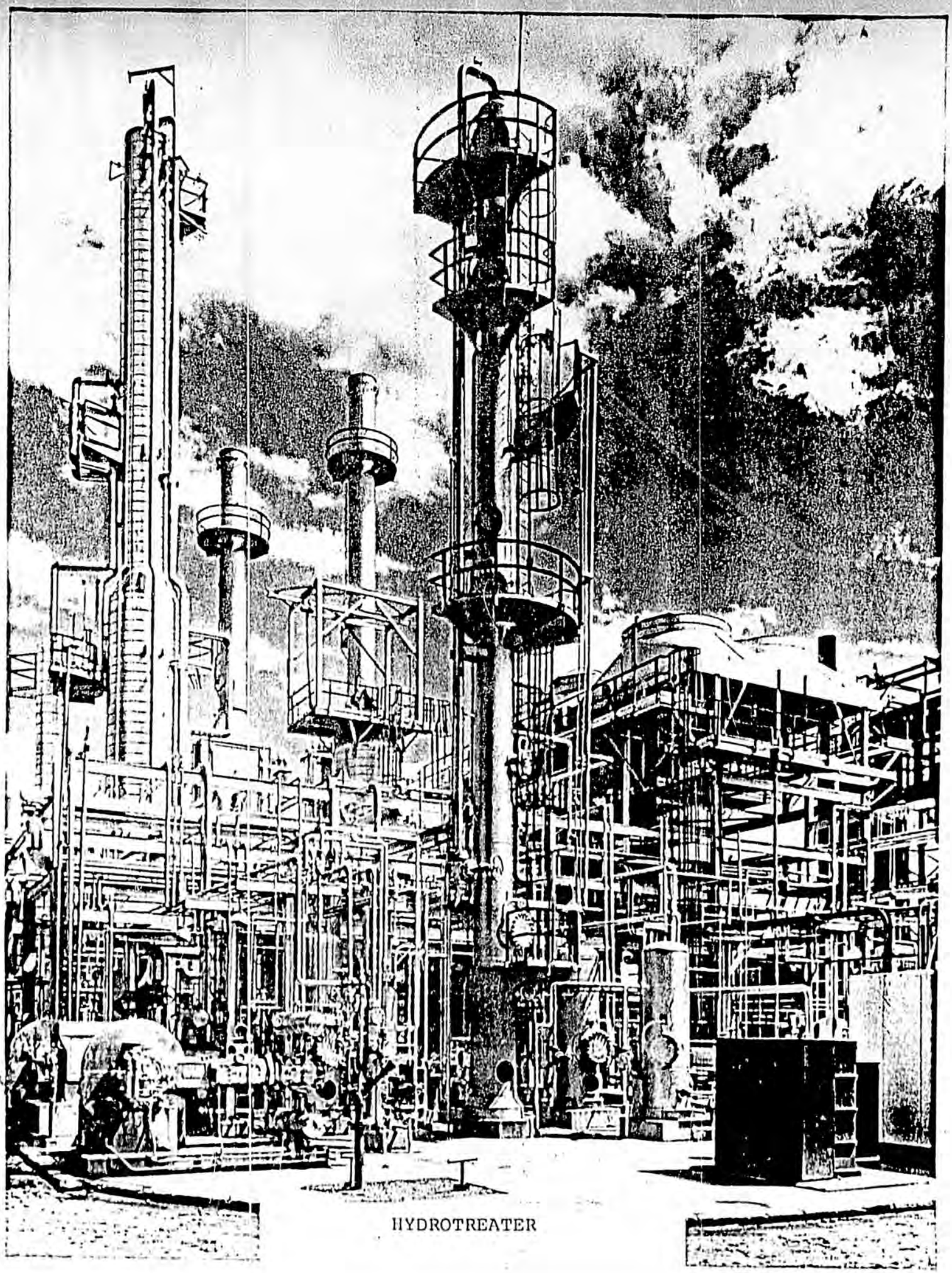
STRAIGHT RUN AROMATI
STEP 1 (REFORME



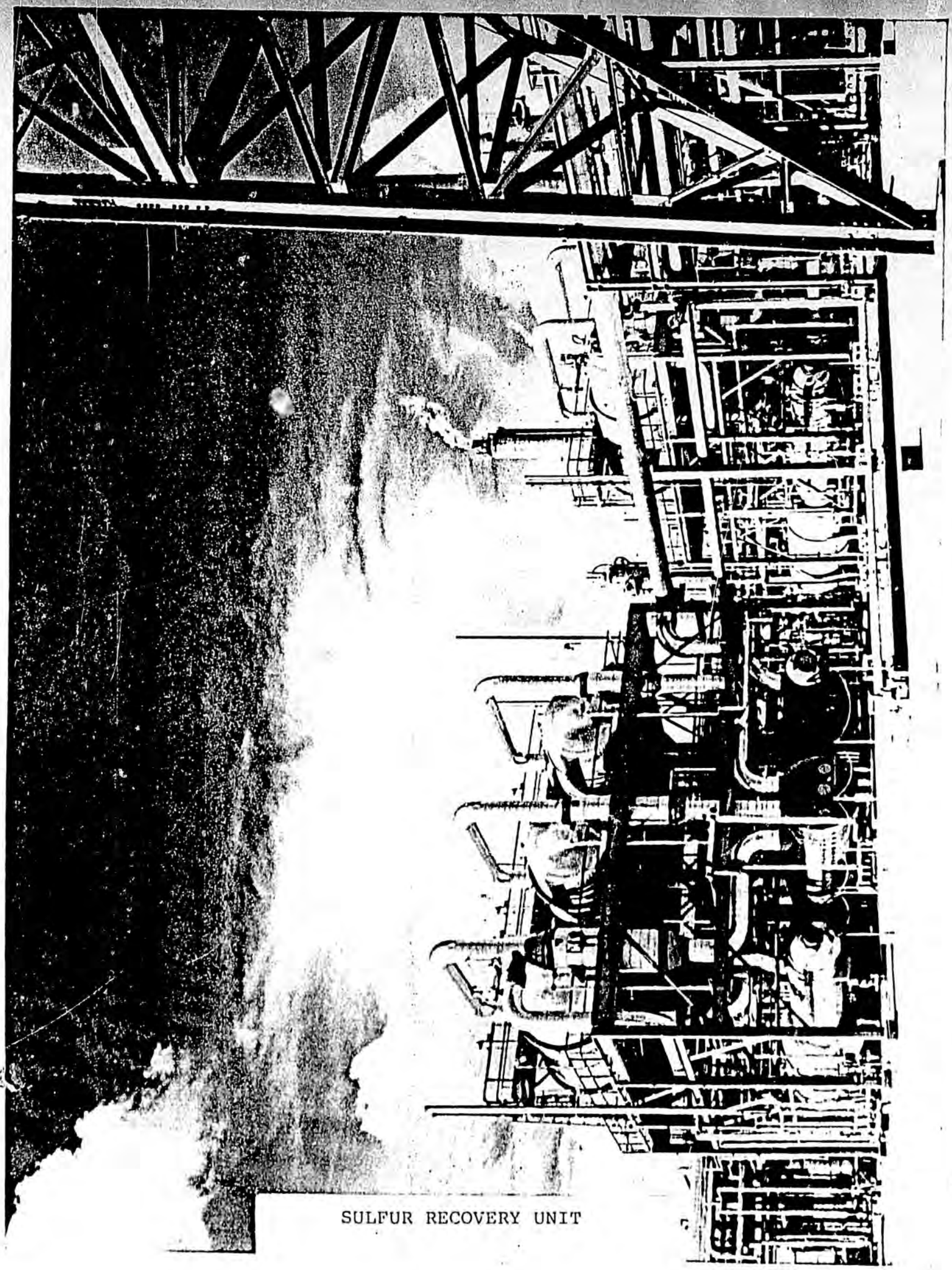
STRAIGHT RUN AROMATICS UNIT
STEP 2 (EXTRACTION)



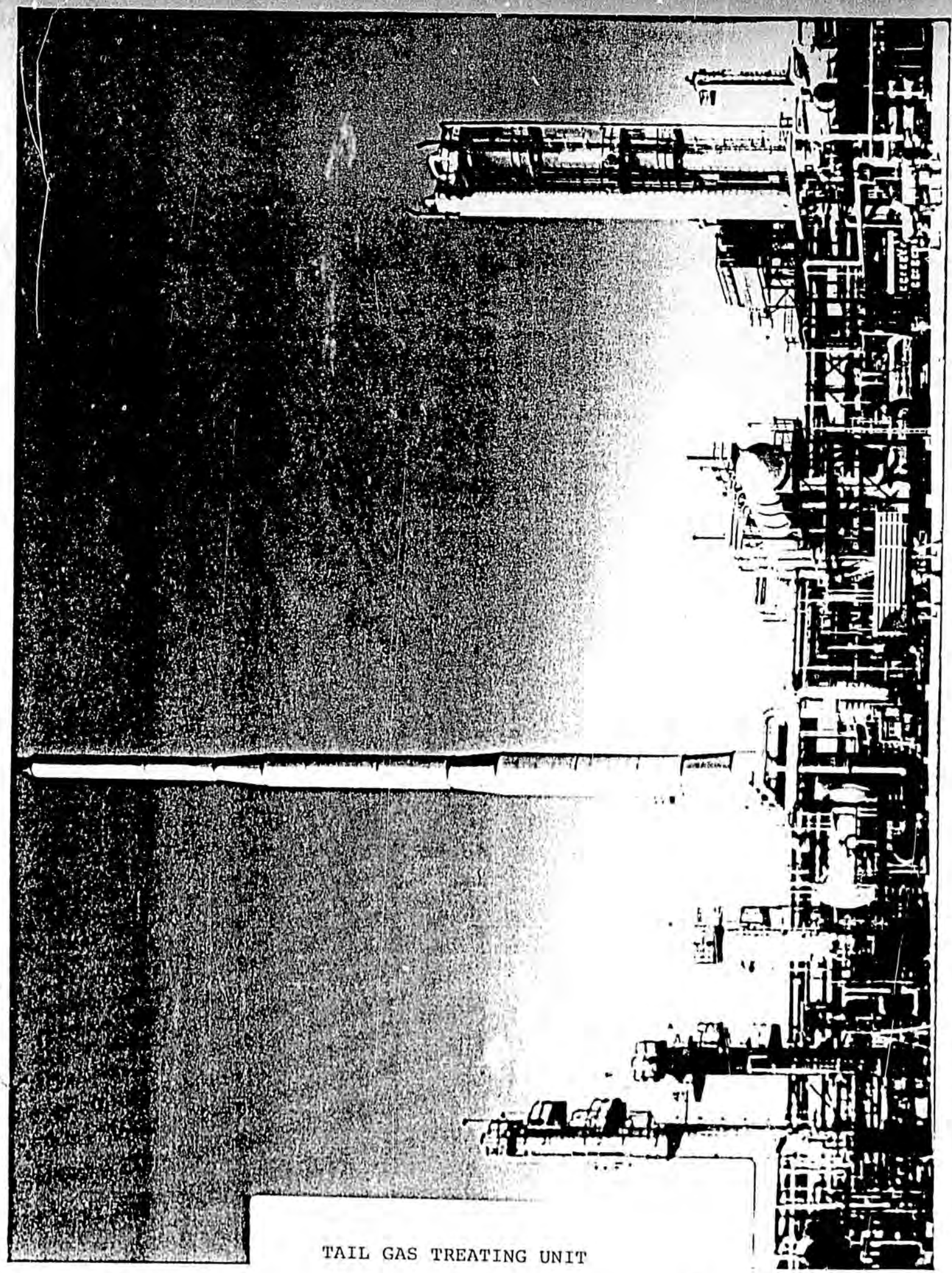
HYDROCRACKER



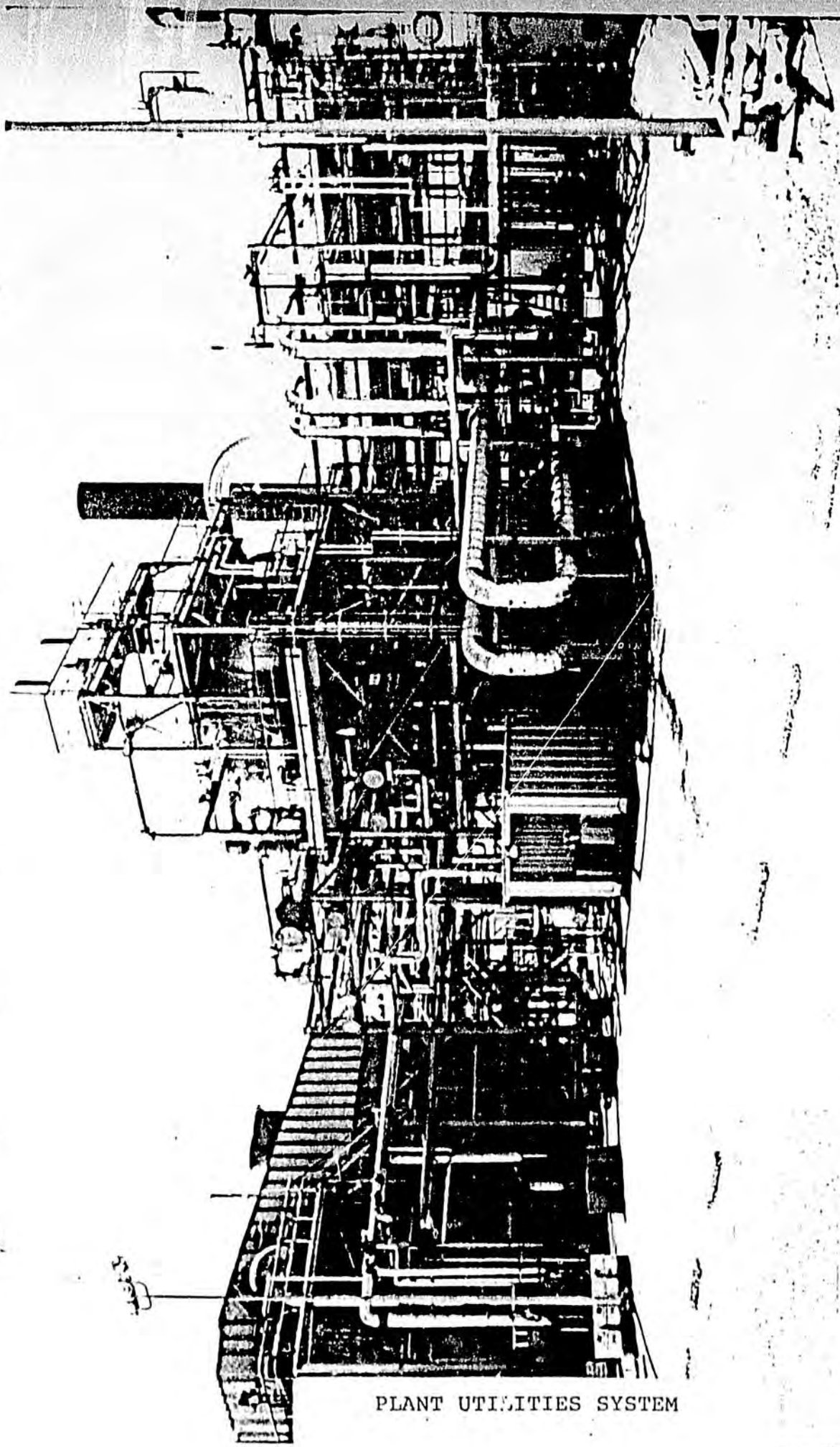
HYDROTREATER



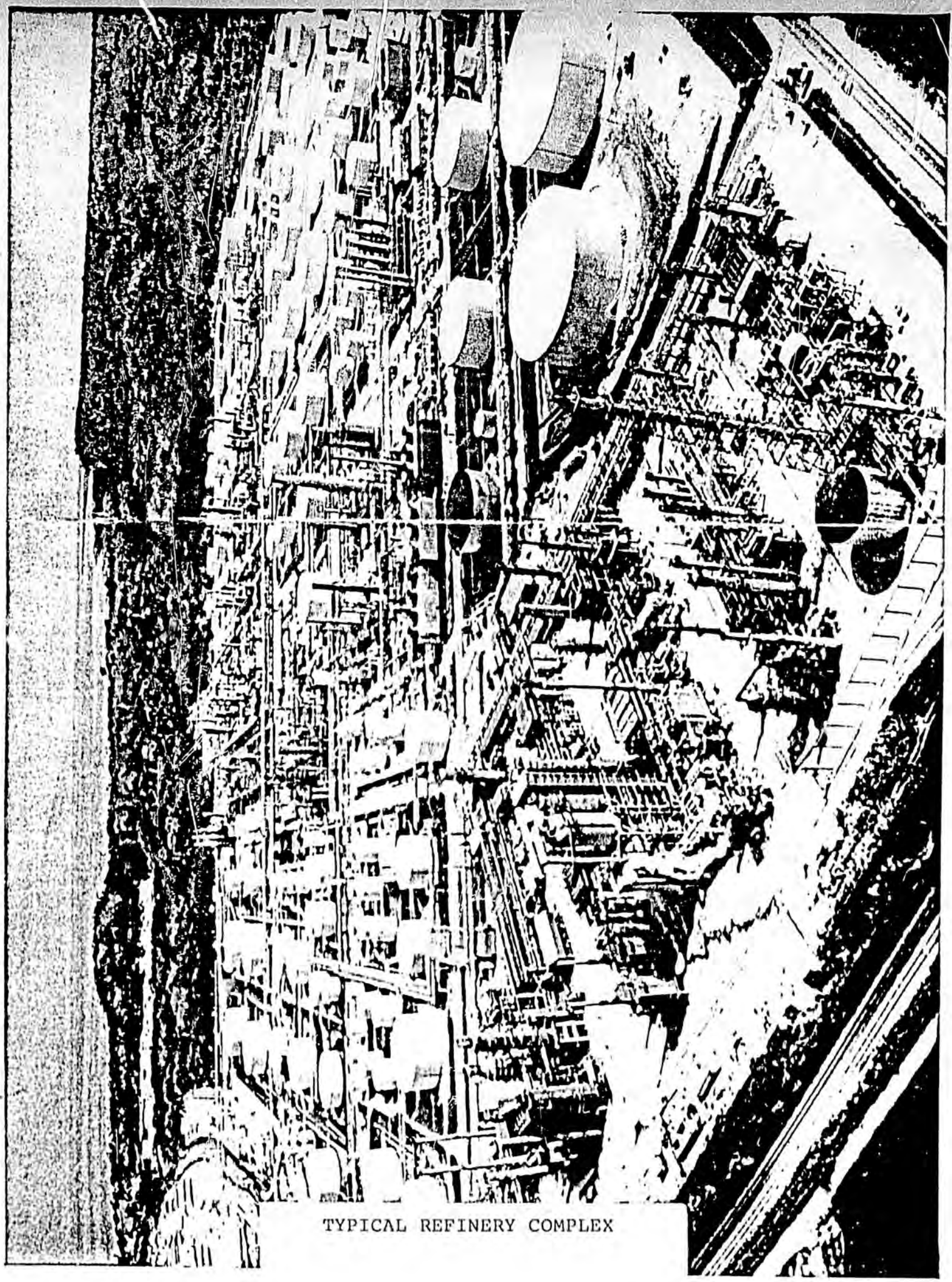
SULFUR RECOVERY UNIT



TAIL GAS TREATING UNIT



PLANT UTILITIES SYSTEM



TYPICAL REFINERY COMPLEX