91-103-NG
PHILLIPS ALASKA NATURAL
11/26/91 - 2/2/93

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ORIGINAL

UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

In the matter of	)	
	)	
PHILLIPS ALASKA NATURAL GAS CORPORATION	)	91-103
and	)	Docket No. ____ LNG
MARATHON OIL COMPANY	)	
	)	

APPLICATION TO AMEND AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS

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Counsel for
MARATHON OIL COMPANY

November 22, 1991

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UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

In the Matter of	)	
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PHILLIPS ALASKA NATURAL GAS CORPORATION	)	Docket No. _____ LNG
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MARATHON OIL COMPANY	)	

APPLICATION TO AMEND AUTHORIZATION
TO EXPORT LIQUEFIED NATURAL GAS

Phillips Alaska Natural Gas Corporation ("PANGC") and Marathon Oil Company ("Marathon") hereby request, pursuant to Section 3 of the Natural Gas Act, 15 U.S.C. §717b, and 10 C.F.R. Part 590, that the Office of Fossil Energy ("FE") of the Department of Energy ("DOE") amend the authorization granted by Economic Regulatory Administration ("ERA") Opinion and Order Nos. 261 and 261-A ("Order No. 261") to increase the quantities of liquified natural gas ("LNG") authorized for export. The currently allowed export volumes are referenced in Phillips 66 Natural Gas Company's ("P66NGC") and Marathon's "Application to Amend Authorization to Export Liquefied Natural Gas" dated April 7, 1988, ERA Docket No.88-22-LNG ("1988 Application"). PANGC and Marathon request the FE amend Order No. 261 to permit PANGC and Marathon to export about twelve percent (12%) in additional volumes of LNG annually as provided in the "Second Amendatory Agreement" among Sellers, PANGC

and Marathon, and their LNG Buyers, The Tokyo Electric Power Company, Incorporated ("Tokyo Electric"), and Tokyo Gas Company, Ltd. ("Tokyo Gas"). PANGC, Marathon, Tokyo Electric and Tokyo Gas are collectively referred to as "Parties."

PANGC and Marathon also request that PANGC be authorized to assume participation in the Kenai LNG project and that the export authorization extended in Order No. 261 be transferred from ("P66NGC"), which is PANGC's parent and a subsidiary of Phillips Petroleum Company ("Phillips"), to PANGC. PANGC requests that this transfer from P66NGC to PANGC be authorized effective as of January 1, 1991.

In support hereof, applicants submit the following:

I. GENERAL INFORMATION

The exact legal name of PANGC is Phillips Alaska Natural Gas Corporation. PANGC is a Delaware Corporation with principal offices in Bartlesville, Oklahoma. PANGC is a wholly-owned subsidiary of P66NGC, a Delaware Corporation, which in turn is a wholly-owned subsidiary of Phillips Petroleum Company, a publicly traded Delaware Corporation. PANGC is authorized to do business in Alaska, Oklahoma, and Delaware.

The exact legal name of Marathon is Marathon Oil Company. Marathon is an Ohio corporation with principal offices in Houston, Texas. The outstanding shares of common stock of Marathon are

owned by USX Corporation (98%) and Texas Oil & Gas Corp. (2%). Marathon is authorized to do business in all states which it does business, including the State of Alaska. P66NGC and Marathon are not affiliated with each other.

All correspondence and communications regarding this application, including service of pleadings and notices, should be directed to the following persons:

PANGC:

Mr. Dennis J. Ryan
Manager - Regulatory Affairs
Phillips 66 Natural Gas Company
P.O. Box 1967
Houston, Texas 77251-1967
Phone: (713) 669-7027

Mr. Larry Pain, Attorney for
Phillips Alaska Natural Gas Corporation
1256 Adams Building
Bartlesville, OK 74004
Phone: (918) 661-6355

Marathon:

Mr. F.R. Adamchak, Manager
International Natural Gas
Marathon Oil Company
P. O. Box 3128
Houston, Texas 77253
Phone: (713) 629-6600

Ms. Lauren Boyd, Attorney
Marathon Oil Company
P. O. Box 3128
Houston, Texas 77253
Phone: (713) 296-2539

The applicants hereby certify that the undersigned persons and those named above are the duly authorized representatives of the

applicants. There are no other proceedings related to this application pending at any other part of the DOE. A petition is pending at the Department of Transportation's Research and Special Programs Administration ("RSPA of DOT"), Docket No. P-47, requesting a finding of continued exemption from the design, construction, and siting regulations of the DOT in 49 C.F.R. Part 193 and for approval of designs for certain modifications at the Kenai LNG Plant. The DOT petition was filed on August 27, 1991, and copies have been provided to the FE for its information and review in connection with this application.

II. AUTHORIZATION REQUESTED

PANGC and Marathon request that FE amend the export authorization granted in Order Nos. 261 and 261-A to approve the two unrelated changes described below.

A. PANGC and Marathon request that the FE grant export authorization for the increased LNG sales contract quantity as provided in the Second Amendatory Agreement. Applicants have attached an executed Letter of Intent and an unexecuted copy of the Second Amendatory Agreement as Appendix A to this Application. The Second Amendatory Agreement has now been fully agreed and is not to be further revised before final execution. A copy of the executed amendment will be filed with the FE when available. The Second Amendatory Agreement amends the June 30, 1988, Liquefied Natural Gas Sale and Purchase Extension Agreement ("Extension Agreement")

by: (1) increasing the base Annual Contract Quantity ("ACQ") to 56.0 Trillion Btu's for the contract year beginning April 1, 1993; (2) increasing the base ACQ to 64.4 Trillion Btu's per year effective as of the contract year beginning April 1, 1994, through the end of the term on March 31, 2004; (3) providing a right of Sellers to cancel the increases of up to 12% in the base ACQ by written notice by March 31, 1994, to be effective as of April 1, 1997; and (4) changing the agreed Accumulated Annual Underlift Quantity provision in Section 5.2c, which limits the cumulative underlift, relative to ACQ, which the LNG Buyers are entitled to exercise. Current provisions for annual sales of up to 106% of the base ACQ's remain unchanged.

B. Applicants also request approval of a July 25, 1991, "Assignment Agreement" which has been approved by all parties and which assigns P66NGC's interest in the Extension Agreement, as amended, to its subsidiary PANGC effective as of January 1, 1991. A copy of the Assignment Agreement is attached as Appendix B to this application and is incorporated by reference.

III. BACKGROUND

In November 1969, Phillips and Marathon began exporting LNG manufactured from Alaskan natural gas to Japan. The exports originally commenced pursuant to the April 19, 1967, order of the FPC in Docket Nos. CI67-1226 and CI67-1227, 37 FPC 777 (1967). In

that order, the FPC found that the export of LNG by Phillips and Marathon would not be inconsistent with the public interest and authorized the export of LNG by applicants for a fifteen-year period ending May 31, 1984.

The original Liquified Natural Gas Sales Agreement dated March 6, 1967, among Phillips and Marathon as sellers and Tokyo Electric and Tokyo Gas as buyers provided that the term could be extended for an additional period of five years under certain circumstances. The parties agreed to a five-year extension, and on May 10, 1982, Phillips and Marathon filed a joint application with the Economic Regulatory Administration to extend the initial export authorization granted by the FPC for an additional five years from May 31, 1984. In granting the authorization to amend and continue the LNG export in Order No. 49, 1 ERA ¶70,116 (December 14, 1982), the ERA found the extension was not inconsistent with the public interest. 1/

The parties entered into the Extension Agreement dated as of June 17, 1988, to continue the LNG sales for an additional fifteen years through March 31, 2004. On April 11, 1988, P66NGC and Marathon filed a joint application with the Economic Regulatory Administration in Docket No. 88-22-LNG requesting approval of a 15 year extension and modification of their existing authorization. In granting the authorization to amend and continue the LNG export

1/ In ERA Order No. 49-A, 1 ERA ¶70,128 (April 3, 1986), the authorization previously granted to Phillips to export LNG was transferred to P66NGC effective as of January 1, 1986.

in Order No. 261, 1 ERA ¶70,130 (July 28, 1988), the ERA concluded inter alia, (1) that there is no domestic need for the gas involved in this export over the term of the extended authorization; (2) that the export arrangement is in accord with the DOE's international gas trade policy; (3) that the exports contribute favorably to the U.S. balance of payments; (4) that the pricing formula is reasonable and provides flexibility to respond to market conditions; and (5) that the extension is not inconsistent with the public interest. Recently, in DOE/FE Order No. 261-A, Docket No. 91-10-NG (June 18, 1991), the FE approved certain changes to the LNG pricing formula designed to keep the price competitive with other LNG prices and with world energy prices.

The Extension Agreement contemplates that applicants will replace their existing LNG tankers with two new and larger LNG tankers before June 1994. Applicants now expect deliveries of the new tankers to occur in June and December 1993. Under the Extension Agreement at the time of replacement of the tankers, the contractually authorized base export volumes are to increase from 52 trillion Btu's per year to 57.5 trillion Btu's per year. The Extension Agreement also allows deliveries of an additional six percent (6%) above the base contract quantities in certain circumstances. The Kenai LNG Plant as presently constructed can accommodate these increased export volumes, which are presently authorized. However, the parties now desire to take advantage of additional LNG delivery capability of the new LNG tankers, which exceeds that contemplated in the Extension Agreement. The

incremental increase in export volumes will require some minor modifications to the existing Kenai LNG Plant.

The natural gas used to manufacture LNG for export to Japan is produced from the Cook Inlet Basin area of Alaska. Historically, seventy percent of the annual wellhead requirement has been produced by Phillips from reserves which it owns or controls in the North Cook Inlet Unit, and thirty percent has been produced by Marathon from reserves which it owns or controls principally in the Kenai Field. The total additional wellhead reserves required to meet the incremental LNG export volumes, for which authority is being requested herein, is approximately 90 Bcf over the remaining term of the Extension Agreement. These reserves will be produced from gas fields owned or controlled by applicants in the Cook Inlet area, supplemented as necessary by the acquisition of reserves or purchases of gas from other fields. Recently, PANGC commenced purchases of about 5 MMcfd of natural gas to be used for LNG manufacture from CIRI Production Company's West Fork Field in the Cook Inlet area.

IV. THE ADDED EXPORTS SERVE THE PUBLIC INTEREST.

PANGC and Marathon request FE authorization for an incremental increase in the Annual Contract Quantity (ACQ) of LNG to be exported in accordance with an agreement between applicants and the buyers, which will be referred to as the Second Amendatory Agreement. The Amendment has not yet been executed by the Parties,

but the parties have agreed to the volume changes and other terms as set forth in the Letter of Intent and Second Amendatory Agreement attached as Appendix A.

When signed, the Second Amendatory Agreement will amend the Extension Agreement under which applicants currently sell LNG to Tokyo Electric and Tokyo Gas. Under the Second Amendatory Agreement, applicants will increase by up to twelve percent (12%) the LNG manufactured at the Kenai LNG Plant in the Cook Inlet area of Alaska and exported to the buyers in Japan commencing April 1, 1993, and ending March 31, 2004. The principal differences in the terms of the Extension Agreement as previously amended and the new Second Amendatory Agreement are:

(1) Commencing April 1, 1993, the base Annual Contract Quantity will be increased from 52.0 trillion Btu's per year to 56.0 trillion Btu's per year for the contract year 1993. The base ACQ quantity will increase to 64.4 trillion Btu's per year beginning in the April 1, 1994, contract year when the new tankers are expected to be in service. If deliveries of the new LNG tankers are delayed, the parties recognize that some deferral of the increase in quantities may be required. The ACQ will remain at 64.4 trillion Btu's per year until the contract term ends on March 31, 2004, unless the Sellers exercise an option by March 31, 1994, to reduce the ACQ's beginning with the contract year starting April 1, 1997,

back to the presently authorized base ACQ for that period of 57.5 trillion Btu per year. In addition to the above changes in the ACQ, as currently provided in the Extension Agreement, the LNG buyers may request additional deliveries up to a maximum of 6% of the ACQ during any contract year. Therefore, export authorization is requested for up to 106% of the increased ACQ's stated abcve.

(2) The amendment also revises Section 5.2c, which limits the cumulative quantity of LNG underlifted by the LNG buyers. The cumulative underlift quantity allowed is a function of the changed ACQ.

The existing Alaskan LNG export project has been a safe and reliable operation for all parties concerned for over twenty-one years. Applicants seek approval for a relatively small increase in the level of LNG exports (approximately 12%).

Section 3 of the Natural Gas Act ("NGA"), in addressing natural gas imports and exports, provides in part, "The Commission shall issue such order upon application, unless, after opportunity for hearing, it finds that the proposed exportation or importation will not be consistent with the public interest." For the reasons stated herein, PANGC and Marathon believe that there continues to be no basis in fact or law for conclusion other than that reached by the FPC in 1967, and again by ERA in 1982 and 1988, that the

export of Kenai liquefied natural gas to Japan by PANGC and Marathon from the Cook Inlet area is wholly consistent with the public interest.

The export project has for the past twenty-one years improved the economy of the State of Alaska and the balance of payments between the United States and Japan. The requested amendment to incrementally increase LNG exports is not inconsistent with the public interest; rather, it would enhance the project by more fully using the facilities.

A. CONTINUED EXPORT OF ALASKAN LNG BENEFITS ALASKA, THE AMERICAN PUBLIC AND JAPAN.

In connection with the 1988 Application for extension of the Kenai Project, P66NGC and Marathon contracted Dames & Moore (D&M), an independent consulting firm to make a comprehensive economic analysis of the regional and national interest with respect to the Kenai LNG export project. Although this report is dated April 5, 1988, we believe the positive conclusions reached in the report are still relevant and would only be improved by the requested increase in export volumes. The D&M report reviews in detail the benefits, both direct and indirect, derived by the local-regional economy as a result of the Kenai export project.

The State of Alaska continues to benefit significantly from the project. The operation of the liquefaction plant and natural gas production facilities provides employment for workers in the area and economic benefits for suppliers and businesses in the area. The State of Alaska and its citizens, as well as the federal

government, also benefit from royalty payments on the natural gas used by the project as well as associated tax revenue. This project generates millions of dollars a year in Alaskan personal income and state and local taxes (Table 6-1,D&M report).

This export has provided a beneficial impact on the balance of payments between the United States and Japan and will continue to do so. Although small in comparison to the total U.S.-Japanese trade balance (D&M table 6-7), this project provides a steady and continuous offset to the trade imbalance between the two countries. Under the Second Amendatory Agreement, exported volumes will increase slightly, thereby increasing the favorable balance of trade effect to the United States.

While this source of LNG is not the largest source of imported energy consumed in Japan, it is one of the most secure and reliable energy sources available to that country. During the twenty-one years that this project has been in operation there have been no major accidents or interruptions of service. This export has benefitted the sellers, their customers, and the trade relations between the two countries, and will continue to do so.

B. THERE IS NO NATIONAL OR REGIONAL NEED FOR THE NATURAL GAS WHICH WILL BE EXPORTED.

The prospects for shipping LNG to the lower forty-eight states are remote, considering both the economics and the absence of need for this gas in the lower forty-eight states. The supply of gas in the lower forty-eight continues to exceed demand. Even if economic

conditions were such that LNG could be shipped to the lower forty-eight at market clearing prices, the constraints of building LNG receiving terminals on the West Coast would likely prevent such interstate sales over the great majority, if not the entire period, of the proposed export of the additional volumes sought here. There are no LNG receiving facilities on the West Coast of the lower forty-eight states, and none are now anticipated. (D&M report at 1-13). Movement of Kenai LNG to existing terminals on the East Coast or Gulf Coast is economically improbable due to the distance and the necessity of employing smaller U.S. registered tankers to pass through the Panama Canal. No such appropriately sized LNG tankers currently exist. In addition, Canada has and will continue to have huge gas reserves available for export to the lower forty-eight states and will continue to be able to provide gas to the U.S. market at lower costs than those necessary for Alaskan LNG.

With respect to the regional need for natural gas, the Cook Inlet area continues to have a large oversupply with resulting low prices. Even with greater local market demand, it is estimated that there will be more than ample gas reserves remaining to supply the local and regional need for gas well beyond the current term of the export authority. The D&M study reports the results of various supply/demand analyses to determine their effect on the Alaska Railbelt Region. Under the expected supply/demand scenario, estimated Cook Inlet area remaining proved, probable, and possible reserves total in excess of 3.5 trillion cubic feet at the end of

2004 (D&M Chapter 5.0, Railbelt Region Supply/Demand Balance). The most unfavorable low supply/high demand scenario examined in the D&M study shows estimated Cook Inlet area remaining reserves in 2004 in excess of 1.2 trillion cubic feet. Further, the Alaska Railbelt Region is blessed with huge oil, coal and hydroelectric energy resources.

The estimates of natural gas supplies in the Cook Inlet area utilized in the D&M study are corroborated by more recent estimates of the Cook Inlet area resource base described below, including those of the Alaska Department of Natural Resources ("ADNR") in its report of Historical and Projected Oil and Gas Consumption dated June 1991 (ADNR Report). Therefore, the results of the 1988 D & M study remain valid today.

The D&M study included estimates of probable and possible gas resources as well as proven gas reserves. According to estimates by the Alaska Department of Natural Resources, in addition to the 1990 year end total Cook Inlet region proven gas reserve base of 3,417 Bcf, prospects are good for the discovery of additional gas reserves in the Cook Inlet Basin area. The ADNR estimates that there is an 80% probability that at least 1,490 Bcf remain to be discovered and a 50% probability that at least 3,070 Bcf of unproven gas reserves remain to be discovered. (D&M Table 4.3.)

These ADNR estimates are consistent with projections developed by ICF Incorporated in an August, 1988 report to the Alaska Power Authority, entitled Fuel Price Outlooks: Crude Oil, Natural Gas, and Fuel Oil. In this detailed analysis of Cook Inlet gas supply

potential, ICF projects that 1,450 Bcf of additional gas reserves remain to be discovered (at wellhead prices less than $2.00/Mcf in constant 1987 dollars) through further development in existing fields and exploration in new fields.

Another study providing evidence of the potential for discovery of additional gas reserves in the Cook Inlet area is the Potential Supply of Natural Gas in the United States as of December 31, 1990, published in May 1991 by the Potential Gas Committee ("PGC") through the Colorado School of Mines. The PGC is made up of volunteers from the gas industry, government agencies and academic institutions. The PGC has prepared and published biennial estimates of the potential supply of natural gas in the United States since 1964. Three categories of potential gas resources are recognized and reported by the PGC: probable, possible, and speculative. These three categories are differentiated on the basis of variation in available geologic, geophysical and engineering information.

The PGC's May 1991 study (Table 15 at 129 - 130) estimates that the "most likely" quantity of gas reserves remaining to be discovered, both onshore and offshore, in the Cook Inlet area is 3,150 Bcf for the "Probable" and "Possible" categories. The "Speculative" category estimate would add another 3,400 Bcf of potential reserves. The PGC's estimates are consistent with ADNR and ICF estimates.

The 1990 total annual demand for natural gas from the Cook Inlet region is approximately 210 Bcf. According to the 1991 ADNR

Report, demand for gas from the Cook Inlet is estimated to decrease from the 1990 levels and then increase by less than 1% annually until again reaching 210 Bcf/year in 1999. (ADNR Report Table 7.2 at 27.) Of the total annual demand for gas from the Cook Inlet region, only 26-27 Bcf are attributable to Cook Inlet area residential and commercial space heating needs, and only about 35-39 Bcf are required for electrical generation. Id. These relatively high priority demands thus account for only about 31% of the total annual gas consumption in the Cook Inlet area.

Since 1988, the region's electric and gas utilities -- Enstar Natural Gas Co., Chugach Electric Association, and the City of Anchorage Municipal Light & Power -- have entered into long term gas supply contracts with Cook Inlet producers. The gas reserves dedicated under these and previous contracts are projected by the utilities to meet their annual gas requirements well beyond the expiration of the current export authority.

Based on the most recent ADNR projections of total annual Cook Inlet area gas demand of 210 Bcf/year and also taking into account additional volumes for manufacturing LNG pursuant to the export authority requested herein, it is estimated that total gas consumption in the Cook Inlet area will be less than 2,900 Bcf during the period from January 1, 1991 through the end of the term of the export authority in 2004. Considering the current total Cook Inlet area proven reserves (See Table 1 of the ADNR Report) and even the most conservative estimate of probable reserves discussed above, it is evident that ample gas exists to meet local

and regional needs well beyond 2004 if the present application is granted.

Natural gas is now in surplus of domestic needs both in Alaska and in the lower 48 states. The proved reserves to production (or RP) ratio for the Cook Inlet area based on the ADNR report stands at 16.2, much higher than the lower 48 states' RP ratio of 9.8 derived from DOE EIA statistics. Furthermore, the various data and studies described herein clearly indicate that Cook Inlet area gas resources will be more than adequate to meet the local and regional need for gas in the foreseeable future. The studies discussed above provide strong evidence that substantial additional gas reserves will be added to the resource base in the future to meet area gas needs in the more distant future.

Applicants submit that there is no evidence of a domestic need, either national or regional, for the incremental volumes of natural gas for which applicants are requesting export authority herein. Therefore, the proposed incremental increase in the LNG export volume is not inconsistent with the public interest and should be approved in all respects.

C. THE PRICE TO BE CHARGED FOR THE INCREASED LNG DELIVERED TO JAPAN IS CONSISTENT WITH THE PUBLIC INTEREST.

The price to be charged for increased LNG deliveries is unchanged from the Extension Agreement as previously amended and

will be determined by the same method approved in Order No. 261-A, and therefore as concluded in Order 261-A, is not inconsistent with the public interest.

V. ENVIRONMENTAL IMPACT

The applicants' LNG manufacturing facilities will require modification to accommodate the incremental increase of LNG production. The modifications planned for the Kenai LNG Plant will increase its efficiency and reliability. The maximum daily inlet capacity will not be materially increased. However, the plant's ability to manufacture LNG is impacted by ambient air temperature. Therefore, the plant is capable of producing higher volumes of LNG during the winter than during the summer. The modifications planned will somewhat smooth out the plant's production capability and increase LNG production capability materially in the summer months.

The essence of the planned modifications to the Kenai LNG Plant follows. Applicants plan to:

(1) Improve the efficiency of the fuel gas system;

(2) Add cooling water capacity to improve summer LNG production capability;

(3) Replace one or both existing LNG transfer pumps between the LNG manufacturing trains and the storage tanks;

(4) Expand and upgrade fire water and fire protection systems; and

(5) Consider adding a new waste heat boiler for steam

generation to reduce loads on existing boilers, improve fuel efficiency, and reduce flue gas emissions.

As an example of the changes contemplated within the fuel gas system, a new LNG storage tank vapor blower will decrease the loss of methane gas from the three existing LNG storage tanks and will recover natural gas equivalent to approximately two percent (2%) of inlet volumes. This will in turn decrease natural gas production and inlet volume requirements by a similar amount. This significant increase in plant efficiency will also largely eliminate present methane emissions to the air from the LNG storage tanks. Also if constructed, the addition of a waste heat recovery boiler would reduce the load on existing boilers and therefore would reduce flue gas emissions.

The specific plant modifications to be made are outlined in full in the application filed by Applicants with the RSPA of the DOT in Docket No. P-47 on August 27, 1991. Copies of that petition have been furnished to the Office of Fossil Energy for its information and review in connection with this application. The DOT petition seeks confirmation of the continued grandfathered exempt status of the Kenai LNG Plant after the above mentioned modifications. The DOT's approval is also requested for the design of the proposed plant modifications. The petition includes a narrative of the proposed plant modifications resulting from a 1990 Kenai LNG Plant efficiency study and a series of plot plans and process flow diagrams that illustrate the contemplated changes in

more detail.

With the exception of the replacement of LNG transfer pump(s), the mechanical design of the LNG liquefaction process is unaltered by the proposed changes. The majority of the modifications are to the utility systems. The changes allow the facility to operate year round at a production level closer to the plant's maximum daily inlet capacity. The cost of the modifications is less than ten percent (10%) the estimated cost of replacement of the Kenai LNG Plant with new facilities, which may range from $250 million to $300 million. For these reasons and for the reasons outlined in detail in the Appendices to the DOT application, Applicants do not believe that the proposed changes to the Kenai LNG Plant process make a significant alteration to the existing facility.

The facilities have operated safely without major disruption of supply or accident from start-up in 1969, and the planned modifications will not in manner reduce this reliability. All of the modifications will occur at the Kenai LNG Plant, an existing industrial facility. The primary environmental effect of the FE's approval in this case will be the production and use of about 90 Bcf of added gas supplies. We have demonstrated above that this added production is consistent with the public interest. Therefore, applicants request FE find that approval of this application is not a major Federal action significantly affecting the quality of the human environment within the meaning of National Environmental Policy Act of 1969, 42 U.S.C. §4321 et.seq. (1976), and that neither an environmental impact statement nor an

environmental assessment is required.

VI. THE TRANSFER OF P66NGC'S PARTICIPATION IN THE EXPORT PROJECT TO PANGC SHOULD BE APPROVED.

PANGC and Marathon request FE to amend the authorization currently held by P66NGC to reflect the assignment of P66NGC's interest in the Extension Agreement and related contracts to its wholly-owned subsidiary, Phillips Alaska Natural Gas Corporation, effective as of January 1, 1991. Marathon will continue to retain the same interest it currently holds.

P66NGC has been and is now involved in a restructuring of its operations designed to more closely align operating group responsibilities with ownership of business assets, to better identify results of its operating groups, and to enable management to react more quickly to changing business environments. As one part of the overall restructuring, PANGC has assumed responsibility for the Kenai LNG operations, subject to the regulatory approval sought here. These operation transfers were provisionally made to PANGC by the July 25, 1991, Assignment Agreement and related assignments subject to FE approval, with the assignment to be effective as of January 1, 1991. Most of the assets and operations involved in the export of LNG covered by Order No. 261 are included in those operations to be transferred to PANGC. The parties agreed in principle to the transfer of P66NGC's participation in the LNG export to PANGC early in 1991; but the formal "Assignment

Agreement" executed pursuant to the Japanese buyers' April 1991 written approval was completed on July 25, 1991, subject to approval of the Office of Fossil Energy. A copy of the P66NGC - PANGC "Assignment Agreement" dated July 25, 1991, but effective on January 1, 1991, is attached as Appendix B to this Application.

PANGC will assume and perform P66NGC's obligations under the Extension Amendment as amended. P66NGC's stock interests in the affiliates owning the liquefication plant,1/ the LNG tankers 2/ and related facilities have been transferred to PANGC subject to regulatory approval. Employees of P66NGC or Phillips will continue to administer and operate the Kenai LNG Plant pursuant to service agreements between PANGC and P66NGC or Phillips.

The reorganization will have no impact on the export operation; therefore, approval of the requested transfer to PANGC is not inconsistent with the public interest. This transfer does not differ materially from the transfer of Phillips' participation in the export project which was approved in ERA Order No. 49-A 3/ retroactively to January 1, 1986.

1/The Kenai LNG Plant is owned by Kenai LNG Corporation, which has been owned 70% by P66NGC and 30% by Marathon.

2/The Arctic Tokyo is owned by Arctic LNG Transportation Company. The Polar Alaska is owned by Polar LNG Shipping Corporation. Each corporation has been owned 70% by P66NGC and 30% by Marathon.

3/DOE/ERA Opinion and Order No. 49-A (1 ERA ¶ 70,127, April 3, 1986).

VII. APPENDICES

Attached hereto and incorporated by reference herein are the following appendices:

Appendix A:	Letter of Intent and Second Amendatory Agreement.
Appendix B:	P66NGC - PANGC Assignment Agreement
Appendix C:	Opinions of Counsel

VIII. CONCLUSION

For the foregoing reasons, PANGC and Marathon respectfully request that FE amend Order Nos. 261 and 261-A, and authorize (1) the incremental increase of LNG exports pursuant to the conditions set forth in this application and (2) the transfer of P66NGC's participation in the export to PANGC.

Respectfully submitted,

PHILLIPS ALASKA NATURAL GAS CORPORATION

By _____

Mr. Dennis J. Ryan
Regulatory Affairs Agent
P.O. Box 1967
Houston, TX 77251-1967
(713) 669-7027

MARATHON OIL COMPANY

By _____

Mr. F.R. Adamchak
Manager, International Natural Gas
P.O. Box 3128
Houston, Texas 77253
(713) 629-6600

November 22, 1991

VERIFICATION

STATE OF OKLAHOMA)
) SS:
COUNTY OF WASHINGTON)

BEFORE ME, the undersigned authority, on this day personally appeared DENNIS J. RYAN, who, having been by me first duly sworn, on oath says that he is Regulatory Affairs Agent for Phillips Alaska Natural Gas Corporation and is duly authorized to make this Verification; that he has read the foregoing instrument and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

Dennis J. Ryan
Dennis J. Ryan

Subscribed and sworn to before me, a notary public, this 25th day of November, 1991.

Jeanne W. Hines
Notary Public

My Commission expires:

JEANNE W. HINES
Notary Public, State of Texas
My Commission Expires 2-08-93

VERIFICATION

STATE OF TEXAS)
) SS:
COUNTY OF HARRIS)

BEFORE ME, the undersigned authority, on this day personally appeared F. R. ADAMCHAK, who, having been by me first duly sworn, on oath says that he is Manager of International Natural Gas of Marathon Oil Company and duly authorized to make this Verification; that he has read the foregoing instrument and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

F. R. Adamchak

Subscribed and sworn to before me, a notary public, this 22nd day of November, 1991.

Notary Public

My Commission expires:

November 8, 1993

APPENDIX A

LETTER OF INTENT AND
SECOND AMENDATORY AGREEMENT

LETTER OF INTENT REGARDING SECOND AMENDATORY AGREEMENT TO JUNE 17, 1988 EXTENSION AGREEMENT

By letter dated April 30, 1991, the Buyers, The Tokyo Electric Power Co., Inc. and Tokyo Gas Co., Ltd., indicated their interest in purchasing additional volumes of LNG from the Sellers, Phillips Alaska Natural Gas Corporation and Marathon Oil Company, under the June 17, 1988, LNG Sale and Purchase Extension Agreement. We have further discussed the increased volume commitments and have substantially agreed on the terms of a Second Amendatory Agreement to the Extension Agreement, the latest draft of which is attached as Exhibit A to this Letter of Intent and incorporated by reference.

The parties are executing this Letter of Intent to signify their substantial satisfaction with the attached Second Amendatory Agreement and their intent to recommend final approval of the amendment, subject to such further modifications as may be agreed among the parties.

EXECUTED this 31st day of October, 1991.

PHILLIPS ALASKA NATURAL GAS CORPORATION

By R. D. Wimer
R. D. Wimer, Vice President

MARATHON OIL COMPANY

By F. R. Adamchak
F. R. Adamchak, Manager
International Natural Gas

THE TOKYO ELECTRIC POWER CO., INC.

By K. Nemoto
K. Nemoto, General Manager
LNG Project Office

TOKYO GAS CO., LTD

By M. Nose
M. Nose, General Manager
Gas Resources Department

EXHIBIT A

SECOND AMENDATORY AGREEMENT

THIS AGREEMENT made and entered into by and between Phillips Alaska Natural Gas Corporation (Phillips) as successor to Phillips 66 Natural Gas Company and Phillips Petroleum Company, corporations incorporated under the laws of the State of Delaware, the United States of America and Marathon Oil Company (Marathon), a corporation incorporated under the laws of the State of Ohio, the United States of America, hereinafter collectively referred to as "Sellers", and The Tokyo Electric Power Company, Incorporated (Tokyo Electric) and Tokyo Gas Co., Ltd. (Tokyo Gas), corporations incorporated under the laws of Japan, hereinafter collectively referred to as "Buyers".

WITNESSETH:

Sellers and Buyers have discussed increasing annual contract quantity (ACQ) applicable under the Liquefied Natural Gas Sale and Purchase Extension Agreement dated the 17th day of June, 1988, (hereinafter referred to as "Extension Agreement"). Sellers are undertaking modifications to manufacture incremental LNG and will have surplus shipping capacity upon delivery of the new LNG tankers now under construction. Buyers have expressed their interest in purchasing such incremental LNG. Now, therefore, in consideration of the mutual and dependent promises herein contained, Sellers and Buyers shall agree as follows:

1. Article V, Sections 5.1 and 5.2c in the Extension Agreement shall be deleted and replaced with the following:

   5.1 ANNUAL CONTRACT QUANTITY

   The annual contract quantity of LNG which Sellers agree to sell and deliver and Buyers agree to purchase and receive under this Extension Agreement shall be denominated in BTU's and shall be as per the following table for the contract years commencing April 1 of the years shown:

Contract Year	TOTAL Btu's Trillion	TOTAL Metric Tons Thousand	TOKYO ELECTRIC Btu's Trillion	TOKYO ELECTRIC Metric Tons Thousand	TOKYO GAS Btu's Trillion	TOKYO GAS Metric Tons Thousand
1989-1992	52.0	988.0	39.0	741.0	13.0	247.0
1993	56.0	1,064.0	42.0	798.0	14.0	266.0
1994-2003	64.4	1,224.0	48.3	918.0	16.1	306.0

Metric Tons are approximations for information purposes and shall in no way affect this Extension Agreement.

In reference to Section 4.1 of the Extension Agreement, Sellers have contracted for the purchase of two new LNG tankers scheduled for delivery during June and December 1993. If Sellers anticipate any material delay in new LNG tankers introduction beyond these dates, Sellers shall notify Buyers of the delay, and Sellers and Buyers shall meet and discuss the necessary changes to the annual contract quantity for the contract years 1993 and 1994.

On or before March 31, 1994, Sellers shall have the option, upon written notice to Buyers, to change the annual contract quantity from contract year 1997 through contract year 2003. Prior to providing such written notice to Buyers, Sellers and Buyers shall meet to discuss Sellers election to change the annual contract quantity. Thereafter, the annual contract quantity of LNG which Sellers agree to sell and deliver and Buyers agree to purchase and receive under this Extension Agreement shall be as per the following table:

TOTAL Btu's Trillion	TOTAL Metric Tons Thousand	TOKYO ELECTRIC Btu's Trillion	TOKYO ELECTRIC Metric Tons Thousand	TOKYO GAS Btu's Trillion	TOKYO GAS Metric Tons Thousand
57.5	1,092.0	43.125	819.0	14.375	273.0

Metric Tons are approximations for information purposes, and shall in no way affect this Extension Agreement.

Prior to the arrival of a cargo of LNG at the LNG berthing facilities used jointly by Buyers, Buyers shall declare together to Sellers the ratio, totalling one hundred percent (100%), in which such cargo is to be allocated between Buyers.

For the purpose of calculating the quantity delivered in a contract year, delivery and receipt of all LNG unloaded from any LNG tanker shall be deemed to have been made on the day on which unloading of that LNG was commenced.

5.2c ACCUMULATED ANNUAL UNDERLIFT QUANTITY

All annual underlift quantities and annual overlift quantities shall be accumulated at the end of each contract year and the accumulated annual overlift quantity shall be subtracted from the accumulated annual underlift quantity to determine the net accumulated underlift quantity, if any. Buyers shall limit the net accumulated underlift quantity to a maximum of sixty trillion, five hundred thirty-four billion (60,534,000,000,000) Btu's, as for Tokyo Electric to a maximum of forty-five trillion, four hundred billion, five hundred million (45,400,500,000,000) Btu's and as for Tokyo Gas to a maximum of fifteen trillion, one hundred thirty-three billion, five hundred million (15,133,500,000,000) Btu's. If pursuant to Section 5.1 above, Sellers provide notice to change the annual contract quantity from the contract year 1997, Buyers shall limit net accumulated underlift quantity to a maximum of fifty-seven trillion, three hundred fourteen billion (57,314,000,000,000) Btu's, as for Tokyo Electric to a maximum of forty-two trillion, nine hundred eighty-five billion, five hundred million (42,985,500,000,000) Btu's and as for Tokyo Gas to a maximum of fourteen trillion, three hundred twenty-eight billion, five hundred million (14,328,500,000,000) Btu's.

Buyers shall not exercise their rights under Section 5.2a above at any time during any contract year if such exercise would result in a net accumulated underlift quantity exceeding the maximums mentioned above at the end of that contract year. Buyers shall endeavor to bring the net accumulated underlift quantity to zero (0) by the end of this Extension Agreement.

2. The provisions of the Extension Agreement other than those specified in this Agreement shall remain as they are.

3. APPROVAL AND AUTHORIZATION OF GOVERNMENTAL REGULATORY BODIES:

3.1 Endeavors to obtain Approvals and Authorizations:

Sellers shall use their best endeavors to obtain forthwith any and all approvals and authorizations required by any legally constituted regulatory bodies of the United States of America, or deemed necessary by Sellers to allow Sellers to commence and continue deliveries of LNG to Buyers under this Agreement, furnishing Buyers with certified copies of all such governmental approvals and authorizations, together with certified copies of rules, regulations and restrictions promulgated by each regulatory body in connection with such approvals and authorizations.

If Sellers fail to obtain by December 31, 1992, the necessary governmental approvals and authorizations to modify the plant as necessary and to increase the annual contract quantity in conformance with this Agreement, Sellers or Buyers may terminate this Agreement at any time thereafter by written notice to the other of their intent to terminate, so long as such notice is given prior to obtaining of such approvals and authorizations. Such termination will not affect the terms and conditions of the Extension Agreement. Further, if any governmental approval or authorization issued imposes terms or conditions unreasonable to Sellers, then Sellers may terminate this Agreement by written notice to Buyers within thirty (30) days after issuance of the said final government approval or authorization.

Both of Sellers or both of Buyers shall act jointly in terminating this Agreement under this Section.

3.2 Liability of Termination:

Should either Sellers or Buyers exercise the right under Section 3.1 to terminate this Agreement, the parties exercising the right shall not be liable to the other parties for any losses, damages or expenses incurred by such other parties as a result of the termination of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in good faith, by their respective duly authorized officers as of the date set forth below.

BUYERS:	SELLERS:
THE TOKYO ELECTRIC POWER COMPANY, INCORPORATED	PHILLIPS ALASKA NATURAL GAS CORPORATION
BY: _____ President & Director	BY: _____ President
TOKYO GAS CO., LTD.	MARATHON OIL COMPANY
BY: _____ President & Director	BY: _____ President

DATED: _____, 1991

APPENDIX B

P66NGC - PANGC ASSIGNMENT AGREEMENT

0013 0001 4038

ASSIGNMENT AGREEMENT

This Assignment Agreement is entered into this 25th day of July, 1991, but effective as of January 1, 1991, by and between PHILLIPS 66 NATURAL GAS COMPANY, a Delaware corporation ("Assignor") and PHILLIPS ALASKA NATURAL GAS CORPORATION, a Delaware corporation ("Assignee").

WHEREAS, Assignor is a party seller to the "Liquefied Natural Gas Sale and Purchase Extension Agreement" ("Extension Agreement") dated as of June 17, 1988, among Assignor, Marathon Oil Company, The Tokyo Electric Power Company, Incorporated, and Tokyo Gas Co., Ltd., under which sales of liquefied natural gas produced in Alaska are made to the buyers in Tokyo, Japan; and

WHEREAS, Assignor desires to assign its interest in the Extension Agreement to Assignee, a wholly owned subsidiary of Assignor;

NOW THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Assignor does hereby assign to Assignee all of Assignor's right, title, and interest as a party to the Extension Agreement. Assignor retains its rights and obligations under the Agreement as to the period prior to January 1, 1991, and agrees to remain responsible for the performance of its obligations under the Extension Agreement for the period on and after January 1, 1991, thereby waiving the release provision of the second paragraph of

Section 20.1 "Assignment" of the Extension Agreement. Assignee agrees to assume, honor, and perform all obligations of Assignor under the Extension Agreement effective as of January 1, 1991.

IN WITNESS WHEREOF, this Assignment is executed by the duly authorized officials of the parties effective as of the date set forth above.

ATTEST

D. L. Cone
~~Secretary~~
D. L. Cone, Assistant Secretary

PHILLIPS 66 NATURAL GAS COMPANY

By K. L. Smalley
K. L. Smalley, President

ATTEST

A. V. Zelewski
Assistant Secretary
A. V. Zelewski

PHILLIPS ALASKA NATURAL GAS CORPORATION

By C. B. Friley
C. B. Friley, Vice President

CONSENT TO ASSIGNMENT

In consideration of the covenants set forth in the Assignment Agreement above, Marathon Oil Company hereby consents to the above assignment and to the modification of the release provision of the second paragraph of Section 20.1 "Assignment" of the Extension Agreement for purposes of this assignment.

ATTEST

Secretary

MARATHON OIL COMPANY

By
Vice President

APPROVED AS TO FORM

91-103-LNG

UNITED STATES OF AMERICA

Department of Transportation
Research and Special Programs Administration

Phillips Alaska Natural Gas Corporation
and
Marathon Oil Company,
Petitioners.

Docket No. P-47

PETITION OF PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPANY FOR CONTINUED EXEMPTION AND FOR APPROVAL OF MODIFICATIONS AT KENAI LNG PLANT

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Counsel for
MARATHON OIL COMPANY

August 26, 1991

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION

RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION

Phillips Alaska Natural Gas Corporation and Marathon Oil Company	))))	Docket No. P-47

PETITION OF PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPANY FOR CONTINUED EXEMPTION AND FOR APPROVAL OF MODIFICATIONS AT KENAI LNG PLANT

Phillips Alaska Natural Gas Corporation ("PANGC") and Marathon Oil Company ("Marathon"; both are "Petitioners") petition the Research and Special Programs Administration of the Department of Transportation ("RSPA" of "DOT") for a finding that certain modifications planned for the Kenai LNG Plant near Nikiski, Alaska, are not significant and will not cause the Kenai LNG Plant to lose its grandfathered exempt status under the DOT's regulations in 49 C.F.R. Part 193 applicable to the siting, design, installation, and construction of LNG facilities. This petition is filed pursuant to 49 U.S.C. App. §§1672(d) and 1674a and 49 C.F.R. §193.2015. In the alternative, should the RSPA find that the grandfathered status of the Kenai LNG Plant is in any way impaired by the modifications proposed, Petitioners request a waiver or amendment of the applicable requirements as to the Kenai LNG Plant. Petitioners also request a determination that the attached designs for the replacement or new components and parts of the Kenai LNG Plant

are consistent with 49 C.F.R. Part 193 or are otherwise acceptable to the Director of the RSPA.

I.

CORRESPONDENCE

Correspondence regarding this petition should be addressed to:

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Marathon Oil Company
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Mr. F. R. Adamchak, Manager
International Natural Gas
Marathon Oil Company
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Houston, TX 77253
(713) 629-6600

PANGC is a Delaware corporation with its principal place of business in Bartlesville, Oklahoma, and is an affiliate of Phillips Petroleum Company. PANGC has just assumed participation in the Kenai LNG project from Phillips 66 Natural Gas Company, which is its parent and a subsidiary of Phillips. Marathon is an Ohio corporation with its principal offices in Houston, Texas, and is an affiliate of USX Corporation.

II.

BACKGROUND

PANGC and Marathon transport natural gas produced in the Cook Inlet area of Alaska, manufacture liquid natural gas ("LNG") in the Kenai LNG Plant near Nikiski, Alaska, load the LNG onto LNG tankers at the Kenai LNG Plant, and export LNG for sale to customers in Tokyo, Japan. Construction of the Kenai LNG Plant was commenced in 1967 following Federal Power Commission authorization for LNG exports to Japan under Section 3 of the Natural Gas Act, 15 U.S.C. §717b ("NGA"). Phillips Petroleum Co., 37 FPC 777 (1967). The Kenai LNG Plant commenced operations in 1969 and has been operated continuously since then for the purpose of the Japanese export sales. Regulatory authorizations for extensions and modifications of the sales agreements with the Japanese customers have been extended and amended on several occasions.[1] Presently, PANGC and Marathon are making sales to The Tokyo Electric Power Company, Incorporated, and Tokyo Gas Co., Ltd. under a Liquefied Natural Gas Sale and Purchase Extension Agreement dated June 17, 1988. The contract and the present export authorization under Section 3 of the NGA are for a term ending in 2004.

The 1988 Extension Agreement contemplates that Petitioners will replace their existing LNG tankers with new and

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[1] DOE/ERA Opinion and Order No. 49 (1 ERA ¶70,116, December 14, 1982); DOE/ERA Opinion and Order No. 49-A (1 ERA ¶70,127, April 3, 1986); DOE/ERA Opinion and Order No. 206 (1 ERA ¶70,128, November 16, 1987); DOE/ERA Opinion and Order No. 261 (1 ERA ¶70,130, July 28, 1988); and DOE/FE Order No. 261-A (June 18, 1991).

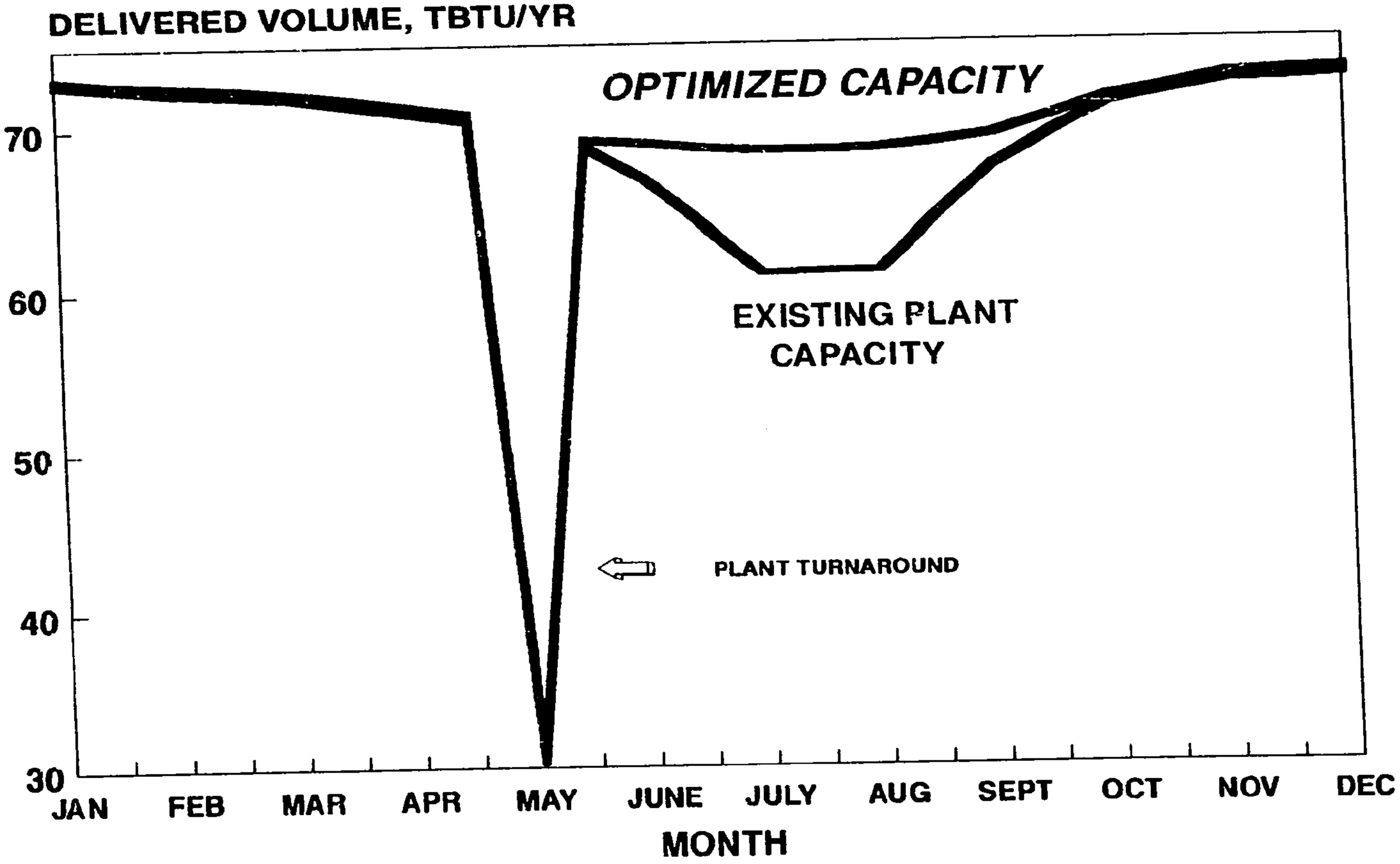
slightly larger LNG tankers before June 1994. At the time of replacement of the tankers, the contractually authorized base export volumes are to increase from 52 trillion Btu's per year to 57.5 trillion Btu's per year. The 1988 Extension Agreement also allows deliveries of an additional six percent (6%) above the base contract quantities in certain circumstances. The Kenai LNG Plant as presently constructed can accommodate these increased export volumes, which are presently authorized; but Petitioners desire to make changes to improve the efficiency of the Kenai LNG Plant and to provide a more constant year-round margin in the plant's ability to produce required LNG volumes. Finally, the parties are contemplating an additional incremental increase in export volumes which will be within the capabilities of the Kenai LNG Plant as modified.

III.

MODIFICATIONS PLANNED

The modifications planned for the Kenai LNG Plant will increase its efficiency and reliability. The maximum daily inlet capacity will not be materially increased. However, the plant's ability to produce LNG is impacted by ambient air temperature as the seasons of the year change. The plant is capable of producing higher volumes of LNG during the winter than during the summer. The modifications planned will somewhat smooth out the plant's production capability and increase LNG production capability materially in the summer months as indicated in the following chart:

KENAI LNG PLANT OPTIMIZED CAPACITY



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The planned modifications materially decrease the June to September summer downturn in LNG production capability. The significant decrease in production in May of each year shown on the chart is due to annual plant turnarounds for maintenance purposes that normally occur each year in May.

The essence of Petitioners' plan to modify the Kenai LNG Plant follows. Petitioners plan to:

(1) Improve the efficiency of the fuel gas system;

(2) Add cooling water capacity to improve summer LNG production capability;

(3) Replace one or both existing LNG transfer pumps between the LNG manufacturing trains and the storage tanks;

(4) Expand and upgrade fire water and fire protection systems; and

(5) Consider adding a new waste heat boiler for steam generation to reduce loads on existing boilers, improve fuel efficiency, and reduce flue gas emissions.

As an example of the changes contemplated within the fuel gas system, a new LNG storage tank vapor blower will decrease the loss of methane gas from the three existing LNG storage tanks and will recover natural gas equivalent to approximately two percent (2%) of inlet volumes. This will in turn decrease natural gas production and inlet volume requirements by a similar amount. This significant increase in plant efficiency will also largely eliminate present methane emissions to the air from the LNG storage tanks.

The specific plant modifications to be made are outlined in full in Appendix "A" attached to and incorporated by reference in this petition. Appendix "A" includes a narrative of the proposed plant modifications resulting from a 1990 Kenai LNG Plant efficiency study and a series of plot plans and process flow diagrams that illustrate the contemplated changes in more detail.

With the exception of the replacement of one LNG transfer pump, the mechanical design of the LNG liquefaction process is unaltered by the proposed changes. The majority of the modifications are to the utility systems. The changes allow the facility to operate year round at a production level closer to the plant's maximum daily inlet capacity. For these reasons and for the reasons outlined in detail in Appendix "A", Petitioners do not believe that the proposed changes to the Kenai LNG Plant process make a significant alteration to the existing facility.

IV.

ARGUMENT

A. THE EXISTING KENAI LNG PLANT FACILITIES RETAIN THEIR GRANDFATHERED EXEMPT STATUS FOLLOWING THE PROPOSED MODIFICATIONS.

1. Statutory Exemption. Congress amended the Natural Gas Pipeline Safety Act of 1968 ("NGPSA") in 1979 to provide for safety regulation of LNG facilities. As to matters of design,

location, construction, initial inspection, and initial testing, previously constructed LNG facilities were exempted from regulation. Congress was concerned that already-constructed facilities should not be required to meet the new regulations, since they had not been sited, designed or constructed in accordance with the new requirements. In adopting the 1979 LNG safety amendments to the NGPSA, Congress required the Secretary of the DOT to formulate regulations applicable to future LNG facilities not later than 1980, but provided the following exemption for existing LNG facilities:

> (c) Effect on existing LNG facilities
>
> (1)(A) Except to the extent provided under subparagraph (B), any standard issued under this chapter after March 1, 1978, affecting the design, location, installation, construction, initial inspection, or initial testing shall not apply to an existing LNG facility either--
>
> (i) under the authority of this chapter; or
>
> (ii) under the authority of any other Federal law if such standard was not issued at the time such authority was exercised.
>
> (B) Any such standard (other than one affecting location) may be made applicable under the provisions of such standard to any replacement component or part thereof of an LNG facility if that component or part is placed in service after the date of the issuance of that standard, but only if such applicability
>
> (i) would not render such component or part incompatible with the other components or parts of the facility involved; or
>
> (ii) would not otherwise be impracticable.
>
> No standard issued under this chapter after March 1, 1978, affecting location shall apply to any replacement component or part thereof of an existing LNG facility.
>
> . . . .

(3) Standards affecting the design, installation, construction, initial inspection, and initial testing shall not be applicable to LNG facilities in existence on the date such standards are adopted.

49 U.S.C. App. §1674a(c).

Subsections (c)(1)(A) and (c)(3) above provide a clear, unqualified statutory exemption from LNG safety regulation of siting, construction, and related matters as to LNG facilities constructed prior to March 1, 1978. The Kenai LNG Plant is such a "grandfathered" LNG Plant.

Subsection (c)(1)(B) addresses the subject of replacement components or parts of LNG facilities. Even as to replacement components or parts, LNG safety regulation as to design and construction is not to apply unless DOT finds that applicability of the LNG safety regulations would not render the component or part incompatible with the other components or parts of the existing LNG facility, or would not otherwise be impracticable. The statute further states that no siting approval requirements are to apply to any replacement components or parts of pre-March 1, 1978, existing LNG facilities.

Given this statutory exemption, Petitioners submit that the current petition for clarification presents no substantial or difficult issue. Petitioners do not seek a determination that the replacement parts or components need be or should be exempt from LNG safety regulation. The replacement parts and components have been designed and will be constructed in accordance with the applicable regulatory requirements of 49 C.F.R. Part 193. Petitioners simply seek confirmation from the DOT

that the existing unmodified parts of the Kenai LNG Plant will remain exempt from the design, location, installation, construction, initial inspection and initial testing requirements of the LNG facility safety regulations.

2. DOT-RSPA Regulations. In accordance with the 1979 LNG safety amendments to the NGPSA, the DOT adopted LNG facility safety regulations in 1980, 49 C.F.R. Part 193. Subsection (a) of 49 C.F.R. Section 193.2005 echoes the statutory exemption for pre-March 1, 1978, LNG facilities. An exemption as to siting, design, installation and construction applies to:

> (1) LNG facilities under construction before the date such standards are published; or
>
> (2) LNG facilities for which an application for approval of the siting, construction, or operation was filed before March 1, 1978, with the Department of Energy (or any predecessor organization of that Department) or the appropriate State or local agency in the case of any facility not subject to the jurisdiction of the Department of Energy under the Natural Gas Act (not including any facility the construction of which began after November 29, 1979, not pursuant to such an approval).

49 C.F.R. §193.2005(a)(1) and (2).

The Kenai Plant meets the exemption criteria in both subsections of the regulation. The facility was under construction years before the date of publication of the standards adopted in Part 193; and Petitioners or their predecessors in interest had filed for and secured approval for LNG exports under Section 3 of the NGA with the Department of Energy or its predecessor agency the Federal Power Commission well before adoption of the LNG safety amendments to the NGPSA.

Subsection (b) of 49 C.F.R. §193.2005 deals with the matter of replacement parts or components of existing LNG facilities in language that differs somewhat in tone from the statutory provisions, but is generally consistent with the statutory terms discussed above:

> (b) If an LNG facility listed in paragraph (a) of this section is replaced, relocated, or significantly altered after February 11, 1980, the replacement, relocated facility, or significantly altered facility must comply with the applicable requirements of this part governing siting, design, installation, and construction, except that:
>
> (1) The siting requirements apply only to LNG storage tanks that are significantly altered by increasing the original storage capacity or relocated, not pursuant to an application for approval filed as provided by paragraph (a)(2) of this section before March 1, 1978; and
>
> (2) To the extent compliance with the design, installation, and construction requirements would make the replaced, relocated, or altered facility incompatible with other facilities or would otherwise be impracticable, the replaced, relocated, or significantly altered facility may be designed, installed, or constructed in accordance with the original specifications for the facility, or in a manner that the Director finds acceptable.

With respect to replacement parts and components, the DOT in subparagraph (b)(2) apparently presumes that the replacement parts and components will not be incompatible with the existing LNG facilities if designed and constructed in accordance with the LNG safety regulations. To the extent that compliance with the safety regulations as to the replacement parts and components would make the replacement parts and components incompatible with the pre-existing facilities or would be impracticable, the replacement parts and components are to be designed "in a manner that the Director finds acceptable."

The opening subparagraph of 49 C.F.R. §193.2005(b) includes a phrase that raises an interpretation question:

> [T]he replacement, relocated facility, or significantly altered facility must comply . . . .

While this statement is subject to the exceptions in the following subparagraphs (b)(1) and (b)(2) that reflect exemptions in the statute, it carries at least a potential implication that even the unaltered portions of a grandfathered LNG plant must be brought into compliance with the design and construction portions of the LNG facilities regulations if another component of the plant is "significantly altered."

The RSPA should clarify that this is not the regulation's intent. First, the statutory provisions discussed above grant an unqualified continuing exemption for the unaltered portions of grandfathered LNG facilities. A contrary interpretation of the regulation would conflict with the statute. Second, when read in conjunction with the definitions contained in 49 C.F.R. §193.2007, the "significant alteration" phrase does not affect the continuing exemption for grandfathered LNG facilities, but addresses only the replacement components and parts that constitute the alteration of the plant. In Section 193.2007, "LNG facility" is defined as a "pipeline facility that is used for liquefying or solidifying natural gas." The term "LNG plant" is defined "an LNG facility or system of LNG facilities functioning as a unit." This definition establishes that an LNG plant such as the Kenai LNG Plant may consist of a number

of "LNG facilities." Finally, "pipeline facility" is defined as follows:

> Pipeline facility means new and existing piping, rights of way, and any equipment, facility, or building used in the transportation of gas or in the treatment of gas during the course of transportation.

"Pipeline facility" refers to specific items of equipment, buildings, lengths of pipe, and the like. For these reasons, "LNG facility" as used in Section 193.2005(b) in practice refers to the particular replacement parts and components that may be significantly altered rather than to the entire Kenai LNG Plant.

In any event, the Kenai LNG Plant will not be "significantly altered" by the current planned modification. Our outline above and Appendix "A" demonstrates that the modifications are minor in relation to the overall Kenai LNG Plant facilities. The estimated cost of the modifications is approximately $18.7 million. This figure is small in comparison to the estimated cost of replacement of the Kenai LNG Plant with new facilities, which may range from $250 million to $300 million. The modifications do not address the primary liquefaction process, and affect the existing LNG storage tanks only by making improvements in handling of boil-off natural gas vapors. Under the ordinarily understood meaning of the term, no "significant alteration" of the overall Kenai LNG Plant will occur as a result of the planned modification.

Petitioners submit that under both the statute and the RSPA's regulations, unaltered portions of grandfathered exempt

LNG plants are to remain exempt from regulations as to design, construction, location, and related matters. Since Petitioners do not assert that the replacement components and parts are exempt from the design and construction criteria, no substantial issue under 49 C.F.R. §193.2005(b)(2) is presented.

B. THE REPLACEMENT COMPONENTS AND PARTS SHOULD BE APPROVED AS CONSISTENT WITH PART 193; ALTERNATELY, A WAIVER SHOULD BE GRANTED.

Petitioners request that the RSPA review the outline of the proposed Kenai LNG Plant changes in Appendix "A" and determine that the replacement parts and components have been designed in a manner that either satisfies applicable 49 C.F.R. Part 193 regulations or is acceptable to the Director of the RSPA. Waivers or modifications of the LNG safety regulations are clearly authorized in the NGPSA at 49 U.S.C. App. §1674a(e) and in the regulations at Section 193.2005(b)(2). In the alternative, to the extent that a waiver of applicable regulatory requirements is necessary to grant the determinations and approvals requested above, Petitioners hereby request such a waiver so that the benefits of the improvements contemplated may be realized at the earliest possible date.

V.

CONCLUSION

WHEREFORE, Petitioners respectfully request that the foregoing Petition be granted, that the RSPA find that the existing Kenai LNG Plant facilities will continue to be exempt under 49 C.F.R. Part 193, and that the replacement parts and

components contemplated in this Petition satisfy Part 193 design standards or are otherwise acceptable to the RSPA.

Respectfully submitted,

PHILLIPS ALASKA NATURAL GAS CORPORATION

By Larry Pain

Larry Pain, Attorney
1256 Adams Building
Bartlesville, Oklahoma 74004
(918) 661-6355

MARATHON OIL COMPANY

By Lauren Boyd by LP

Lauren Boyd, Attorney
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August 26, 1991

APPENDIX A TO PETITION
FOR CONTINUED EXEMPTION

KENAI LNG PLANT EFFICIENCY STUDY
PROPOSED PLANT MODIFICATIONS

INTRODUCTION

During 1990, a process review of the Kenai LNG Plant located near Kenai, Alaska was completed. The results of the study indicated the plant efficiency and reliability could be increased by implementing certain modifications to the plant. This summary presents a narrative description of the planned modifications to the following systems at the Kenai LNG Plant:

- Fuel Gas
- Cooling Water
- Steam Generation
- LNG Transfer
- Fire Water

Details of these modifications are outlined in the schedules and and diagrams that follow.

SAFETY CONSIDERATIONS

The Kenai LNG Plant has had an exemplary safety record over many years of operation. As one of the oldest continuously operating LNG plants in the world, the Kenai Plant still serves as an LNG role model for safe and reliable operation. Since the beginning of operation, the plant has been maintained with a rigorous program which includes regular inspections by company and outside experts. An in-depth plant review is conducted at the annual plant turnaround (major maintenance and inspection operation during a scheduled plant shutdown). In over 20 years of operation, only one DOT reportable equipment failure has occurred. This failure resulted from erosion of the J-T valve body (flashing LNG from high pressure to final flash tank pressure). The valve was replaced with a valve with a stellite coated body, and there have been no problems since as indicated by the annual inspection of the valve. Petitioners' commitment to safety began in the early stages of project development and continues throughout the project life.

Safety and hazard reduction will be given high priority in the design and installation of all the planned modifications. Safety and hazard design reviews will be conducted during key phases of the engineering and construction. Specific hazard analyses are shown as milestones on the proposed Summary Job Schedule for the engineering and construction. (Refer to Attachment 1).

Petitioners' reviews include a process design hazards review, a mechanical design hazards review (using one or more recognized methodologies such as 'What If' check or Hazop), and a precommissioning operations hazards review. The process design hazard review has been completed and documented. It should be noted that both the process and mechanical design hazards review procedures are presently being reviewed for revision to meet the requirements of the OSHA proposed 29CFR 1910 Rules.

Process Modifications

The proposed process modifications for the fuel gas system, the cooling water system, the steam system, and the LNG transfer system are discussed in this section. For each system, a description of the proposed revision, the basis for completing the revision, and impact on the plant operation is provided. Attachment 2 contains diagrams which show simplified flow of the main liquefaction, storage and fuel system before and after the modifications. Attachment 3 contains the Process Flow Diagrams for the plant. All new modifications are shown encircled in clouds on the flow diagrams. Since the design is affected by both summer and winter operations, both operational cases are shown on separate flow diagrams.

· Fuel Gas System

The existing fuel gas system consists of a storage vapor blower, two methane refrigerant to fuel gas exchangers, and a gas driven fuel gas compressor. The storage vapor blower recovers LNG vapors from three storage tanks. This LNG vapor is combined with flash gas from the f[illegible]l flash tank in the liquefaction train. The combined stream is heat exchanged with methane refrigerant in the Methane Refrigerant Subcooler and then the Methane Refrigerant Economizer. The warmed gas is then compressed by the fuel gas compressor into the fuel gas header. A letdown of dry liquefaction feed gas is used to maintain pressure in the fuel gas header as loads vary.

The existing fuel gas compressor and the storage vapor blower do not have sufficient capacity to recover all of the flash and storage vapors. This has been exhibited by venting of storage tank vapors to atmosphere.

To eliminate venting of this vapor to atmosphere and raise the overall plant efficiency by reducing losses, the following modifications are proposed.

1. Replacing the existing storage blower with a higher capacity blower. The blower will be driven by a variable frequency drive motor controlling the suction pressure of the blower by varying the motor speed.

2. The installation of an auxiliary fuel compressor to recover the higher fuel gas flows that will be available from the new storage vapor blower. This compressor would also utilize a variable frequency drive motor.

The installation of this equipment would also provide the benefit of reducing the dry feed gas which is used as fuel make-up volume. The proposed modifications to the fuel system are illustrated on the following PFDs in Attachment 3:

P-B-006 - Final Flash And Fuel Gas System Summer Design Case

P-B-026 - Final Flash And Fuel Gas System Winter Design Case

U-B-001 - LNG Storage (new storage vapor blower) Summer Design Case

U-B-021 - LNG Storage (new storage vapor blower) Winter Design Case

· Cooling Water System

The existing cooling tower and cooling water pumps have never performed as originally specified. It has been determined that the existing equipment could be brought up to the original design specifications with only minor modification. Currently, there is insufficient cooling water to condense the maximum propane refrigerant from the propane compressors during the warm summer months. This is due in part to low cooling water rates and high cooling water supply temperatures. This has caused high propane compressor discharge pressures and reduced plant capabilities during summer operations. To correct these problems, an upgrade and expansion of the cooling water system is proposed. The modifications would include the following:

1. Replacement of the existing cooling tower fan blades with new fan blades of higher efficiency.

2. The addition of two new cooling tower cells.

3. The addition of four cooling water pumps and a new pump pit for those pumps. (Three operating pumps and one spare). These pumps would be attached to the new cooling tower cells basin. The pumps would be for service flow for both the existing and new cooling tower cells.

The proposed cooling water system modifications are shown on the following PFDs in Attachment 3.

U-B-002 - Cooling Water System

U-B-005 - Cooling Tower Modifications

· Steam System

To reduce fuel gas requirements, a waste heat boiler is proposed. The boiler would utilize the exhaust gas from the existing fuel gas compressor's gas turbine driver to generate saturated 400 psig steam. The addition of the boiler would reduce the duty on the existing fired boilers so that fuel gas required for steam production is reduced. The addition would also lower the flue gas emissions to atmosphere.

This modification is being handled as a stand alone project with the fuel savings for project justification. If acceptable economics are not generated, it is possible this portion of the project may not be implemented.

The proposed modifications for the steam system are shown on the following listed PFDs in Attachment 3.

U-B-003 - Steam Balance

U-B-004 - Wasteheat Boiler

· LNG TRANSFER SYSTEM

In reviewing the existing LNG transfer pumps, it was determined the pumps may be operating near their upper limit of stable operation with the efficiency improvement items implemented. To enhance the safety and reliability of the transfer system, the following modifications are proposed:

1. Purchase two new LNG transfer pumps sized for the revised process conditions.

2. Replace one existing LNG transfer pump with a new pump sized for the revised process conditions. The pump will be designed to fit into the existing suction pot.

3. Replace the second existing LNG transfer pump with the remaining new pump when satisfactory operation is achieved with the first replacement LNG transfer pump.

The proposed modifications to the LNG transfer system are shown on the following listed PFDs in Attachment 3.

P-B-006 - Final Flash And Fuel Gas System Summer Design Case

P-B-026 - Final Flash And Fuel Gas System Winter Design Case

· FIRE WATER SYSTEM

The existing fire water system was determined to need modifications to provide adequate protection for the plant with the process modifications installed. The major modifications proposed for the fire water system are as follows:

1. Install three new fire water deluge systems. The new systems will be installed in the following locations;

   a. The new cooling tower cells

   b. The new auxiliary fuel gas compressor building

   c. The new storage vapor blower building.

2. Install two additional 2500 GPM diesel engine driven fire water pumps, and replace two existing 750 GPM gasoline engine driven pumps with one 1500 GPM diesel engine driven pump.

The equipment layout for the proposed modifications is provided on Drawing D-A-001 "Efficiency Study Overall Plot" in Attachment 4.

SUMMARY

Modifications planned for the Kenai LNG plant will increase the efficiency and reliability of the existing plant. The modifications as outlined in this letter will allow the facility to operate safely year round at a production level closer to its maximum production capacity.

Except for the replacement of the LNG transfer pumps, the mechanical design of the liquefaction process is unaltered by the proposed changes. The majority of the modifications are to the utility systems. Petitioners do not believe that the proposed changes to the Kenai LNG Plant process make a significant alteration to the existing facility, therefore; the siting, design, installation and construction portions of 49 C.F.R. Part 193 do not apply.

APPENDIX C

OPINIONS OF LEGAL COUNSEL REGARDING
CORPORATE AUTHORITY TO EXPORT LNG

PHILLIPS ALASKA NATURAL GAS CORPORATION
BARTLESVILLE, OKLAHOMA 74004

November 14, 1991

Office of Fuels Programs
Fossil Energy, U. S. Department of Energy
Docket Room 3F-056, FE50
Forrestal Building
1000 Independence Avenue, SW
Washington, D.C. 20585

Re: Phillips Alaska Natural Gas Corporation / Marathon Oil Company Application for LNG Export Authorization, Opinion of Counsel Regarding Corporate Powers

Ladies and Gentlemen:

In accordance with the requirements of 10 C.F.R. §590.202(c), I have examined the Certificate of Incorporation and Bylaws of Phillips Alaska Natural Gas Corporation, a Delaware corporation, the Delaware corporation law and other authorities as necessary, and have concluded that the proposed exportation of natural gas by Phillips Alaska Natural Gas Corporation, one of the applicants, is within the corporate powers of Phillips Alaska Natural Gas Corporation. Further, Phillips Alaska Natural Gas Corporation is authorized to do business in Alaska and to engage in foreign commerce. Phillips Alaska Natural Gas Corporation is a wholly-owned subsidiary of Phillips 66 Natural Gas Company, which in turn is a wholly-owned subsidiary of Phillips Petroleum Company, a Delaware corporation, which has similar corporate powers and authority.

Very truly yours,

Larry Pain

Attorney for
Phillips Alaska Natural Gas
Corporation
1256 Adams Building
Bartlesville, OK 74004
(918) 661-6355

LP/jk

Lauren D. Boyd
Attorney
Exploration & Production United States

Marathon Oil Company

P.O. Box 4813
Houston, Texas 77210
Telephone 713/296-2539
FAX 713/296-2581

November 21, 1991

Office of Fuels Programs, Fossil Energy
U.S. Department of Energy
Forrestal Building, Room GA-076
1000 Independence Avenue, S.W.
Washington, D.C. 20585

RE: Phillips Alaska Natural Gas Corporation/
Marathon Oil Company
Application to Amend Authorization
to Export Liquefied Natural Gas,
Opinion of Counsel Regarding
Corporate Powers

Ladies and Gentlemen:

In accordance with the requirements of 10 C.F.R. § 590.202(c), as counsel for Marathon Oil Company, I have reviewed the relevant corporate documents and have concluded that the proposed exportation of natural gas by Marathon Oil Company, one of the applicants, is within the corporate powers of Marathon Oil Company. Further, Marathon Oil Company is a corporation duly organized under the laws of the State of Ohio and is authorized to do business in Alaska and to engage in foreign commerce.

Very truly yours,

Lauren D. Boyd

Lauren D. Boyd

Attorney for
Marathon Oil Company
P.O. Box 4813
Houston, Texas 77210
(713) 296-2539

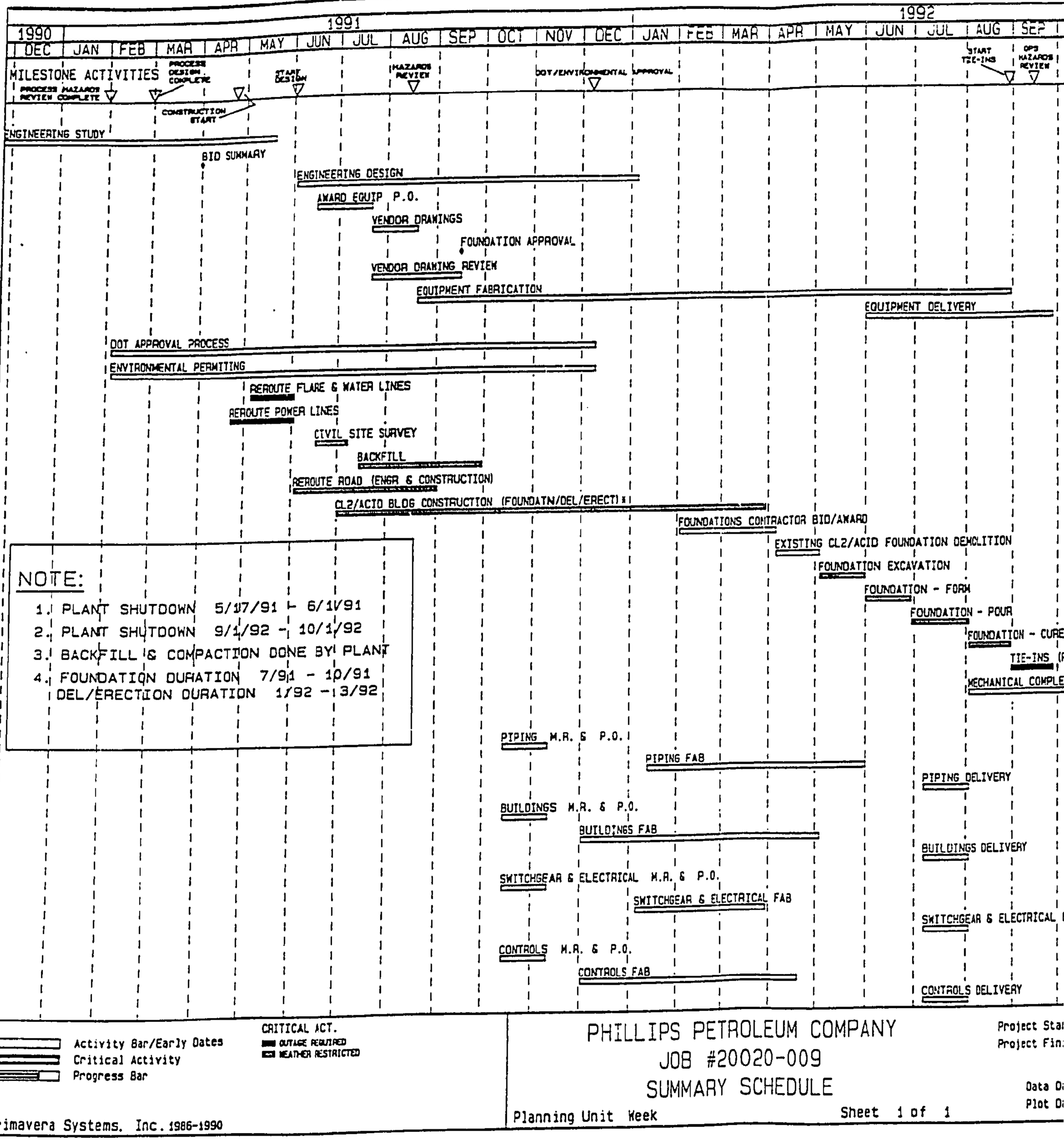
LDB:csj
JJX/4903

1.5.1

ATTACHMENT 1

KENAI LNG PLANT EFFICIENCY STUDY

SUMMARY SCHEDULE



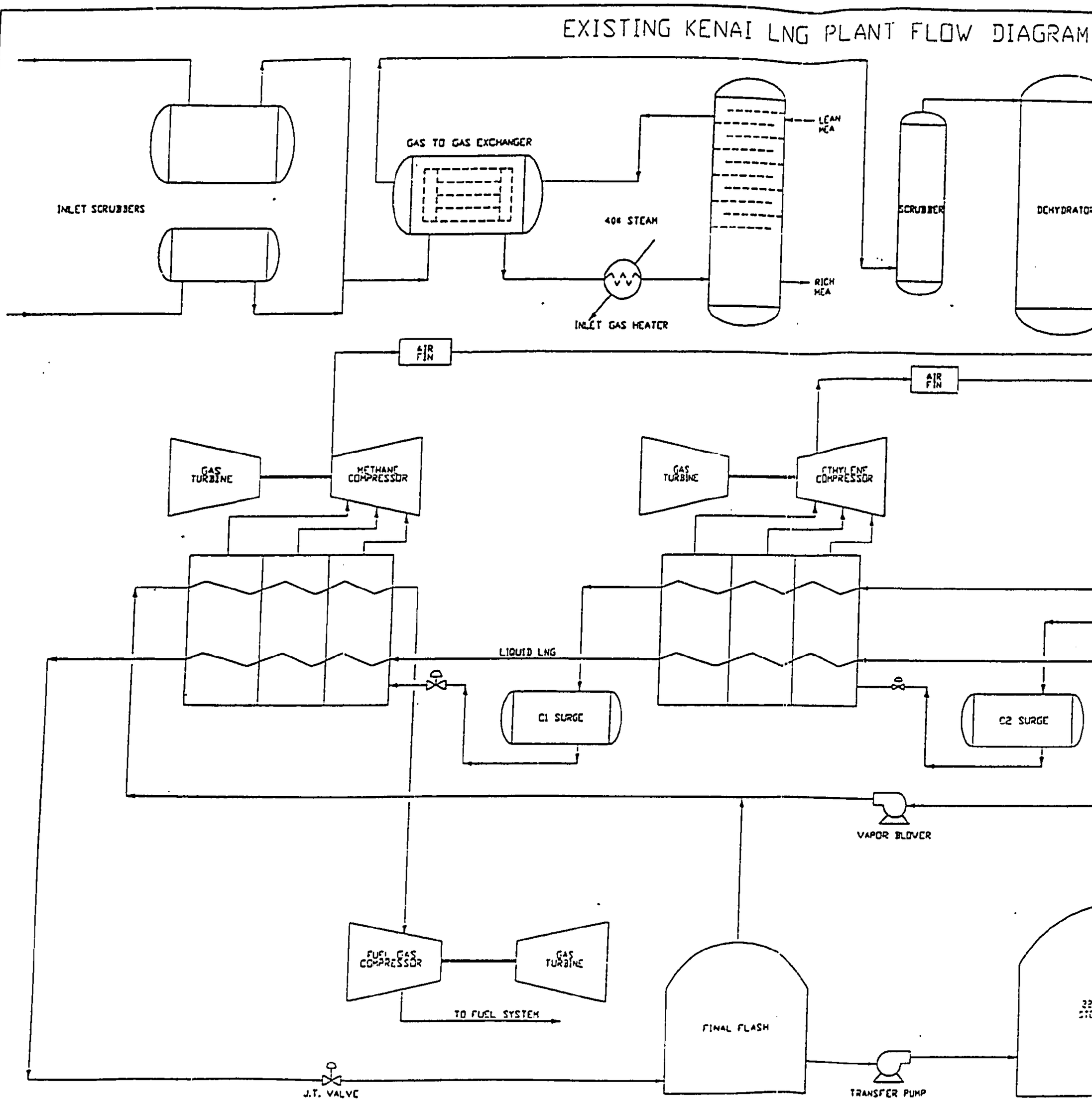
ATTACHMENT 2

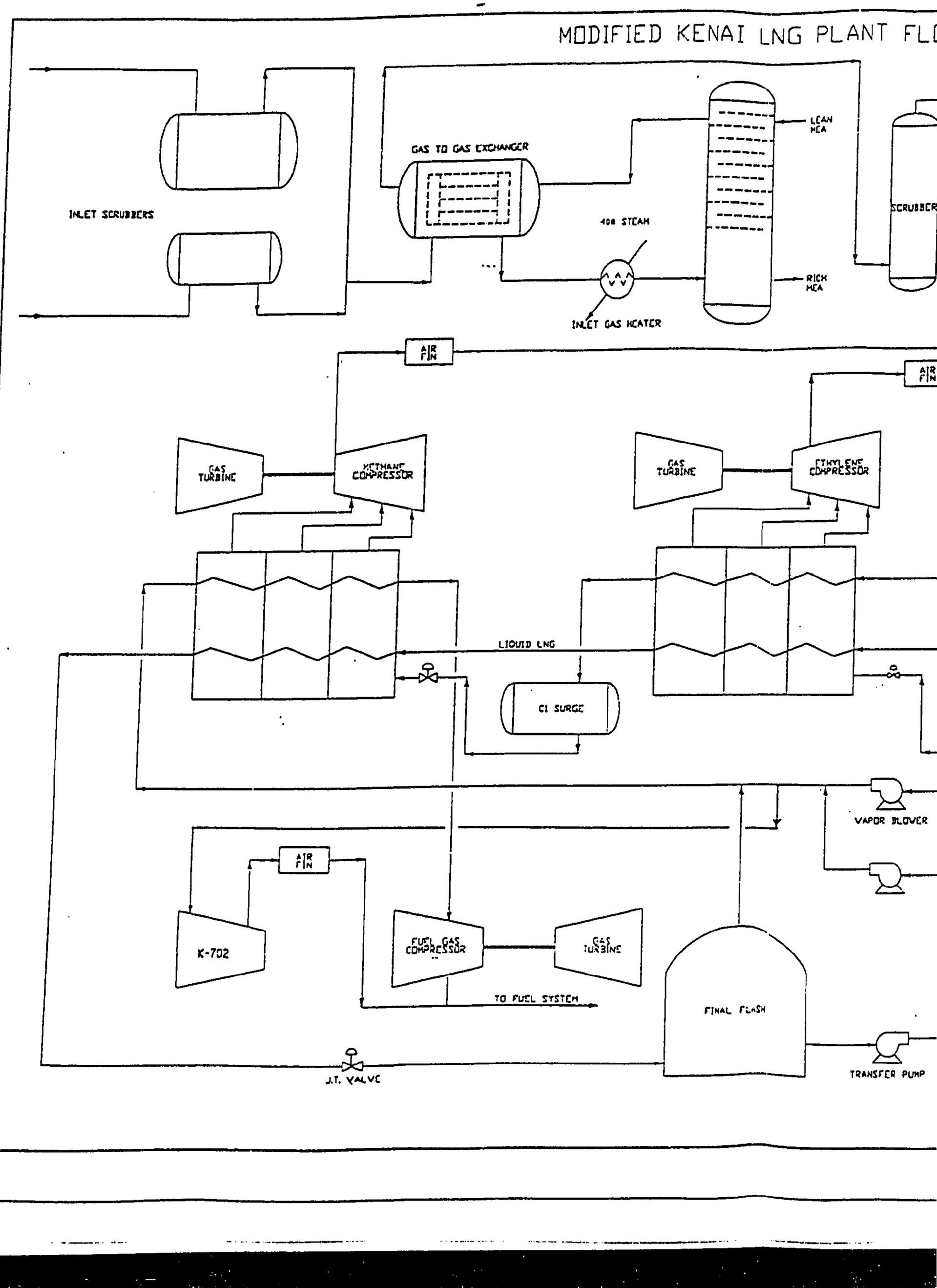
KENAI LNG PLANT EFFICIENCY STUDY

SIMPLIFIED LNG PLANT FLOW DIAGRAMS

EXISTING AND MODIFIED

EXISTING KENAI LNG PLANT FLOW DIAGRAM




MODIFIED KENAI LNG PLANT FL
INLET SCRUBBERS
GAS TO GAS EXCHANGER
LEAN MEA
RICH MEA
40# STEAM
INLET GAS HEATER
SCRUBBER
AIR FIN
GAS TURBINE
METHANE COMPRESSOR
ETHYLENE COMPRESSOR
LIQUID LNG
C1 SURGE
VAPOR BLOWER
K-702
FUEL GAS COMPRESSOR
TO FUEL SYSTEM
FINAL FLASH
J.T. VALVE
TRANSFER PUMP

ATTACHMENT 3

KENAI LNG PLANT EFFICIENCY STUDY

PROCESS FLOW DIAGRAMS

SUMMER AND WINTER DESIGN CASES

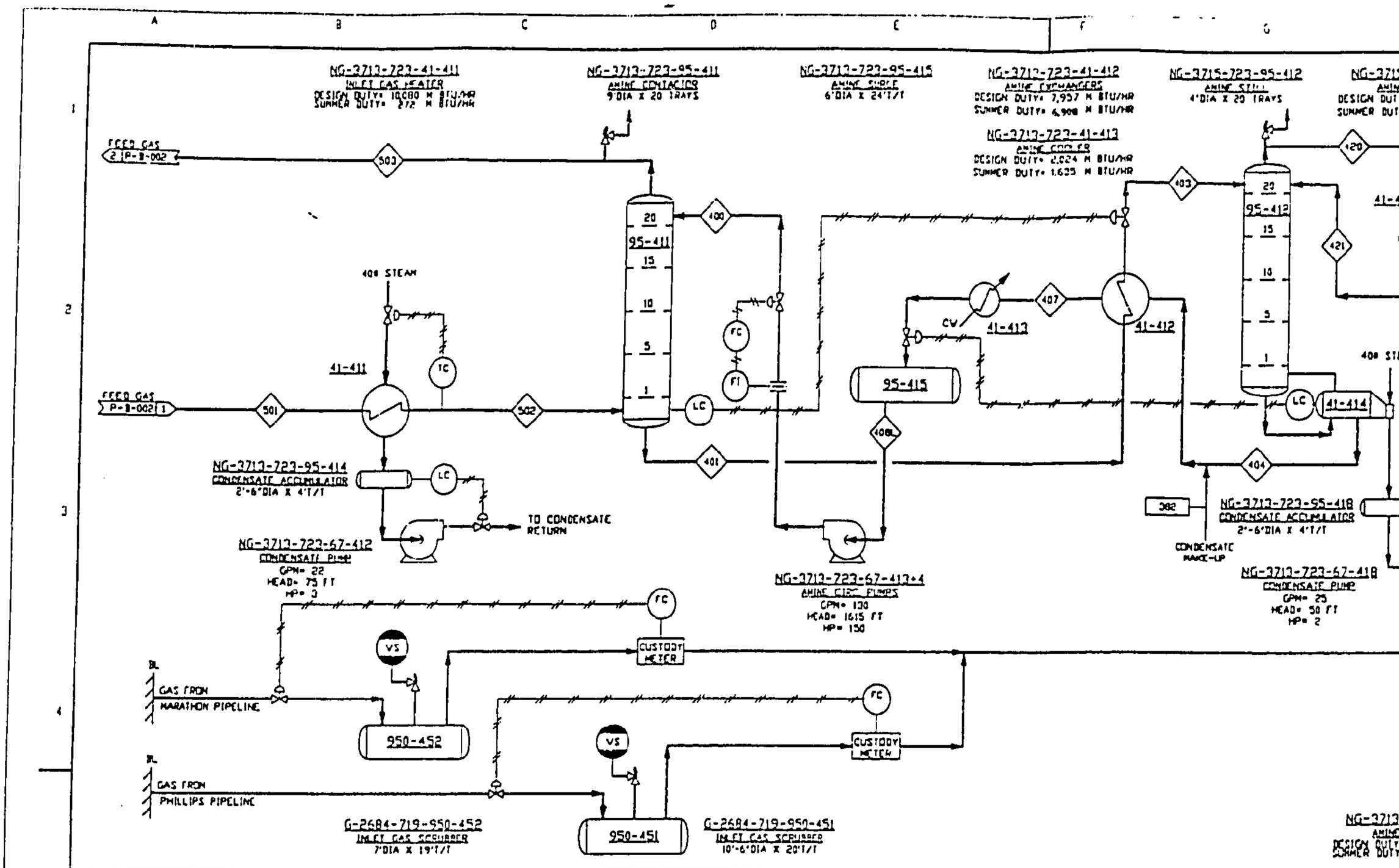
PROCESS FLOW DIAGRAMS

Process flow diagrams for the modifications proposed for the Kenai LNG Plant Efficiency Study are attached in this section. A list of the process flow diagrams follows:

Drawing No.	Revision	Title
P-B-001	0	Inlet Metering and Amine System Summer Design Case
P-B-002	0	Dehydration Section Summer Design Case
P-B-003	0	Propane Refrigeration Exchangers and C2 Surge Summer Design Case
P-B-004	0	Ethylene Cold Box Exchangers Summer Design Case
P-B-005	0	Methane Cold Box Exchangers and C1 Surge Summer Design Case
P-B-006	0	Final Flash and Fuel Gas System Summer Design Case
P-B-007	0	Propane Refrigerant Compression Summer Design Case
P-B-008	0	Methane and Ethylene Compression Summer Design Case
P-B-021	0	Inlet Metering and Amine System Winter Design Case
P-B-022	0	Dehydration Section Winter Design Case
P-B-023	0	Propane Refrigeration Exchangers and C2 Surge Winter Design Case

PROCESS FLOW DIAGRAMS
Cont.d

Drawing No.	Revision	Title
P-B-024	0	Ethylene Cold Box Exchangers Winter Design Case
P-B-025	0	Methane Cold Box Exchangers and C1 Surge Winter Design Case
P-B-026	0	Final Flash and Fuel Gas System Winter Design Case
P-B-027	0	Propane Refrigerant Compression Winter Design Case
P-B-028	0	Methane and Ethylene Compression Winter Design Case
U-B-001	0	LNG Storage -- Summer Design Case
U-B-002	0	Cooling Water System
U-B-003	0	Steam Balance
U-B-004	0	Waste Heat Boiler
U-B-005	0	Cooling Tower Modifications
U-B-021	0	LNG Storage -- Winter Design Case

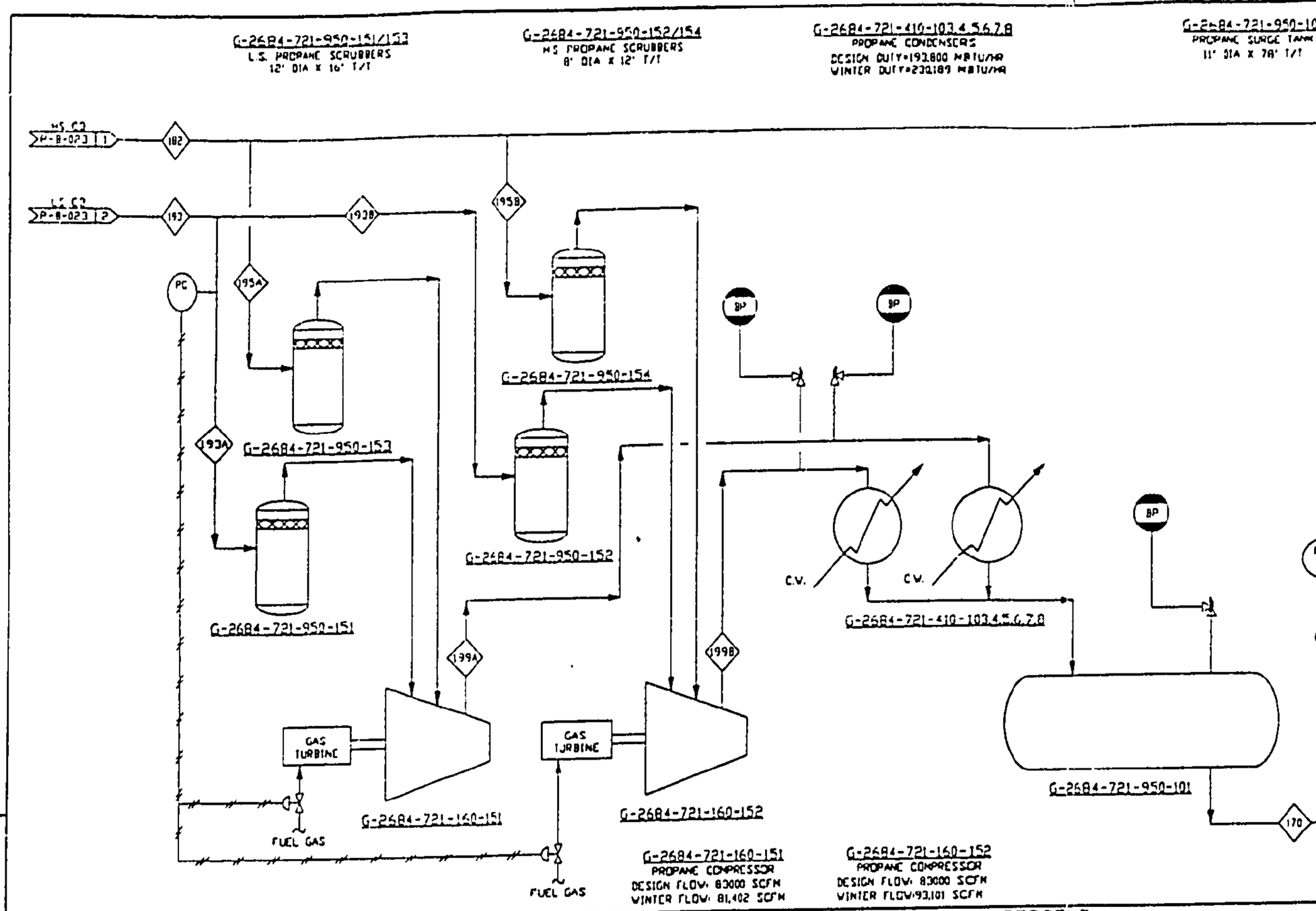


MATERIAL	MOL WT	MOL PERCENT 400	401	403	404	405	407	408L	500	501	502	503	420	421
METHANE	16.04	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	99.0520	99.0615	99.0615	99.1435	0.0000	0.0008
ETHANE	30.07	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0670	0.0670	0.0670	0.0670	0.0000	0.0000
ETHYLENE	28.03	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0050	0.0050	0.0050	0.0000	0.0000
ISOBUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0020	0.0020	0.0020	0.0000	0.0000
N - BUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000
NITROGEN	28.02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7110	0.7110	0.7110	0.7116	0.0000	0.0000
ARGON	39.944	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0100	0.0100	0.0100	0.0100	0.0000	0.0000
CARBON DIOXIDE	44.01	0.3587	1.9695	1.9695	2.0761	83.6300	0.3587	0.3587	0.1500	0.1405	0.1405	0.0100	11.1843	0.1870
WATER	18.016	99.5134	97.1468	97.1468	97.0454	16.3700	99.5134	99.5134	0.0000	0.0000	0.0000	0.0479	88.6853	99.6629
MEA	61.08	0.9279	0.8837	0.8837	0.8784	0.0000	0.9279	0.9279	0.0000	0.0000	0.0000	0.0000	0.1304	0.1501
TOTAL LB/HR		50739	52082	52082	50375	1707	50739	50739	415143	445143	445143	443799	6836	5129
TOTAL MOL/HR		2501	2524	2524	2481	43	2501	2501	23653	27511	27511	27488	326	283
MSCFD		22784	22988	22988	22598	391	22784	22784	230641	250563	250563	250334	2968	2577
FLOW - GPM (MACFH)		102	105	(0.013)/114	108	(13.0)	103	102	(185.58)	(208.5)	(209.6)	(212.75)	(168.5)	105
PRESSURE - PSIG		659.7	662.7	10	10	6.5	5	2	666.7	664.7	662.7	659.7	7.0	6.5
TEMPERATURE - F		76	67.8	209.0	242	145	105	71	490	441	650	691	228.5	145
AVG. MOL WEIGHT		20.2	20.63	20.63/20.6	20.3	39.75	20.2	20.2	16.18	16.18	16.18	16.14	20.97	18.12
DENSITY - LB/FT3		62.0	61.62	0.084/57.1	58.1	0.131	61.03	62.1	2.237	2.135	2.123	2.086	1.063	60.8
VISCOSITY - CP		1.14	1.26	0.014/0.29	0.24	0.016	0.769	1.23	0.010	0.010	0.010	0.010	0.013	0.44
CP/CV				1.28		1.27			1.25	1.25	1.25	1.25	1.30	
HEAT CAPACITY BTU/LB F		0.93	0.92	0.36/0.94	0.96	0.23	0.935	0.93	0.617	0.617	0.617	0.617	0.403	0.99
MOL FRACT. LIQ.		1.0000	1.000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000

NO.	REVISION	BY / DATE CHK'D	APP'D
A	ISSUED FOR REVIEW	1/29/91 PG	
B	ISSUED FOR APPROVAL	7/11/91 PG	
0	ISSUED FOR DESIGN	2/6/91	2/9/91

BECHTEL CORPORATION
HOUSTON, TEXAS

20020-009



MATERIAL	MOL WT	MOL PERCENT														
		170	174	175	180	182	183	184	193	193A	193B	195A	195B	199A	199B	
METHANE	16.04	0.5000	0.5000	0.5000	0.5000	0.5000	3.1714	0.1087	0.1087	0.1087	0.1087	1.3562	1.3562	0.5035	0.4952	
ETHANE	30.07	2.0000	2.0000	2.0000	2.0000	2.0000	5.8323	1.4387	1.4387	1.4387	1.4387	3.2283	3.2283	2.0078	1.9931	
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PROPANE	44.09	95.0000	95.0000	95.0000	95.0000	95.0000	90.1390	95.7120	95.7120	95.7120	95.7120	93.4420	93.4420	94.9900	95.0087	
ISOBUTANE	58.12	2.0000	2.0000	2.0000	2.0000	2.0000	0.7348	2.1853	2.1853	2.1853	2.1853	1.5945	1.5945	1.9974	2.0023	
N - BUTANE	58.12	0.5000	0.5000	0.5000	0.5000	0.5000	0.1225	0.3333	0.3333	0.3333	0.3333	0.3790	0.3790	0.4992	0.5007	
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NITROGEN	28.02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
ARGON	39.984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
CARBON DIOXIDE	44.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
TOTAL LB/HR		1214710	955810	258900	955810	258900	117909	837900	837900	388367	449533	178230	198578	566597	648112	
TOTAL MOL/HR		27590	21709	5880	21709	5880	2773	18935	18935	8776	10159	4093	4360	12879	14719	
MSCFD		251284	197726	53558	197726	53558	25262	172464	172464	79937	92527	37282	39538	117219	134065	
FLOW - GPM (MACFM)		47786	37601	10185	(230)/3140	(489.72)	(229.25)	3140	(4319.84)	(2094.94)	(2424.89)	(340.11)	(378.94)	(451.79)	(514.43)	
PRESSURE - PSIG		1386	1386	1386	415	415	415	415	37	37	37	415	415	1446	1438	
TEMPERATURE - F		300	300	300	168	226	168	168	-314	-314	-314	208	208	1431	1394	
AVG. MOL WEIGHT		44.02	44.02	44.02	225/44.2	44.02	42.50	44.24	44.24	44.24	44.24	43.54	43.54	44.02	44.02	
DENSITY - LB/FT3		31.692	31.692	31.692	0.514/333	0.528	0.514	33.268	0.185	0.185	0.185	0.524	0.524	1.256	1.259	
VISCOSITY - CP		0.112	0.112	0.112	0.037/0.134	0.007	0.007	0.134	0.006	0.006	0.006	0.007	0.007	0.009	0.009	
CP/CV					1.12	1.12	1.12		1.14	1.14	1.14	1.12	1.12	1.09	1.09	
HEAT CAPACITY BTU/LB F		0.617	0.617	0.617	0.41/0.59	0.410	0.408	0.591	0.358	0.358	0.358	0.409	0.409	0.498	0.497	
MOL FRACT. LIQ.		1.0000	1.0000	1.0000	0.8722	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

NO.	REVISION	BY CHK'D	DATE APP'D
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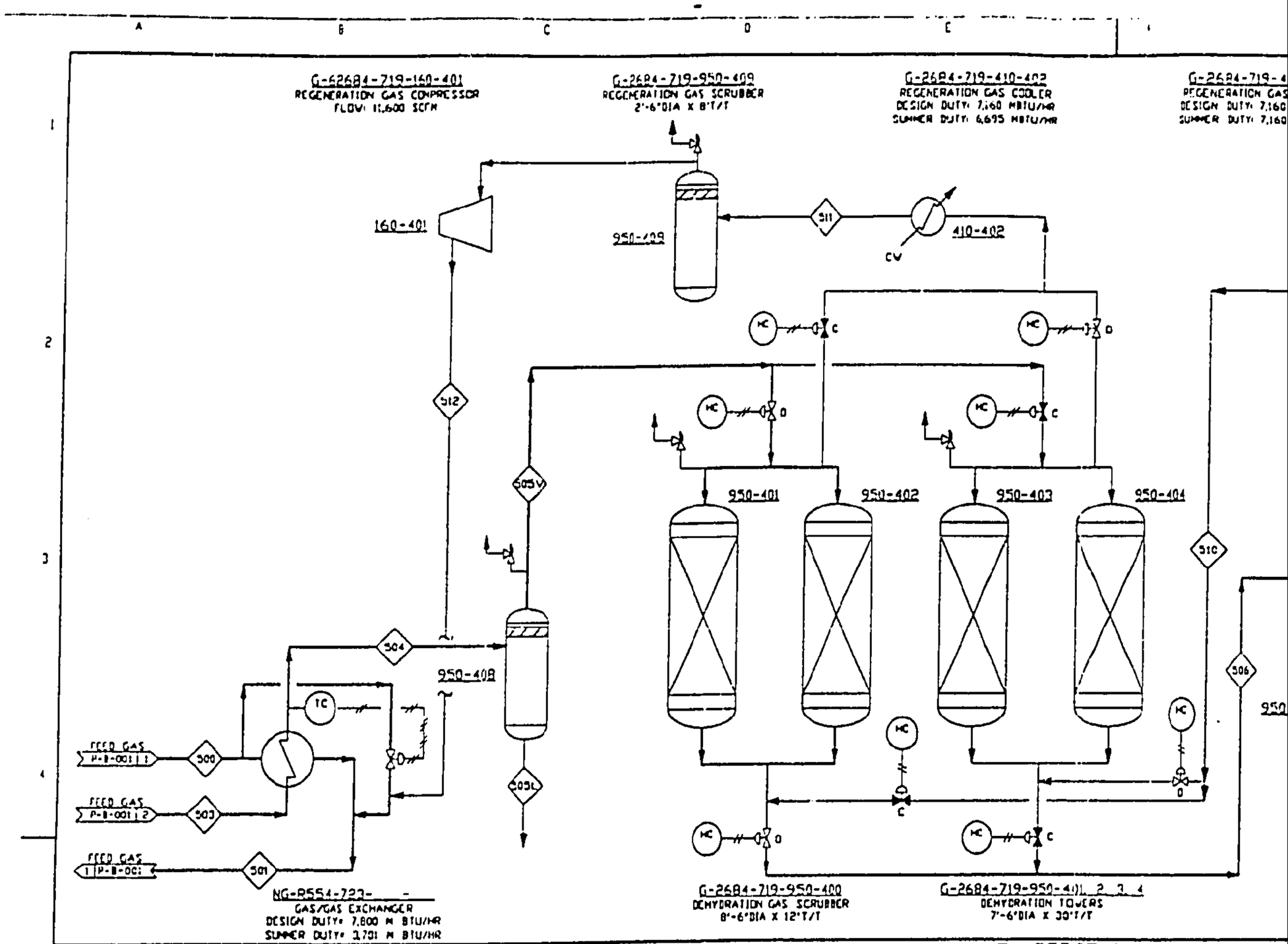
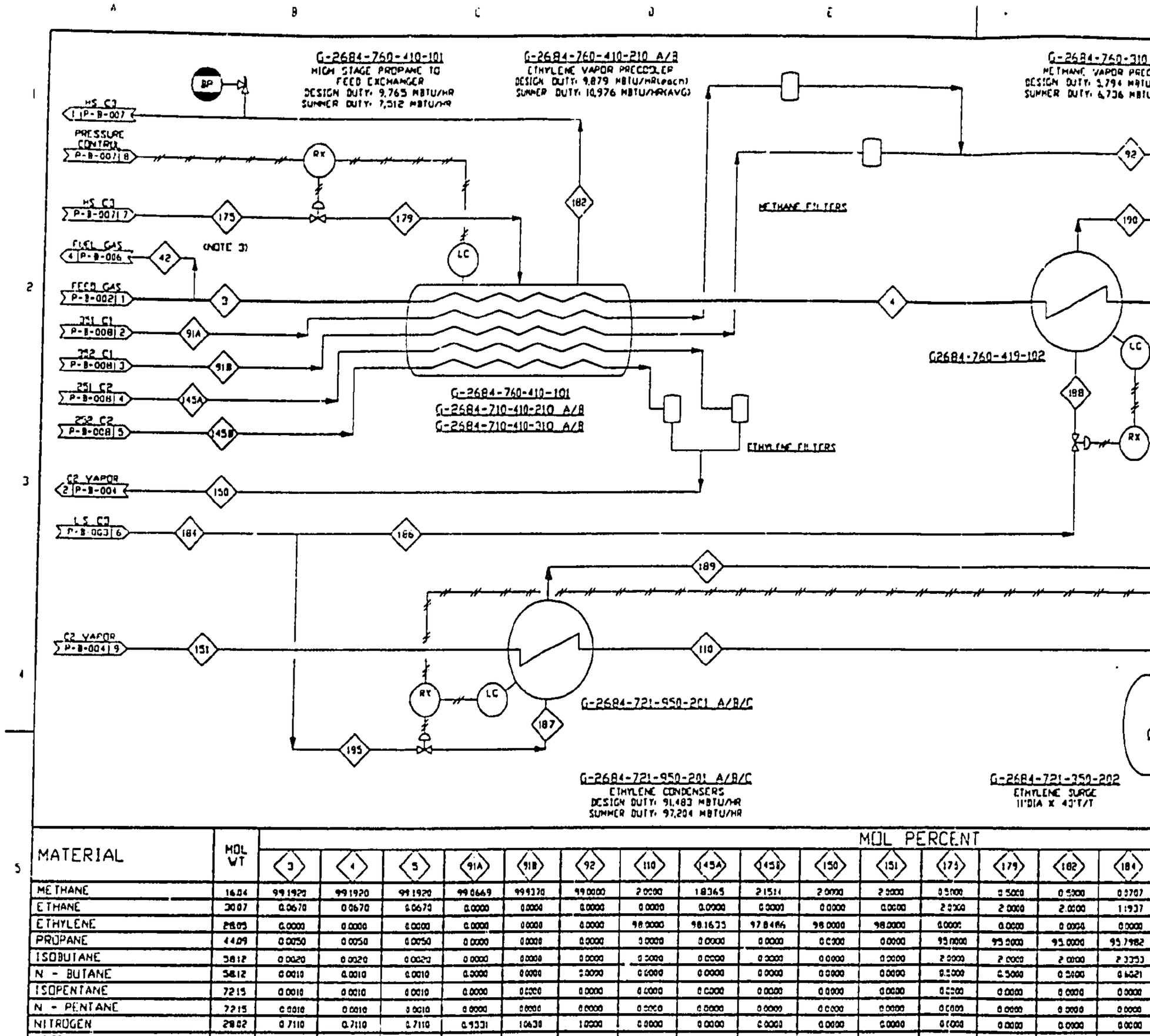
0	ISSUED FOR DESIGN	3/20/91 PC	4/9/91 MEL



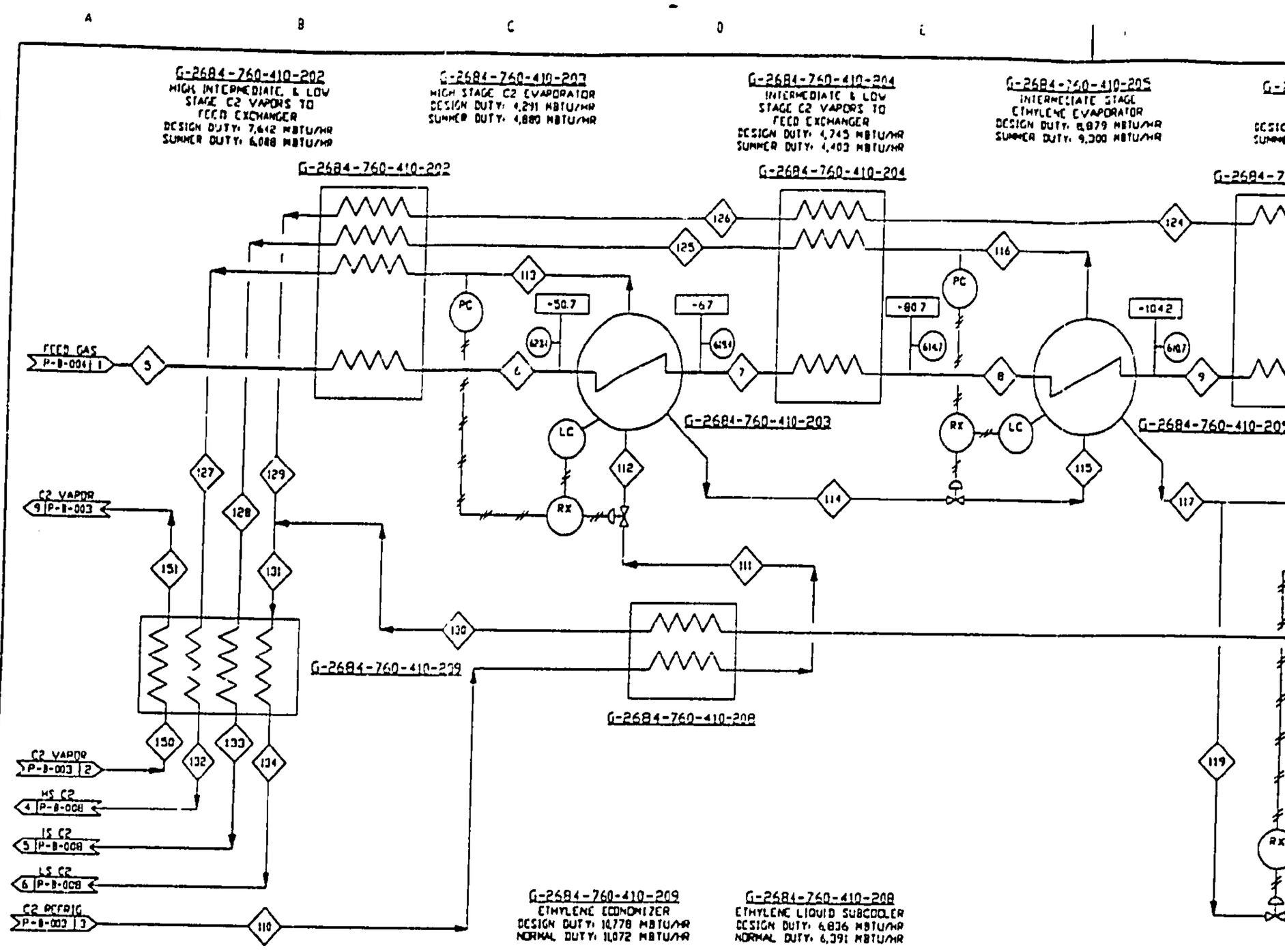
MATERIAL	MOL WT	MOL PERCENT 500	501	503	504	505V	505L	506	507	508	509	510	511	512	1
METHANE	16.04	99.0520	99.0615	99.1435	99.1435	99.1586	0.0000	99.1920	99.1920	99.1920	99.1920	99.1920	99.1920	99.1920	99.1920
ETHANE	30.07	0.0670	0.0670	0.0670	0.0670	0.0670	0.0000	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0050	0.0050	0.0050	0.0000	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
ISOBUTANE	58.12	0.0020	0.0020	0.0020	0.0020	0.0020	0.0000	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
N - BUTANE	58.12	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
ISOPENTANE	72.15	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
N - PENTANE	72.15	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
NITROGEN	28.02	0.7110	0.7110	0.7110	0.7110	0.7110	0.0000	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110
ARGON	39.984	0.0100	0.0100	0.0100	0.0100	0.0100	0.0000	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
CARBON DIOXIDE	44.01	0.1500	0.1405	0.0130	0.0100	0.0100	0.0000	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
WATER	18.06	0.0000	0.0000	0.0479	0.0479	0.0334	100.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MEA	61.08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		415143	445143	443799	443799	443723	76	443562	443562	443562	30000	30000	30000	30000	413562
TOTAL MOL/HR		25653	27511	27488	27488	27484	4	27475	27475	27475	1858	1858	1858	1858	25617
MSCFD		233641	250562	250354	250354	250316	38	250241	250241	250241	16925	16925	16925	16925	233316
FLOW - GPM (MACFM)		(1855.8)	(2088.5)	(2127.5)	(2063.2)	(2063)	0.13	(2092)	(2092)	(2092)	(114.3)	(27.2)	(13.6)	(14.9)	(1950.7)
PRESSURE - PSIG		666.7	664.7	659.7	656.7	656.7	656.7	646.7	644.7	643.7	643.7	638.7	625.7	664.7	643.7
TEMPERATURE - F		48	641	691	530	530	530	530	530	530	530	431	81	88	530
AVG MOL WEIGHT		16.18	16.18	16.14	16.14	16.14	18.02	16.14	16.14	16.14	16.14	16.14	16.14	16.14	16.14
DENSITY - LB/FT3		2.135	2.135	2.086	2.151	2.150	62.4	2.12	2.120	2.120	2.120	1.193	1.919	2.006	2.120
VISCOSITY - CP		0.010	0.010	0.010	0.011	0.011	1.2	0.011	0.011	0.011	0.011	0.017	0.013	0.013	0.011
CP/CV		1.25	1.25	1.25	1.25	1.25		1.25	1.25	1.25	1.25	1.21	1.25	1.25	1.25
HEAT CAPACITY BTU/LB F		0.617	0.612	0.617	0.615	0.615	1.0000	0.613	0.613	0.613	0.613	0.697	0.604	0.608	0.613
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO.	REVISION	BY / DATE DWN	BY / DATE APP'D
A	FOR REVIEW	12/29/92 PG	
B	FOR APPROVAL	1/11/93 PG	
0	ISSUED FOR DESIGN	3/9/93	3/9/93



MATERIAL	MOL WT	MOL PERCENT														
		3	4	5	91A	91B	92	110	145A	145B	150	151	175	179	182	184
METHANE	16.04	99.1920	99.1920	99.1920	99.0669	99.0370	99.0000	2.0000	1.8365	2.1514	2.0000	2.0000	0.5000	0.5000	0.5000	0.0707
ETHANE	30.07	0.0670	0.0670	0.0670	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	2.0000	2.0000	1.1937
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	98.0000	98.1635	97.8486	98.0000	98.0000	0.0005	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	95.0000	95.0000	95.0000	95.7982
ISOBUTANE	58.12	0.0020	0.0020	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0000	2.0000	2.0000	2.2353
N - BUTANE	58.12	0.0010	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5000	0.5000	0.5000	0.6021
ISOPENTANE	72.15	0.0010	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - PENTANE	72.15	0.0010	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NITROGEN	28.02	0.7110	0.7110	0.7110	0.9331	1.0630	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARGON	39.948	0.0100	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		404204	404204	404204	137315	146074	283350	634200	303584	330616	634200	634200	329429	329429	329429	737391
TOTAL MOL/HR		25033	25033	25033	8500	9031	17531	22801	10907	11894	22801	22801	7482	7482	7482	16637
MSCFD		228000	228000	228000	77416	82252	159669	207672	99340	108332	207672	207672	68148	68148	68148	151528
FLOW - GPM (MACFH)		(190.66)	(176.75)	(148.57)	(84.47)	(89.94)	(147.32)	2829	(181.16)	(290.89)	(337.29)	(265.73)	1354	(1323)/972	(604.7)1	2772
PRESSURE - PSIG		643.7	636.7	631.7	561.9	562.6	545.4	286.3	304.5	304.1	297.3	291.8	108	43.3	43.3	443
TEMPERATURE - F		53.0	22.5	-28.6	104.1	105.6	24.4	-34.8	98.9	104.5	25.0	-10.8	76.5	19.8	24.5	19.8
AVG MOL WEIGHT		16.14	16.14	16.14	16.15	16.17	16.16	27.81	27.83	27.79	27.81	27.81	44.02	42.9/44.3	44.02	44.32
DENSITY - LB/FT3		2.120	2.286	2.720	1.623	1.623	1.920	279	1.675	1.645	2.064	2.386	78.32	0.535/331	0.544	331
VISCOSITY - CP		0.011	0.011	0.010	0.012	0.012	0.010	0.075	0.011	0.011	0.010	0.009	0.09	0.007/013	0.007	0.132
CP/CV		1.25	1.24	1.22	1.26	1.26	1.25		1.10	1.19	1.17	1.15		1.12	1.12	
HEAT CAPACITY BTU/LB F		0.613	0.627	0.682	0.595	0.594	0.635	0.6882	0.449	0.449	0.477	0.542	0.148	0.41/0.59	0.412	0.5933
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.7800	0.0000	1.0000

NO.	REVISION	BY	DATE
		ORIG	APP'D
A	ISSUED FOR REVIEW	12/29/90	
		PG	
B	ISSUED FOR APPROVAL	1/11/91	
		PG	
0	ISSUED FOR DESIGN	3/8/91	3/8/91
		PG	



MATERIAL	MOL WT	MOL PERCENT														
		5	11	60	94	110	111	113	116	121	123	124	125	126	127	128
METHANE	16.04	99.1920	99.1920	99.0000	99.0000	2.0000	2.0000	7.9830	41.908	0.3718	0.3718	0.3718	41.908	0.3718	7.9830	41.908
ETHANE	30.07	0.0670	0.0670	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	98.0000	98.0000	92.0170	55.8092	99.6282	99.6282	99.6282	55.8092	99.6282	92.0170	55.8092
PROPANE	44.09	0.0050	0.0050	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOBUTANE	58.12	0.0020	0.0020	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - BUTANE	58.12	0.0010	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOPENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - PENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NITROGEN	28.02	0.7110	0.7110	1.0001	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARGON	39.984	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		404204	404204	283350	283350	634200	634200	73452	118980	197566	244200	244200	118980	244200	73452	118980
TOTAL MOL/HR		25033	25033	17531	17531	22801	22801	2710	4318	7053	8718	8718	4318	8718	2710	4318
MSCFD		228000	228000	159669	159669	207672	207672	24690	39332	64242	79406	79406	39332	79406	24690	39332
FLOW - GPM (MACFH)		(148.57)	2925	2100	(85.27)	2829	2726	(69.81)	(246.39)	(871.22)	(1898.32)	(1219.98)	(295.90)	(1512.65)	(82.57)	(357.29)
PRESSURE - PSIG		631.7	602.0	533.0	539.2	286.3	282.3	125.0	46.0	12.0	14.0	11.4	12.6	8.8	12.04	38.4
TEMPERATURE - F		-28.6	-130.2	-130.8	-100.3	-34.8	-49.9	-67.8	-105.1	-135.4	-132.4	-103.7	-69.9	-69.9	-38.2	-38.2
AVG. MOL WEIGHT		16.14	16.14	16.16	16.16	27.81	27.81	27.09	27.55	28.00	28.00	28.00	27.55	28.00	27.09	27.55
DENSITY - LB/FT3		2.720	17.2	16.8	3.322	27.9	28.9	1.064	0.482	0.226	0.242	0.200	0.402	0.161	0.889	0.331
VISCOSITY - CP		0.010	0.033	0.033	0.009	0.079	0.084	0.008	0.007	0.006	0.006	0.006	0.007	0.007	0.008	0.008
CP/CV		1.22			1.15			1.21	1.23	1.28	1.28	1.28	1.24	1.27	1.22	1.25
HEAT CAPACITY BTU/LB F		0.682	1.6981	2.0147	0.909	0.6862	0.6528	0.417	0.354	0.319	0.321	0.320	0.348	0.325	0.395	0.352
MOL FRACT. LIQ.		0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO	REVISION	BY	DATE
A	FOR REVIEW	CWB 1/29/91 PG	
B	FOR APPROVAL	1/11/91 PG	
0	ISSUED FOR DESIGN	PG 2/6/91	2/6/91 MAL

G-2684-760-410-302
HIGH, INTERMEDIATE, & LOW STAGE CI TO FEED EXCHANGER
DESIGN DUTY: 7,922 MBTU/HR
SUMMER DUTY: 8621 MBTU/HR

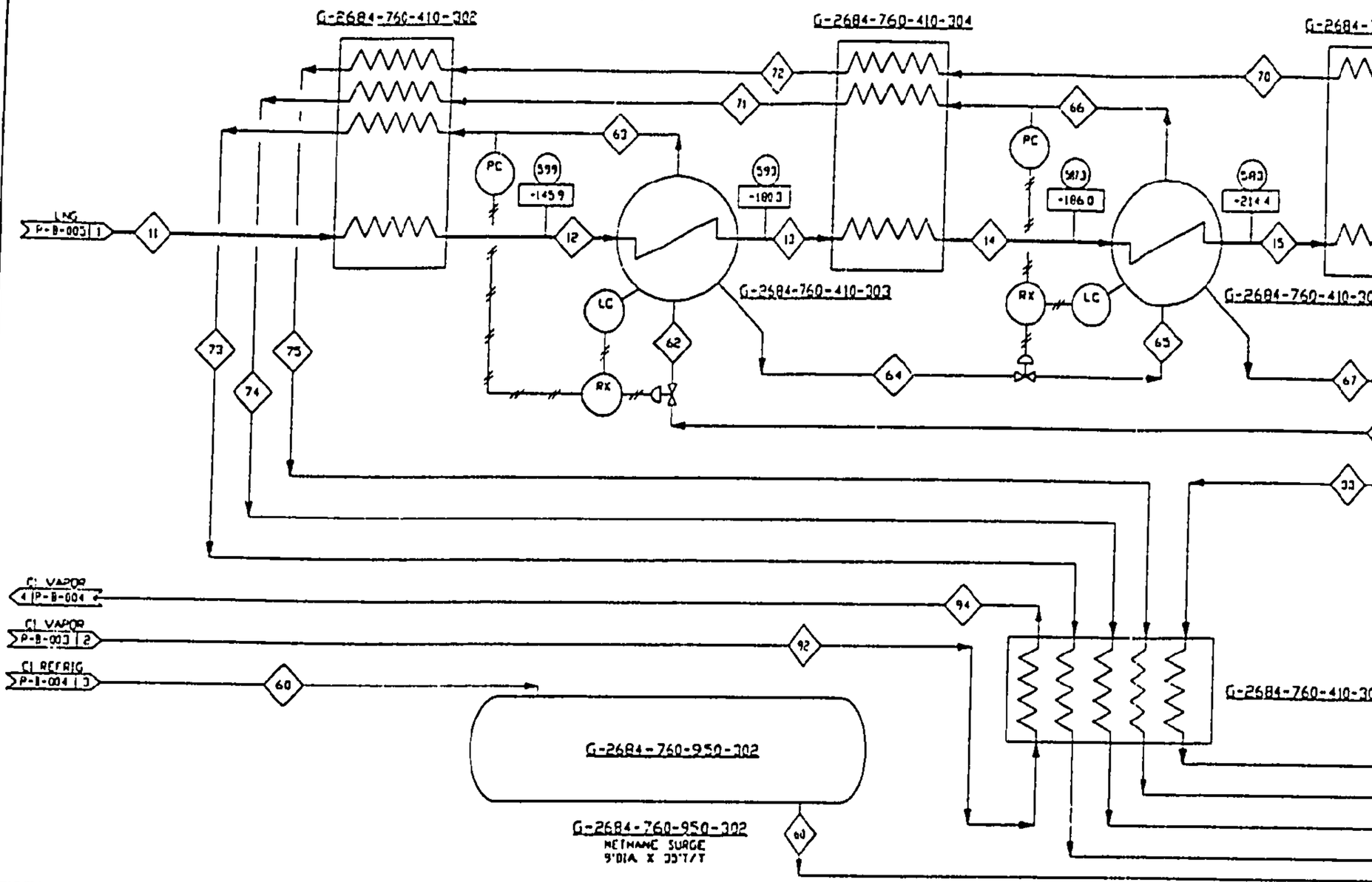
G-2684-760-410-303
HIGH STAGE CI EVAPORATOR
DESIGN DUTY: 13676 MBTU/HR
SUMMER DUTY: 14,083 MBTU/HR

G-2684-760-410-304
INTERMEDIATE & LOW STAGE CI VAPORS TO FEED EXCHANGER
DESIGN DUTY: 2,417 MBTU/HR
SUMMER DUTY: 2,150 MBTU/HR

G-2684-760-410-305
INTERMEDIATE STAGE CI EVAPORATOR
DESIGN DUTY: 12,178 MBTU/HR
SUMMER DUTY: 10,254 MBTU/HR

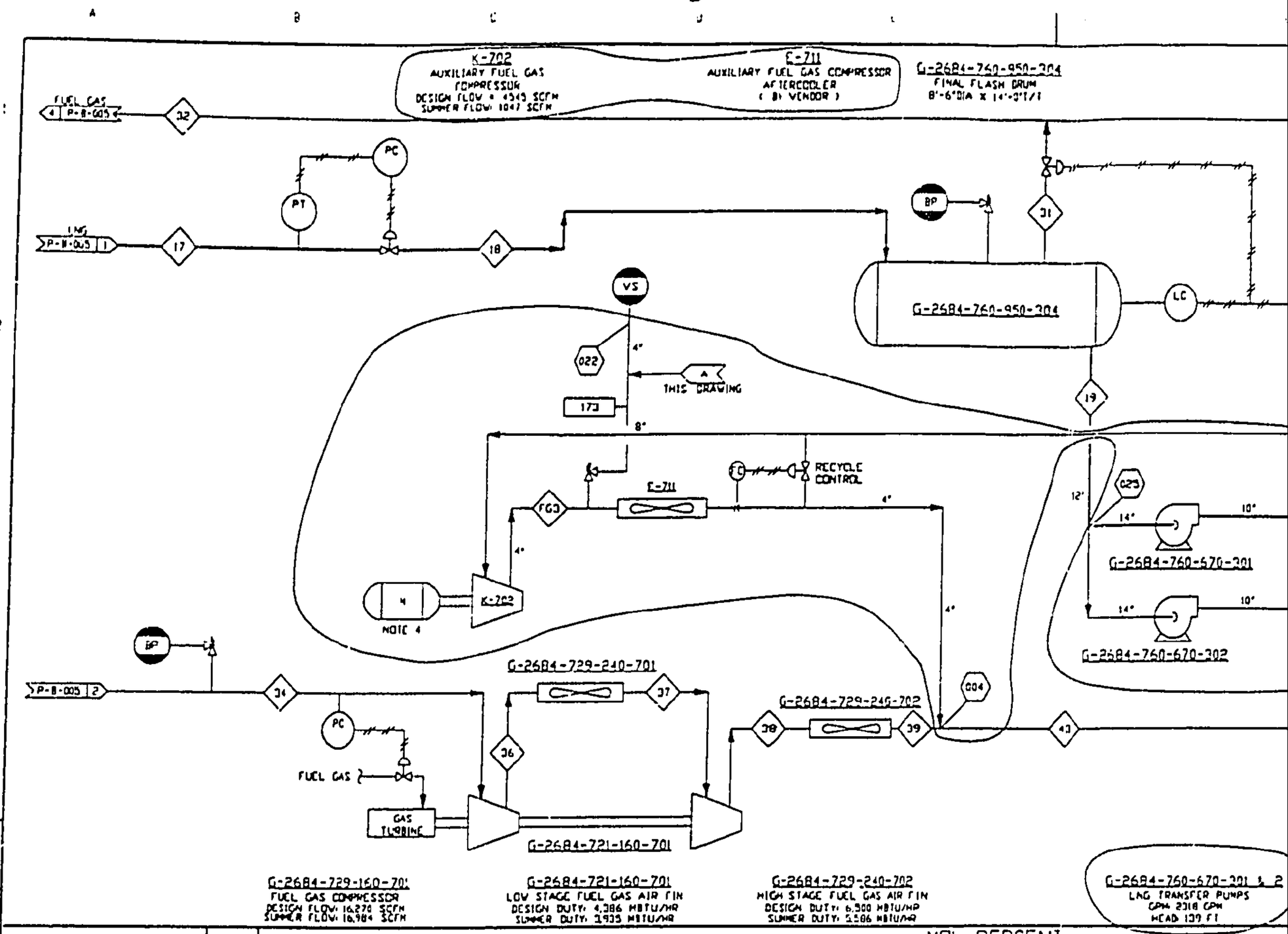
G-2684-760-410-306
LOW STAGE CI VAPOR TO FEED EXCHANGER
DESIGN DUTY: 411 MBTU/HR
SUMMER DUTY: 459 MBTU/HR

G-2684-760-
LOW STAGE METHANE
DESIGN DUTY: 6,5
SUMMER DUTY: 7,1



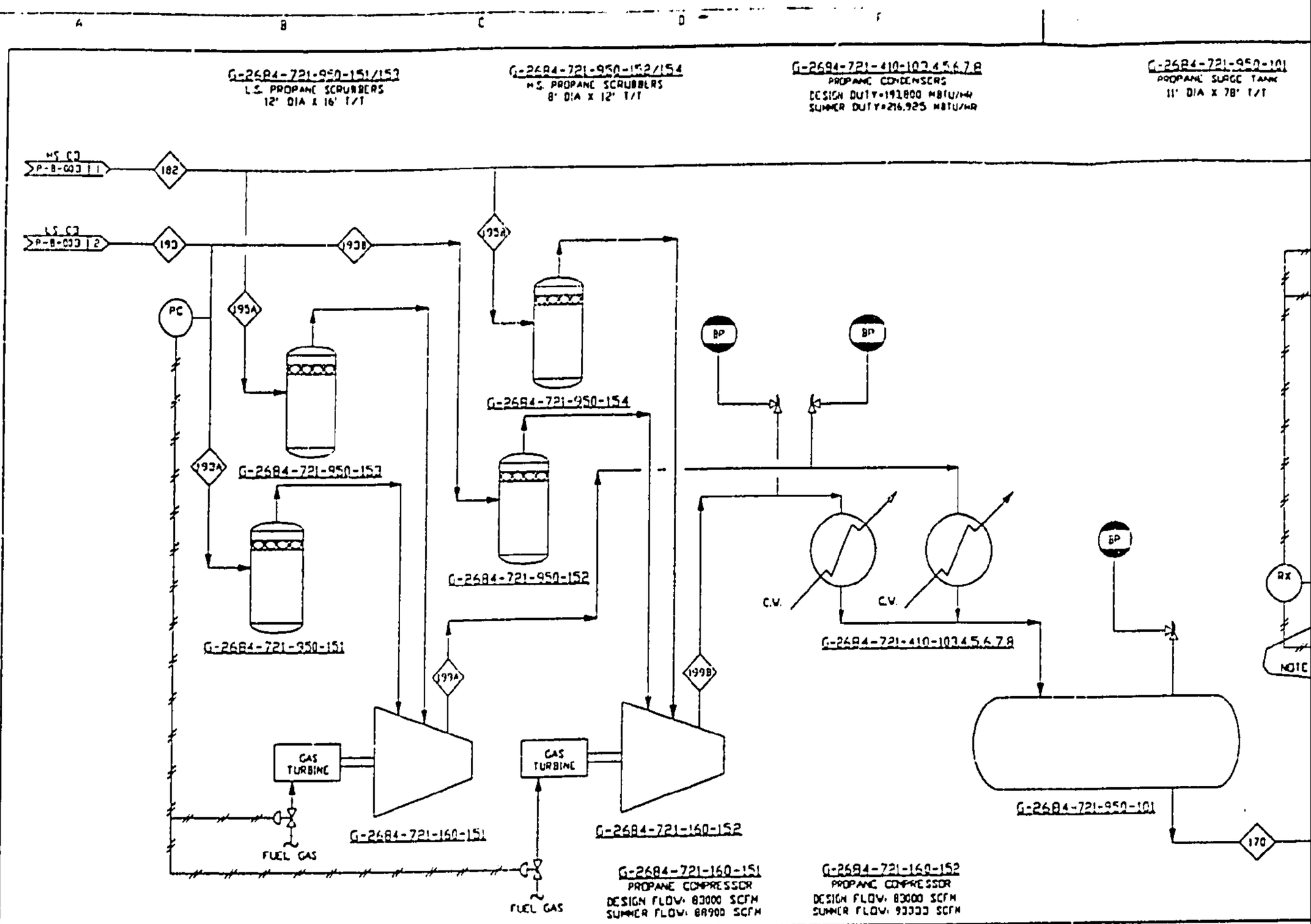
MATERIAL	MOL WT	MOL PERCENT														
		11	17	32	33	34	60	61	63	66	69	70	71	72	73	74
METHANE	16.04	99.1920	99.1920	94.8344	94.8344	94.8344	99.0000	99.0000	98.5472	99.6314	99.9642	99.9642	99.6314	99.9642	98.5472	99.631
ETHANE	30.07	0.0670	0.0670	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOBUTANE	58.12	0.0020	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - BUTANE	58.12	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOPENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - PENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NITROGEN	28.02	0.7110	0.7110	5.1245	5.1245	5.1245	1.0000	1.0000	1.4528	0.3686	0.0358	0.0358	0.3686	0.0358	1.4528	0.3686
ARGON	39.984	0.0100	0.0100	0.0408	0.0408	0.0408	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		404204	404204	44755	44755	44755	283350	283350	177173	68740	37436	37436	68740	37436	177173	68740
TOTAL MOL/HR		25033	25033	2685	2685	2685	17531	17531	10925	4273	2332	2332	4273	2332	10925	4273
MSCFD		228000	228000	24457	24457	24457	159769	159769	99504	38917	21247	21247	38917	21247	99504	38917
FLOW - GPM (MACFH)		2925	1975	(1396)	(4061)	(8083)	2100	2020	(14357)	(13653)	(17809)	(22839)	(17466)	(3148)	(19466)	(22613)
PRESSURE - PSIG		602.0	565.0	96	83	20	533.0	529.0	165.0	58.0	14.1	10.6	53.8	7.1	162.0	49.4
TEMPERATURE - F		-130.2	-235.8	-210.6	-131.2	10.8	-130.8	-133.9	-180.5	-216.3	-212.1	-219.8	-181.0	-181.0	-130.9	-130.9
AVG. MOL WEIGHT		16.14	16.14	16.66	16.66	16.66	16.16	16.16	16.21	16.08	16.04	16.04	16.08	16.04	16.21	16.08
DENSITY - LB/FT3		17.2	23.9	0.156	0.110	0.035	16.8	17.5	1.234	0.303	0.210	0.163	0.394	0.119	0.910	0.303
VISCOSITY - CP		0.033	0.119	0.005	0.0073	0.0101	0.0337	0.0351	0.0065	0.0054	0.0047	0.0052	0.0061	0.0060	0.0074	0.0071
CP/CV				1.31	1.33	1.31				1.2696	1.2997	1.3136	1.2965	1.3249	1.2710	1.3129
HEAT CAPACITY BTU/LB F		1.6981	0.8656	0.491	0.480	0.495	2.0147	1.6844	1.6891	0.5817	0.5370	0.5187	0.5407	0.5050	0.5746	0.5183
MOL FRACT. LIQ.		1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO	REVISION	BY	DATE
		CHKD	APP'D
A	FOR REVIEW	12/29/90	
		PG	
B	FOR APPROVAL	1/11/91	
		PG	
0	ISSUED FOR DESIGN	3/6/91	3/6/91
		[illegible]	WAL



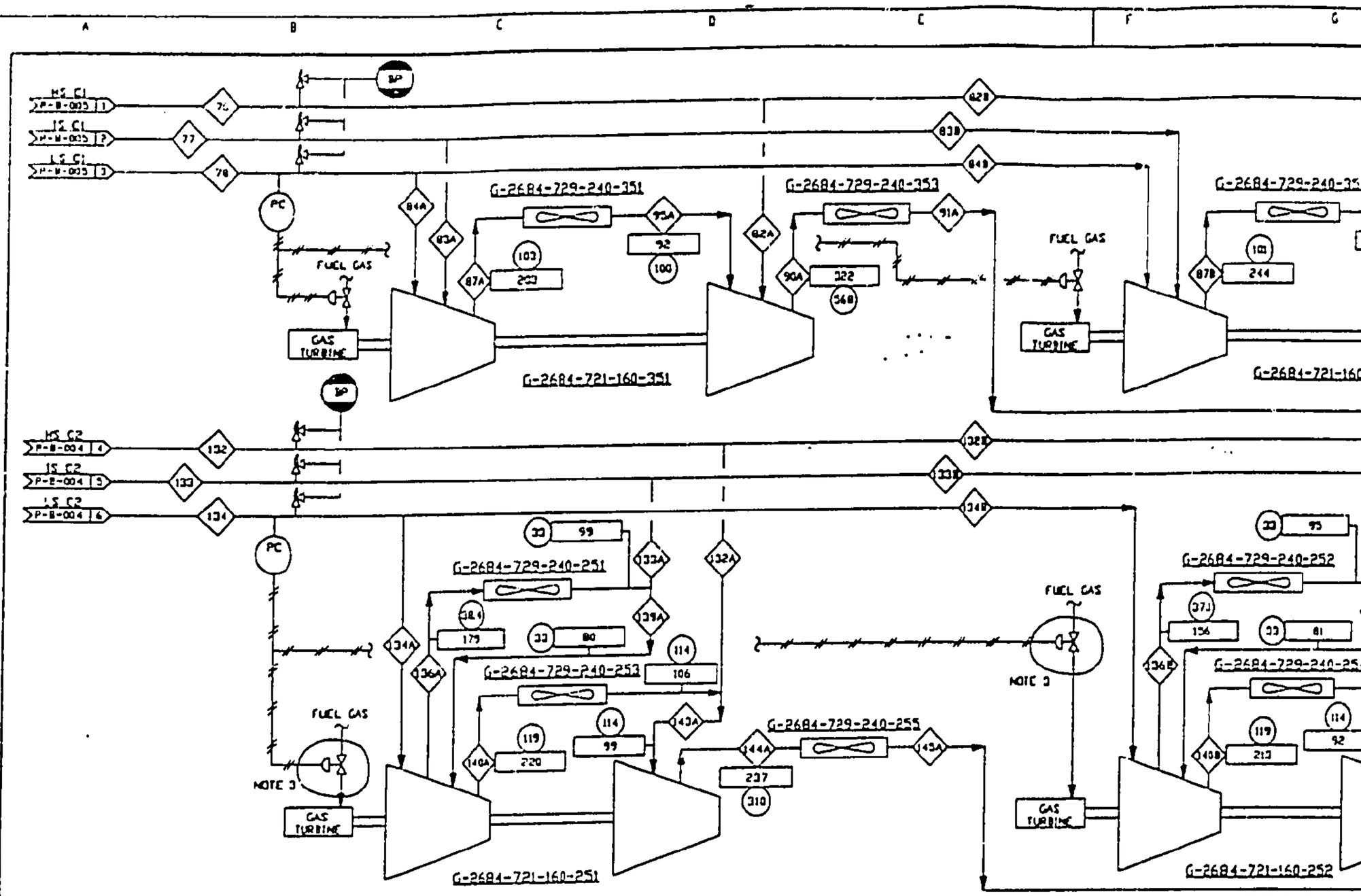
MATERIAL	MOL WT	MOL PERCENT															
		17	18	19	20	30	30B	31	32	34	36	37	38	39	42	43	
METHANE	16.04	99.1920	99.1920	99.3573	99.3573	96.3383	96.3383	92.7919	94.8344	94.8344	94.8344	94.8344	94.8344	94.8344	99.1920	94.9217	96
ETHANE	30.07	0.0670	0.0670	0.0715	0.0715	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0670	0.0002	0
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0
PROPANE	44.09	0.0050	0.0050	0.0053	0.0053	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0000	0
ISOBUTANE	58.12	0.0020	0.0020	0.0021	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000	0
N - BUTANE	58.12	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0
ISOPENTANE	72.15	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0
N - PENTANE	72.15	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000	0
NITROGEN	28.02	0.7110	0.7110	0.3421	0.3421	3.6229	3.6229	6.1453	5.1245	5.1245	5.1245	5.1245	5.1245	5.1245	0.7110	5.0373	3
ARGON	39.984	0.0100	0.0100	0.0078	0.0078	0.0385	0.0385	0.0423	0.0408	0.0408	0.0408	0.0408	0.0408	0.0408	0.0100	0.0406	0
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0107	0.0107	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0100	0.0002	0
TOTAL LB/HR		404204	404204	377573	377573	20854	18123	26631	44755	44755	44755	44755	44755	44755	9759	47485	2
TOTAL MOL/HR		25033	25033	23447	23447	1265	1099	1586	2685	2685	2685	2685	2685	2685	584	2851	1
MSCFD		228000	228000	213549	213549	11520	10012	14445	24457	24457	24457	24457	24457	24457	5316	25966	15
FLOW - GPM (MACFM)		1975	(139)/1812	1812	1812	(1440)	(1653)	(1396)	(2859)	(808 3)	(3205)	(2631)	(1136)	(83 7)	(4 41)	(892)	(2
PRESSURE - PSIG		565 0	97	97	297	123	96	97	96	20	490	450	180	176	6403	176	9
TEMPERATURE - F		-235 8	-249	-249	-248 6	166 4	-154	-248 7	-210 6	108	250 7	892	323	103 9	530	103 9	-1
AVG. MOL WEIGHT		16 14	16 8/16 1	16 10	16 10	16 49	16 49	16 79	16 66	16 66	16 66	16 66	16 66	16 66	16 66	16 14	16 66	16
DENSITY - LB/FT3		25 5	0196/25 9	25 9	25 9	0144	0124	0190	0156	0055	0139	0170	0387	0534	2120	0532	0
VISCOSITY - CP		0111	0005/013	0131	0131	0006	0006	0004	0005	0010	0014	0011	0015	0011	0011	0012	0
CP/CV			1 3075			1 32	1 32	1 30	1 31	1 31	1 26	1 30	1 24	1 29	1 25	1 29	1
HEAT CAPACITY BTU/LB F		0 8656	0 50/0 875	0 8751	0 8749	0 490	0 488	0 501	0 491	0 495	0 575	0 519	0 60	0 534	0 613	0 535	0
MOL FRACT. LIQ.		1 0000	0 93664	1 0000	1 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0000	0 0

NO.	REVISION	BY CHKD	DATE APP'D
A	FOR REVIEW	12/29/95 PG	
B	FOR APPROVAL	12/11/96 PG	
C	ISSUED FOR DESIGN	3/20/01	3/21/01



MATERIAL	MOL WT	MOL PERCENT															
		170	174	175	180	182	183	184	193	193A	193B	195A	195B	199A	199B		
METHANE	16.04	0.5000	0.5000	0.5000	0.5000	0.5000	2.0219	0.0707	0.0707	0.0707	0.0707	1.0866	1.0866	0.5477	0.4546		
ETHANE	30.07	2.0000	2.0000	2.0000	2.0000	2.0000	4.8585	1.1937	1.1937	1.1937	1.1937	3.1017	3.1017	2.3895	1.9147		
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
PROPANE	44.09	95.0000	95.0000	95.0000	95.0000	95.0000	92.1703	95.7982	95.7982	95.7982	95.7982	93.9093	93.9093	94.9114	95.0844		
ISOBUTANE	58.12	2.0000	2.0000	2.0000	2.0000	2.0000	0.8113	2.3353	2.3353	2.3353	2.3353	1.9418	1.9418	1.9628	2.0353		
N - BUTANE	58.12	0.5000	0.5000	0.5000	0.5000	0.5000	0.1381	0.6021	0.6021	0.6021	0.6021	0.3605	0.3605	0.4887	0.5108		
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
NITROGEN	28.02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
ARGON	39.984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
CARBON DIOXIDE	44.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
TOTAL LB/HR		1268520	939090	329429	939090	329429	201698	727391	727392	330499	406892	287871	243256	618370	620149		
TOTAL MOL/HR		28812	21319	7482	21329	7482	4692	16637	16637	7496	9180	6398	5576	14095	14756		
MSCFD		262416	194267	68148	194267	68148	42739	151528	151528	67914	83613	60101	50786	128316	134400		
FLOW - GPM (MACFM)		5214	3860	1354	3761/2772	(604.71)	(376.63)	2772	(3980.28)	(1780.96)	(2196.32)	(531.92)	(449.48)	(484.22)	(539.76)		
PRESSURE - PSIG		1380	1380	1380	433	433	433	433	37	37	37	433	433	1452	1447		
TEMPERATURE - F		76.4	76.4	76.4	198	245	198	198	-305	-305	-305	22.7	22.7	1376	1376		
AVG. MOL WEIGHT		44.02	44.02	44.02	42.98/44.32	44.02	42.98	44.32	44.32	44.32	44.32	43.62	43.62	43.99	44.05		
DENSITY - LB/FT3		30.3	30.3	30.3	0.535/331	0.544	0.535	331	0.185	0.185	0.185	0.541	0.541	1.277	1.275		
VISCOSITY - CP		0.096	0.096	0.096	0.007/0.133	0.007	0.007	0.1327	0.006	0.006	0.006	0.007	0.007	0.009	0.009		
CP/CV					1.1268	1.1228	1.1268		1.1428	1.1428	1.1428	1.1243	1.1243	1.0997	1.0996		
HEAT CAPACITY BTU/LB F		0.6476	0.6482	0.6482	0.411/0.593	0.412	0.411	0.5933	0.358	0.358	0.358	0.412	0.412	0.498	0.498		
MOL FRACT. LIQ.		1.0000	1.0000	1.0000	0.7800	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

NO	REVISION	BY / CHK	DATE / APP'D
A	FOR REVISION	1/29/91 PG	
B	FOR APPROVAL	2/11/91 PG	
0	ISSUED FOR DESIGN	3/6/91 PG	3/6/91 W.R.L.



G-2684-721-160-251/252
ETHYLENE COMPRESSOR
DESIGN FLOW: 147,000 SCFM(TOTAL)
SUMMER FLOW: 144,217 SCFM(TOTAL)

G-2684-721-160-351/352
METHANE COMPRESSOR
DESIGN FLOW: 123,500 SCFM(TOTAL)
SUMMER FLOW: 110,881 SCFM(TOTAL)

G-2684-729-240-251/252
LOW STAGE C2 AIR FIN
DESIGN DUTY: 6,850 MBTU/HR(each)
SUMMER DUTY: 6,234 MBTU/HR(AVG)

G-2684-729-240-253/254
INTERSTAGE C2 AIR FIN
DESIGN DUTY: 14,800 MBTU/HR(each)
SUMMER DUTY: 13,315 MBTU/HR(AVG)

G-2684-729-240-255/256
HIGH STAGE C2 AIR FIN
DESIGN DUTY: 21,401 MBTU/HR(each)
SUMMER DUTY: 18,124 MBTU/HR(AVG)

G-2684-729-240
INTERSTAGE C1 A
DESIGN DUTY: 5,160
SUMMER DUTY: 3,879

MATERIAL	MOL WT	MOL PERCENT 76	77	78	132	133	134	91A	91B	145A	145B						
METHANE	16.04	98.5478	99.6214	99.9642	7.9830	41908	0.3713	99.8649	98.9370	1.8365	2.1514						
ETHANE	30.07	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ETHYLENE	28.05	0.0000	0.0000	0.0000	92.0170	95.8092	99.6287	0.0000	0.0000	98.1635	97.8486						
PROPANE	44.09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ISOBUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
N - BUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
NITROGEN	28.02	1.4528	0.3686	0.0358	0.0000	0.0000	0.0000	0.9331	1.0630	0.0000	0.0000						
ARGON	39.984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
CARBON DIOXIDE	44.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
TOTAL LB/HR		177173	68740	37436	73452	118980	441766	137315	144034	303584	330616						
TOTAL MOL/HR		10923	4273	2332	2710	4314	15772	8500	9031	10907	11894						
MSCFD		99504	38917	21247	24690	39332	143684	77416	82252	99339	108332						
FLOW - GPM (MACFM)		(306.91)	(345.75)	(796.89)	(98.56)	(443.13)	(1362.73)	(84.47)	(89.94)	(181.16)	(200.89)						
PRESSURE - PSIG		160.0	43.8	0.1	115.8	33.8	3.6	561.9	562.6	304.5	304.1						
TEMPERATURE - F		125	125	125	169	169	16.9	104.1	105.6	98.9	104.5						
AVG. MOL WEIGHT		16.21	16.08	16.04	27.09	27.55	28.00	16.15	16.17	27.83	27.79						
DENSITY - LB/FT3		0.377	0.187	0.046	0.745	0.268	0.101	1.625	1.623	1.675	1.645						
VISCOSITY - CP		0.010	0.009	0.009	0.009	0.009	0.009	0.012	0.012	0.011	0.011						
CP/CV		1.29	1.30	1.31	1.22	1.24	1.23	1.26	1.26	1.18	1.18						
HEAT CAPACITY BTU/LB F		0.335	0.323	0.319	0.392	0.363	0.352	0.394	0.394	0.449	0.449						
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

NO.	REVISION	BY / CHK'D	DATE / APP'D
A	FOR REVISION	1/29/91 PC	
B	FOR APPROVAL	7/11/91 PC	
C	ISSUED FOR DESIGN	3/2/92 PC	3/6/92 MEL

G-2684-706-950-701283

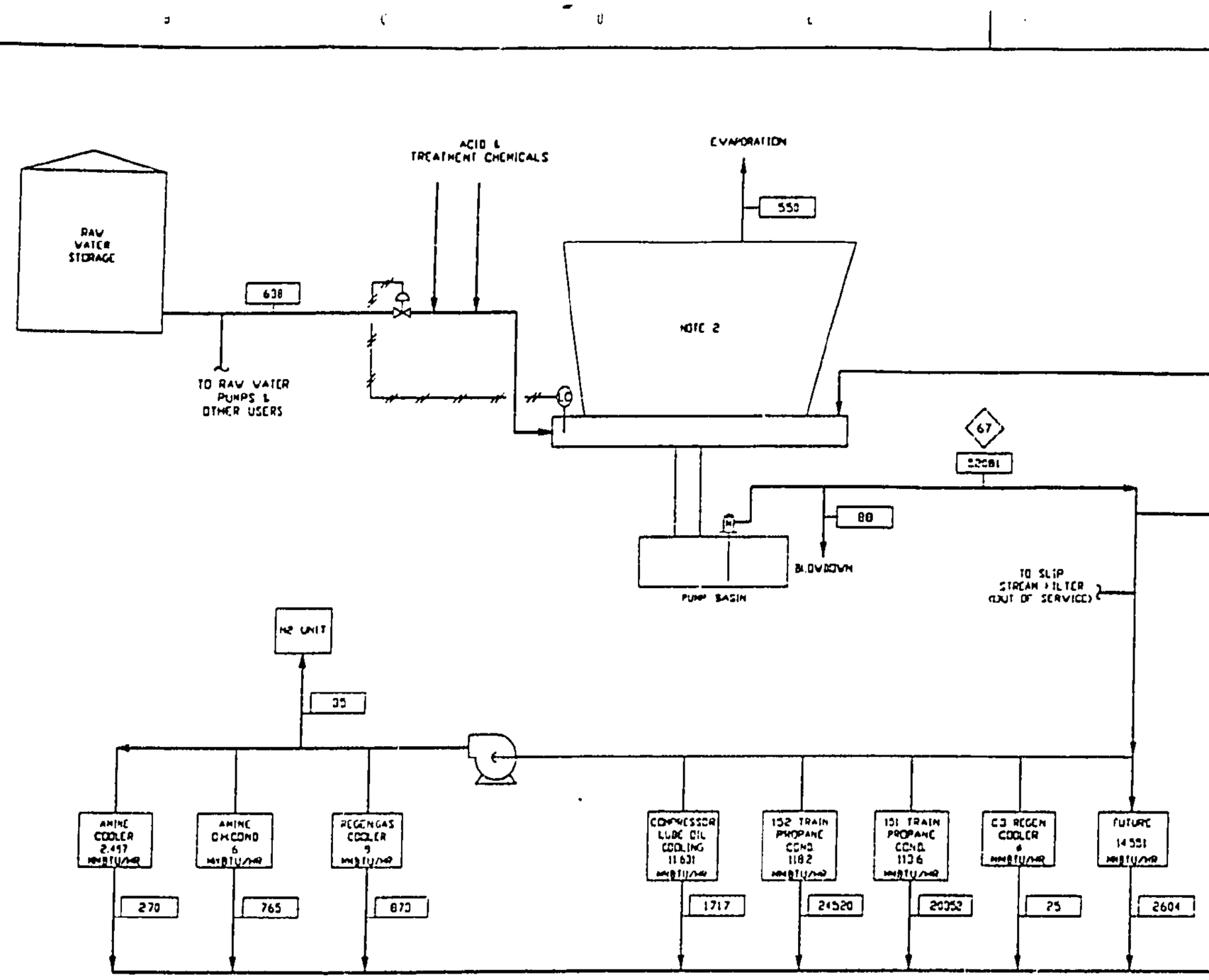
LNG STORAGE

CAP=225,000 BBLS (Each)

K-221
STORAGE VAPOR BLOWER
DESIGN FLOW = 100,000 SCFH
SUMMER FLOW = 80,000 SCFH

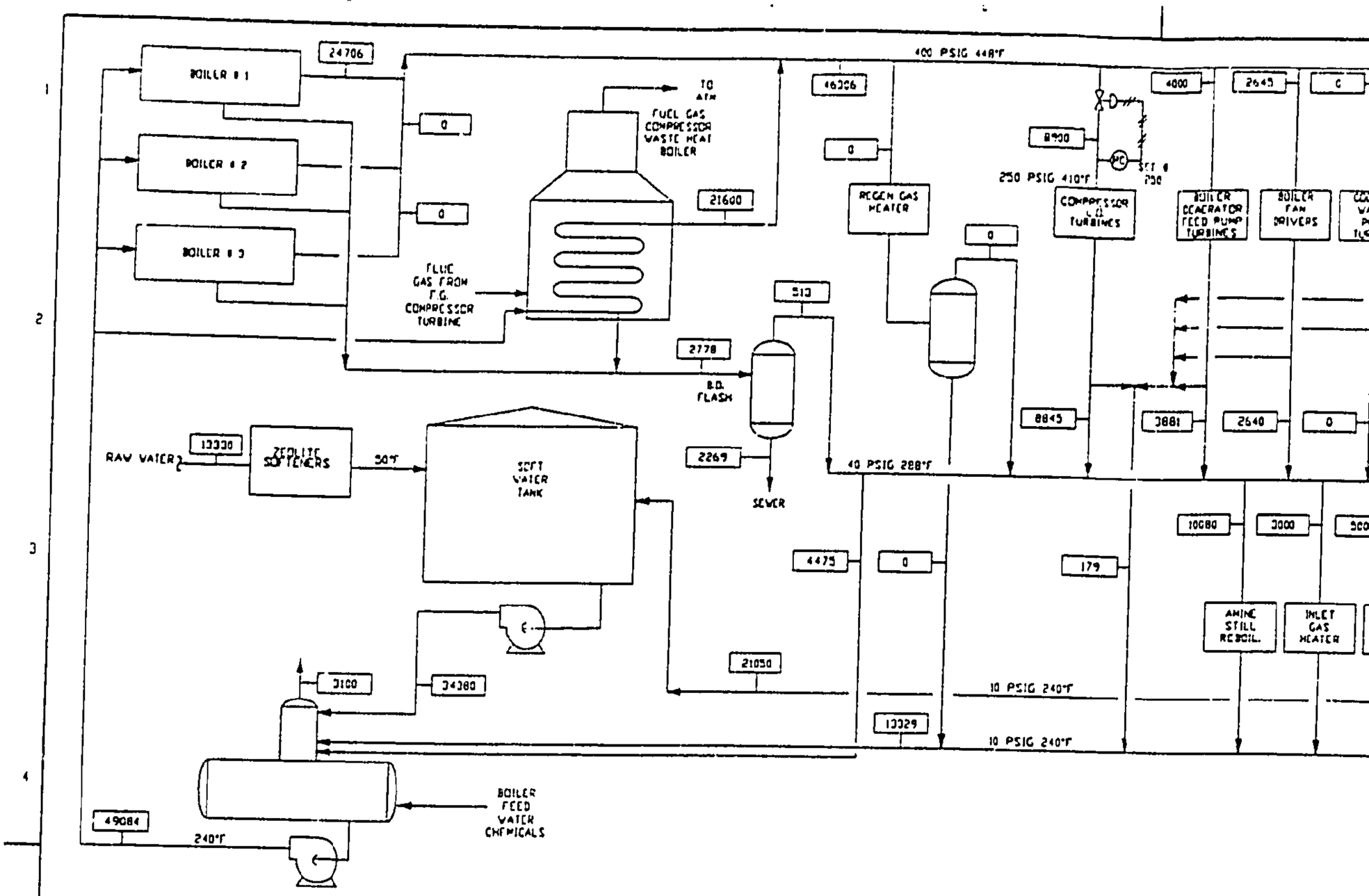
MATERIAL	MOL WT	MOL PERCENT															
		21	29	30	22												
METHANE	16.04	99.3573	96.3383	96.3383	99.7409												
ETHANE	30.07	0.0715	0.0001	0.0001	0.0756												
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000												
PROPANE	44.09	0.0053	0.0000	0.0000	0.0056												
ISOBUTANE	58.12	0.0021	0.0000	0.0000	0.0023												
N - BUTANE	58.12	0.0011	0.0000	0.0000	0.0011												
ISOPENTANE	72.15	0.0011	0.0000	0.0000	0.0011												
N - PENTANE	72.15	0.0011	0.0000	0.0000	0.0011												
NITROGEN	28.02	0.3421	3.6229	3.6229	0.1550												
ARGON	39.984	0.0078	0.0385	0.0385	0.0061												
CARBON DIOXIDE	44.01	0.0107	0.0001	0.0001	0.0113												
TOTAL LB/HR		377373	20854	20854	356719												
TOTAL MOL/HR		23447	1265	1265	22182												
MSCFD		213549	11520	11520	202033												
FLOW - GPM (MACFM)			(2141)	(1440)	1674												
PRESSURE - PSIG			0.108	12.3	0.263												
TEMPERATURE - F			-221	-166.4	-239.4												
AVG. MOL WEIGHT		16.10	16.49	16.49	16.08												
DENSITY - LB/FT3		26.0	0.098	0.144	26.5												
VISCOSITY - CP		0.131	0.005	0.006	0.211												
CP/CV			1.32	1.32													
HEAT CAPACITY BTU/LB F			0.4900	0.4900	0.8758												
MOL FRACT. LIQ.			0.0000	0.0000	1.0000												

NO	REVISION	BY	DATE			
		CHK'D	APP'D			
A	FOR REVISION	PG		1	CHANGED TO ONE BLOWER	
B	FOR APPROVAL	PG				
0	ISSUED FOR DESIGN	PG	WRL			



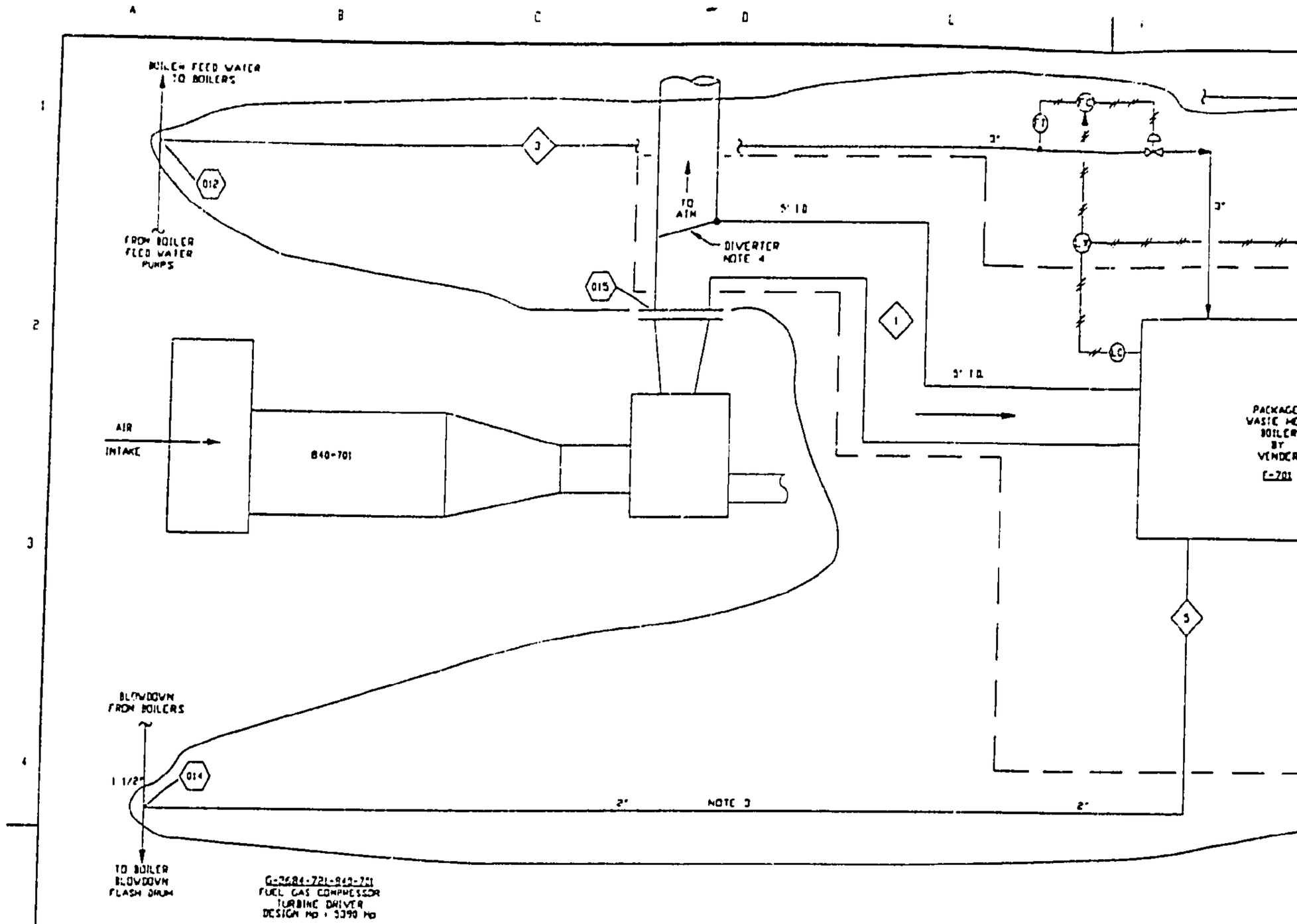
MATERIAL	MOL WT	MOL PERCENT														
METHANE	16.04															
ETHANE	30.07															
ETHYLENE	28.05															
PROPANE	44.09															
ISOBUTANE	58.12															
N - BUTANE	58.12															
ISOPENTANE	72.15															
N - PENTANE	72.15															
NITROGEN	28.02															
ARGON	39.984															
CARBON DIOXIDE	44.01															
WATER	18.02															
TOTAL LB/HR																
TOTAL MOL/HR																
MSCFD																
FLOW - GPM (MACFH)																
PRESSURE - PSIG																
TEMPERATURE - F																
AVG MOL WEIGHT																
DENSITY - LB/FT3																
VISCOSITY - CP																
CP/CV																
HEAT CAPACITY BTU/LB F																
MOL FRACT. LIQ.																

NO.	REVISION	BY CHKD	DATE APP'D
A	FOR APPROVAL	12/11/91 PG	
0	ISSUED FOR DESIGN	3/9/91 MM	3/9/91 W.A.L.



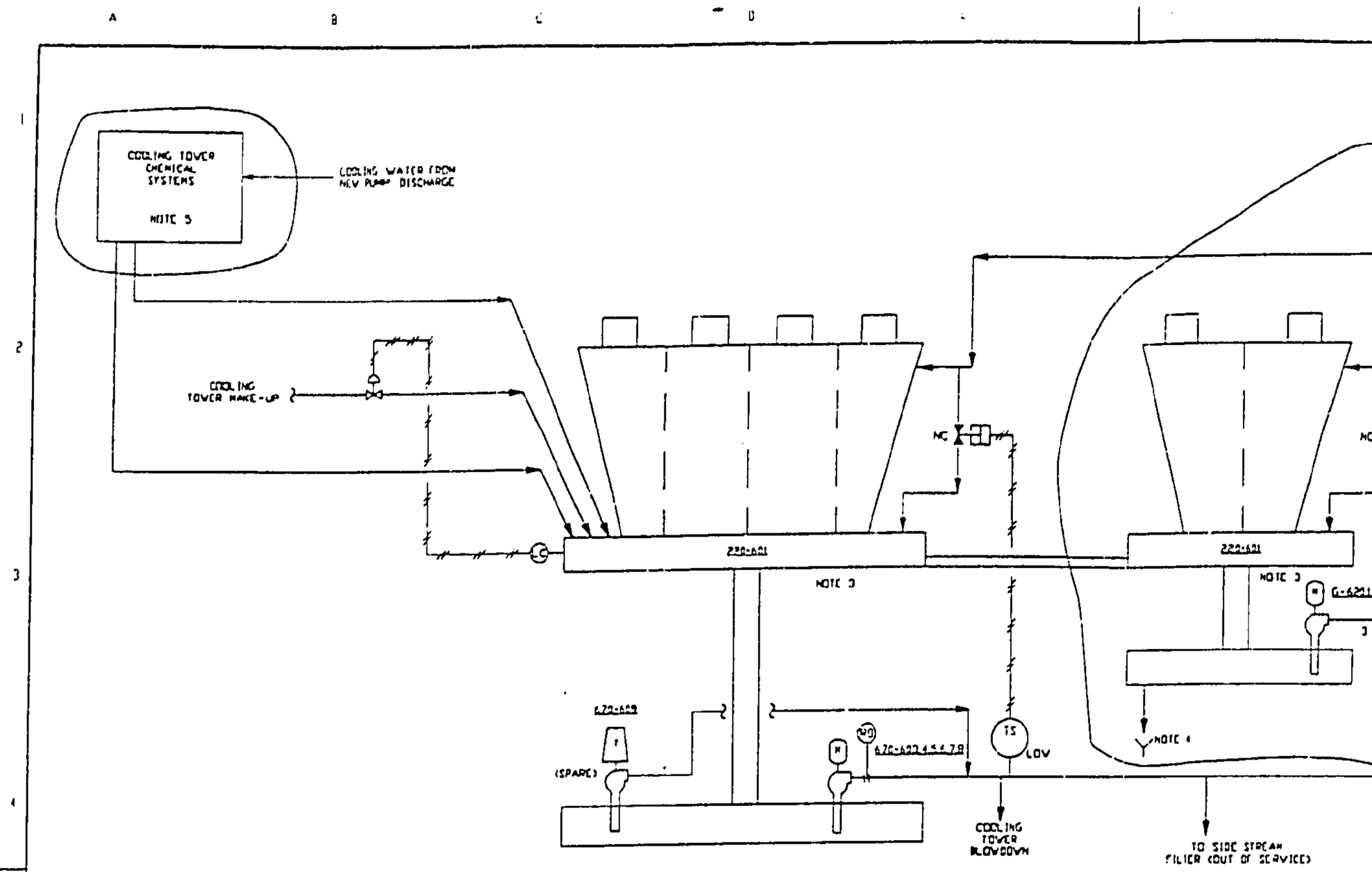
MATERIAL	MOL WT	MOL PERCENT
METHANE	16.04	
ETHANE	30.07	
ETHYLENE	28.05	
PROPANE	44.09	
ISOBUTANE	58.12	
N - BUTANE	58.12	
ISOPENTANE	72.15	
N - PENTANE	72.15	
NITROGEN	28.02	
ARGON	39.984	
CARBON DIOXIDE	44.01	
WATER	18.02	
TOTAL LB/HR		
TOTAL MOL/HR		
MSCFD		
FLOW - GPM (MACFH)		
PRESSURE - PSIG		
TEMPERATURE - F		
AVG. MOL WEIGHT		
DENSITY - LB/FT3		
VISCOSITY - CP		
CP/CV		
HEAT CAPACITY BTU/LB F		
MOL FRACT. LIQ.		

NO	REVISION	BY CHK'D	DATE APP'D
A	FOR APPROVAL	12/11/91 PG	
0	ISSUED FOR DESIGN	3/4/92	3/4/92 MAL



MATERIAL	MOL WT	MOL PERCENT 1	2	3	4	5
METHANE	16.04	0.00	0.00	0.00	0.00	0.00
ETHANE	30.07	0.00	0.00	0.00	0.00	0.00
ETHYLENE	28.05	0.00	0.00	0.00	0.00	0.00
PROPANE	44.09	0.00	0.00	0.00	0.00	0.00
ISOBUTANE	58.12	0.00	0.00	0.00	0.00	0.00
N - BUTANE	58.12	0.00	0.00	0.00	0.00	0.00
ISOPENTANE	72.15	0.00	0.00	0.00	0.00	0.00
N - PENTANE	72.15	0.00	0.00	0.00	0.00	0.00
NITRUGEN	28.02	77.48	77.48	0.00	0.00	0.00
ARGON	39.944	0.00	0.00	0.00	0.00	0.00
CARBON DIOXIDE	44.01	1.92	1.92	0.00	0.00	0.00
WATER	18.02	3.86	3.86	1.00	1.00	1.00
OXYGEN	32.00	16.74	16.74	0.00	0.00	0.00
TOTAL LB/HR		355000	355000	31752	28577	3175
TOTAL MOL/HR		12412	12412	1762	1596	176
MSCFD						
FLOW - GPM (MACFM)		10668	7755	70	332	8
PRESSURE - PSIG		8"H2O	2"H2O	530	400	400
TEMPERATURE - F		740	400	240	448	448
AVG MOL WEIGHT		28.6	28.6	18.02	18.02	18.02
DENSITY - LB/FT3		0.033	0.046	56.8	0.861	48.3
VISCOSITY - CP		0.033	0.026	0.24	0.018	0.12
CP/CV		1.36	1.38			
HEAT CAPACITY BTU/LB F		0.264	0.253	1.09	0.542	1.346
MOL FRACT. LIQ.		0.00	0.00	1.00	0.00	1.00

NO	REVISION	BY	DATE
A	FOR REVIEW	[illegible]	1/23/91
B	FOR APPROVAL	PG	1/11/91
0	ISSUED FOR DESIGN	[illegible]	3/6/91



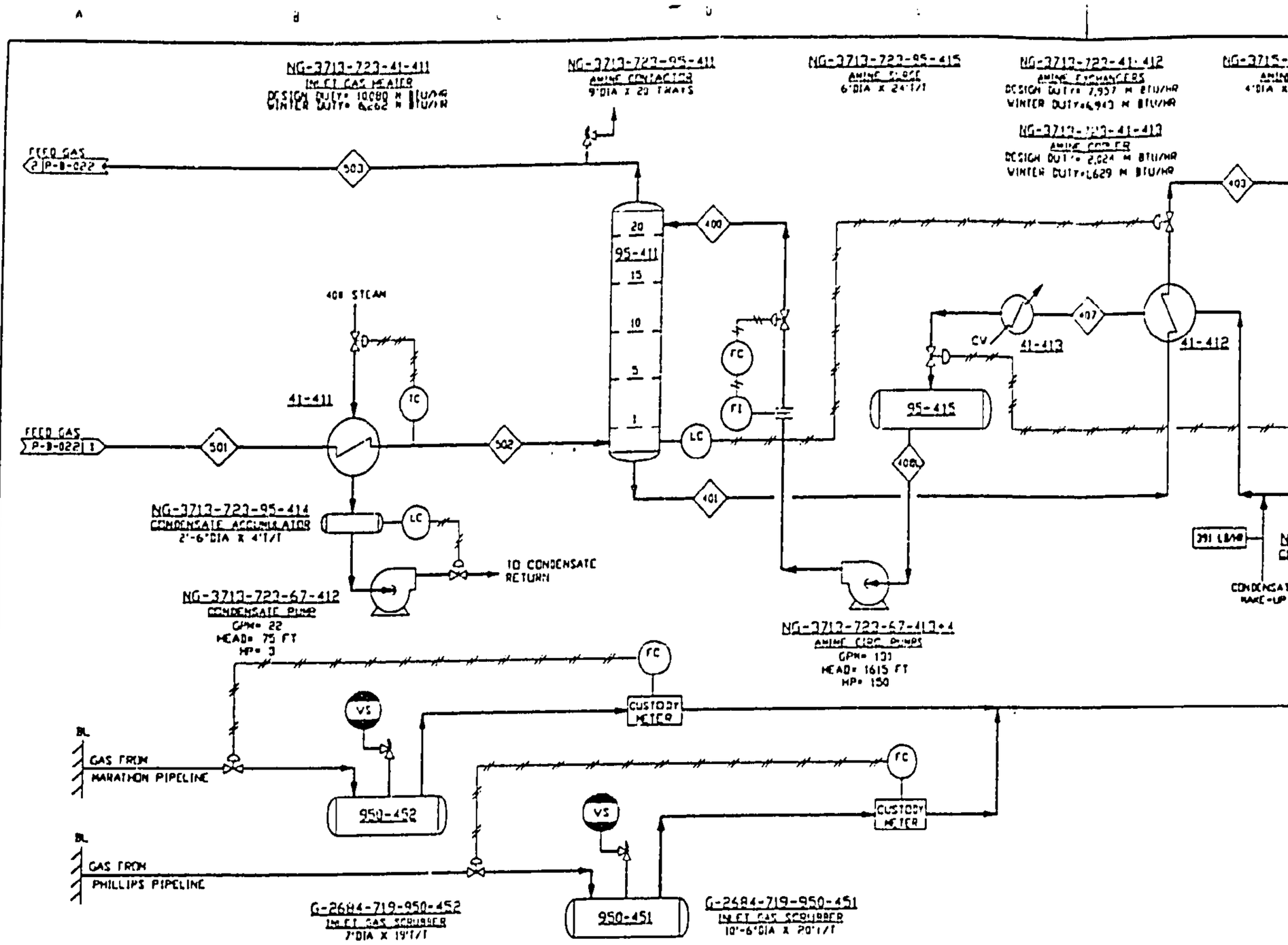
G-2484-728-221-A01
COOLING TOWER
DESIGN DUTY = 287.5 MM BTU/HR
(MODIFIED)

G-2484-728-620-A01 & 6789
COOLING WATER PUMPS
DESIGN FLOW = 7500 GPM (each)
DESIGN HEAD = 403 PSI

G-6211,21
COOLING WATER PUMPS
DESIGN FLOW = 6112 GPM (each)
DESIGN HEAD = 394 PSI

MATERIAL	MOL WT	MOL PERCENT															
METHANE	16.04																
ETHANE	30.07																
ETHYLENE	28.05																
PROPANE	44.09																
ISOBUTANE	58.12																
N - BUTANE	58.12																
ISOPENTANE	72.15																
N - PENTANE	72.15																
NITROGEN	28.02																
ARGON	39.984																
CARBON DIOXIDE	44.01																
WATER	18.02																
TOTAL LB/HR																	
TOTAL MOL/HR																	
MSCFD																	
FLOW - GPM (MACFM)																	
PRESSURE - PSIG																	
TEMPERATURE - F																	
AVG. MOL WEIGHT																	
DENSITY - LB/FT3																	
VISCOSITY - CP																	
CP/CV																	
HEAT CAPACITY BTU/LB F																	
MOL FRACT. LIQ.																	

NO	REVISION	BY CHKD	DATE APP'D
A	FOR REVIEW	12/29/93 PG	
B	FOR APPROVAL	12/11/91 PG	
0	ISSUED FOR DESIGN	3/8/91 MRL	3/8/91 MRL

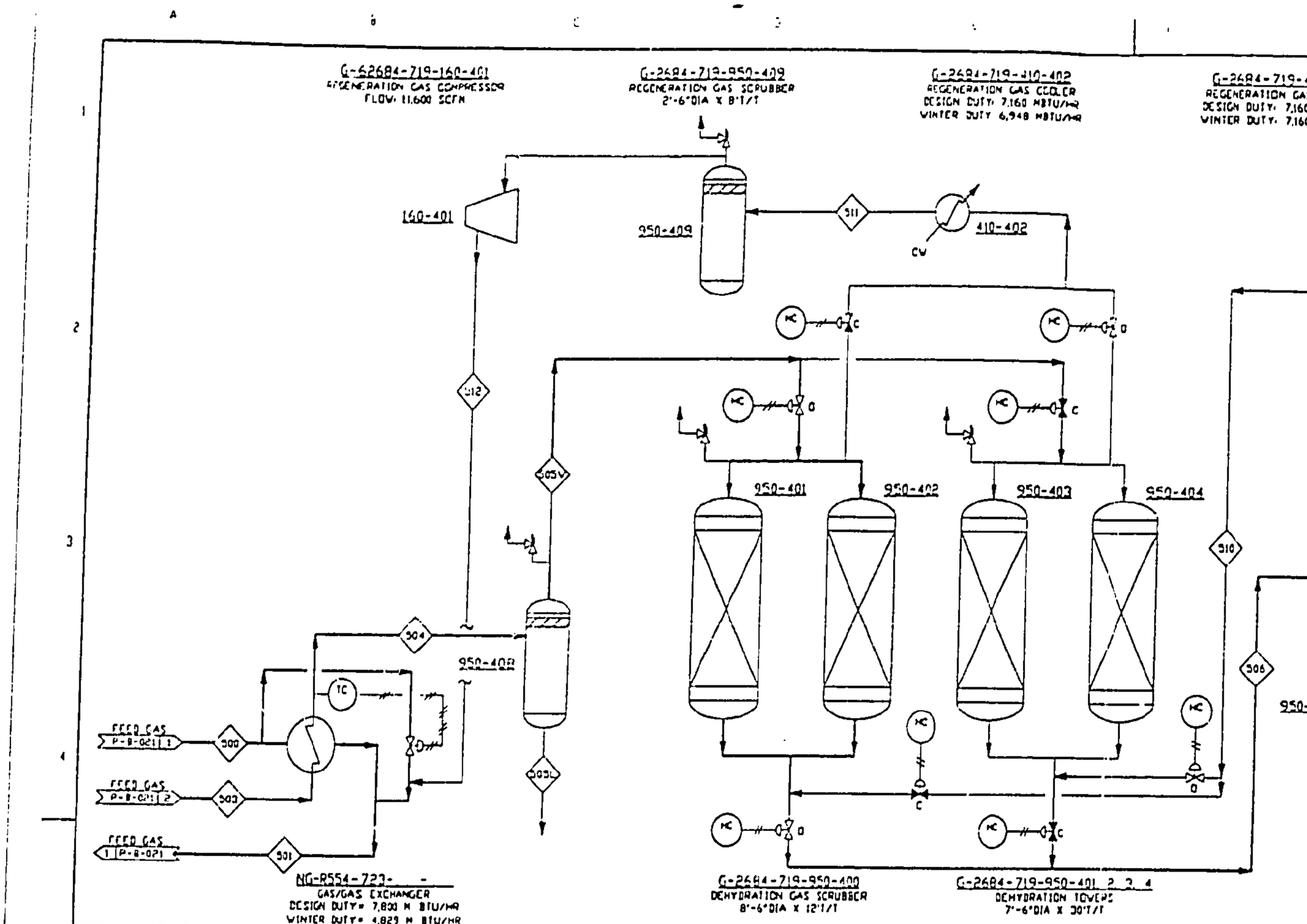


MOL PERCENT

MATERIAL	MOL WT	400	401	403	404	405	407	408L	500	501	502	503	420	421		
METHANE	16.04	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	99.0320	99.0603	99.0603	99.1440	0.0000	0.0000		
ETHANE	30.07	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0670	0.0670	0.0670	0.0570	0.0000	0.0000		
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
PROPANE	44.09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0050	0.0050	0.0050	0.0000	0.0000		
ISOBUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0020	0.0020	0.0020	0.0000	0.0000		
N - BUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000		
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000		
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0010	0.0010	0.0000	0.0000		
NITROGEN	28.02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.7110	0.7110	0.7110	0.7110	0.0000	0.0000		
ARGON	39.948	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0100	0.0100	0.0100	0.0100	0.0000	0.0000		
CARBON DIOXIDE	44.01	0.5612	2.1756	2.1756	0.5645	85.5314	0.5612	0.5612	0.1500	0.1417	0.1417	0.0100	12.7423	0.1822		
WATER	18.016	94.5113	92.9588	29.9588	94.4759	14.4686	94.5113	94.5113	0.0000	0.0000	0.0000	0.0480	87.2546	99.6752		
MEA	61.00	4.9275	4.8636	4.8636	4.9596	0.0000	4.9275	4.9275	0.0000	0.0000	0.0000	0.0000	0.1231	0.1426		
TOTAL LB/HR		50746	52283	52283	50355	1928	50746	50746	4735552	5035552	5035552	5020015	6373	5045		
TOTAL MOL/HR		2502	2528	2528	2480	48	2502	2502	29257	31115	31115	31089	326	278		
MSCFD		22787	23024	23024	22587	436	22787	22787	266471	283396	283396	283151	2971	2535		
FLOW - GPM (MACFH)		102	106	115	108	(14.38)	104	102	(199.02)	(223.8)	(237.2)	(240.5)	(108.9)	13.3		
PRESSURE - PSIG		659.7	662.7	10	10	6.5	5	10	666.7	664.7	662.7	659.7	7.0	6.5		
TEMPERATURE - F		76	67.5	209	242	140	105	71	27	45	65	69	229	140		
AVG MOL WEIGHT		20.28	20.70	20.70	20.3	40.25	20.28	20.28	16.18	16.18	16.18	16.14	21.38	18.12		
DENSITY - LB/FT3		62.01	61.5	56.8	58.1	0.134	61.0	62.1	2.379	2.249	2.123	2.087	0.064	0.049		
VISCOSITY - CP		1.15	1.26	0.29	0.245	0.016	4.7735	1.24	0.010	0.010	0.011	0.011	0.014	0.46		
CP/CV						1.27			1.24	1.25	1.25	1.25	1.30			
HEAT CAPACITY BTU/LB F		0.9312	0.9229	0.9163	0.9628	0.226	0.9350	0.9306	0.629	0.619	0.612	0.611	0.398	0.99		
MOL FRACT. LIQ.		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000		

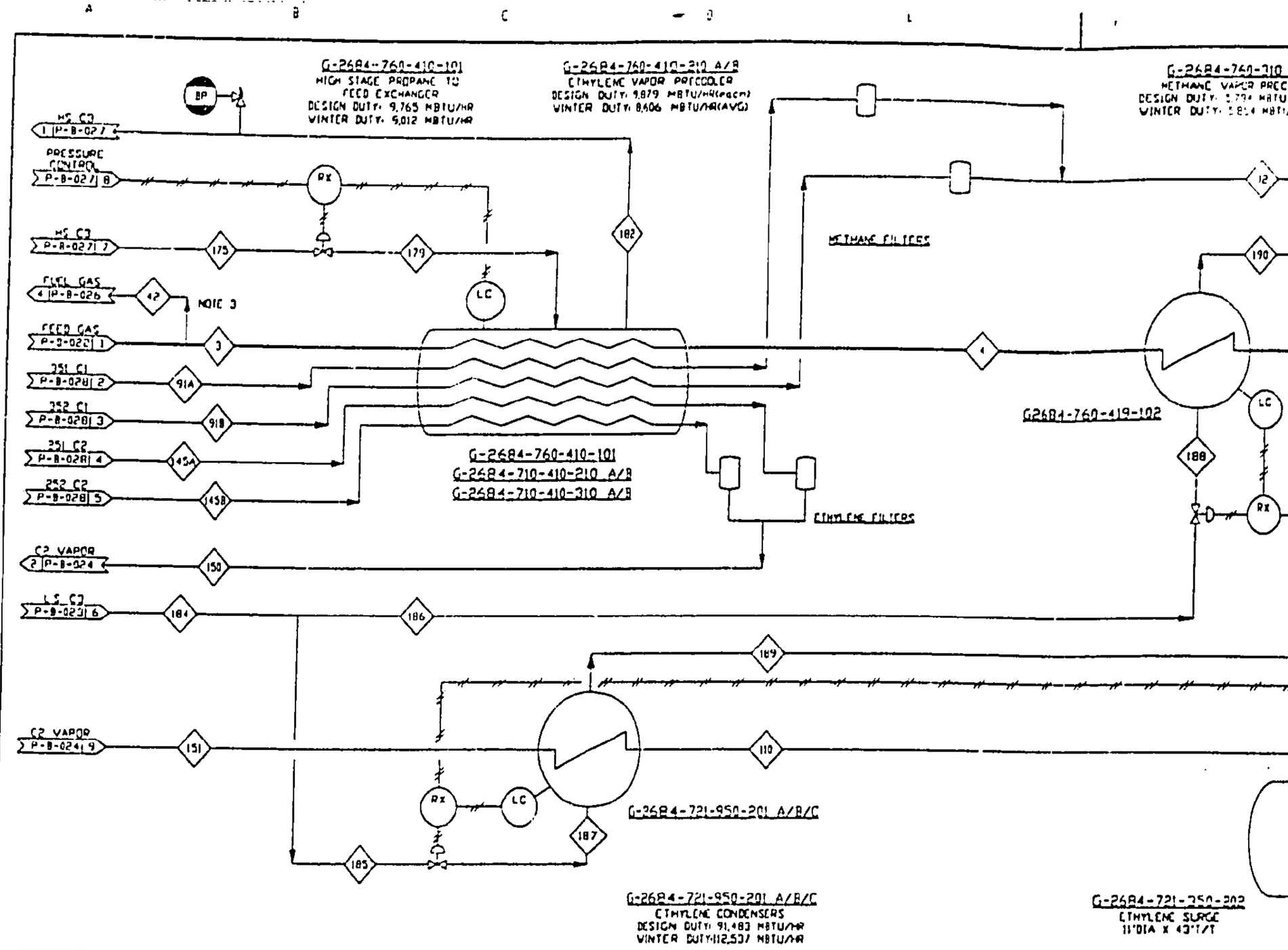
NO.	REVISION	BY DES	DATE APP'D
A	ISSUED FOR APPROVAL	1/11/91 PG	
0	ISSUED FOR DESIGN	3/9/91 PG	3/20/91 [illegible]

A B C D E F



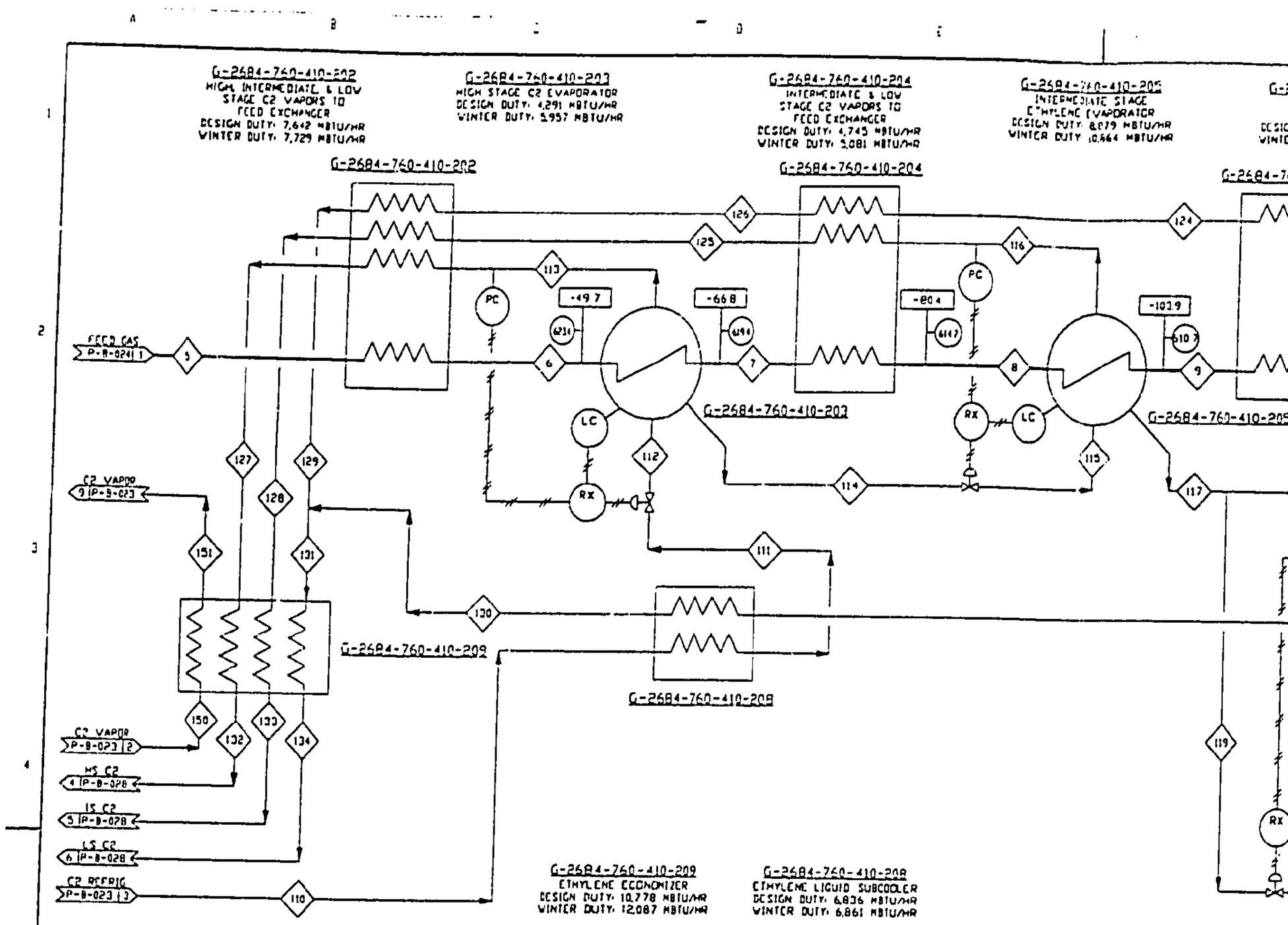
MATERIAL	MOL WT	MOL PERCENT 500	501	503	504	505V	505L	506	507	508	509	510	511	512	1
METHANE	16.04	99.0520	99.0603	99.1440	99.1440	99.1560	0.0000	99.192	99.192	99.192	99.192	99.192	99.192	99.192	99.192
ETHANE	30.07	0.0670	0.0670	0.0670	0.0670	0.0670	0.0000	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670	0.0670
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0050	0.0050	0.0050	0.0000	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
ISOBUTANE	58.12	0.0020	0.0020	0.0020	0.0020	0.0020	0.0000	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020	0.0020
N - BUTANE	58.12	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
ISOPENTANE	72.15	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
N - PENTANE	72.15	0.0010	0.0010	0.0010	0.0010	0.0010	0.0000	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010
NITROGEN	28.02	0.7110	0.7110	0.7110	0.7110	0.7110	0.0000	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110	0.7110
ARGON	39.948	0.0100	0.0100	0.0100	0.0100	0.0100	0.0000	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
CARBON DIOXIDE	44.01	0.1500	0.1417	0.0100	0.0100	0.0100	0.0000	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100
WATER	18.016	0.0000	0.0000	0.0480	0.0480	0.0360	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MEA	61.08	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		473552	303552	302013	302013	301949	64	301749	301749	301749	29300	29000	29000	29000	471749
TOTAL MOL/HR		29257	31115	31089	31089	31085	3.66	31075	31075	31075	1858	1858	1858	1858	29217
MSCFD		266471	283396	283151	283151	283115	033	283026	283026	283026	16925	16925	16925	16925	266101
FLOW - GPM (MACFM)		(199.02)	(223.8)	(240.53)	(231.88)	(231.82)	0.13	(235.6)	(236.7)	(236.7)	(14.2)	(27.1)	(15.5)	(14.4)	(222.5)
PRESSURE - PSIG		666.7	664.7	659.7	656.7	656.7	656.7	646.7	644.7	643.7	643.7	638.7	625.7	664.7	643.7
TEMPERATURE - F		27	45	69	93	93	93	93	93	93	93	428	93	71	93
AVG MOL WEIGHT		16.18	16.18	16.14	16.14	16.14	18.02	16.14	16.14	16.14	16.14	16.14	16.14	16.14	16.14
DENSITY - LB/FT3		2.379	2.249	2.247	2.165	2.165	62.4	2.129	2.123	2.120	2.120	1.107	2.100	2.089	2.120
VISCOSITY - CP		0.010	0.010	0.011	0.011	0.011	1.24	0.011	0.011	0.011	0.011	0.017	0.011	0.011	0.011
CP/CV		1.24	1.25	1.25	1.25	1.25		1.25	1.25	1.25	1.25	1.22	1.25	1.25	1.25
HEAT CAPACITY BTU/LB F		0.625	0.619	0.611	0.616	0.161	1	0.614	0.613	0.613	0.613	0.696	0.628	0.612	0.613
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO	REVISION	BY	DATE
A	FOR APPROVAL	[illegible]	12/11/91
0	ISSUED FOR DESIGN	[illegible]	3/10/92



MATERIAL	MOL WT	MOL PERCENT														
		3	4	5	91A	91B	92	110	145A	145B	150	151	175	179	182	184
METHANE	16.04	.991525	.991525	.991525	.990221	.983775	.970000	.270000	.199731	.270000	.270000	.270000	.970000	.970000	.970000	.910871
ETHANE	30.07	.006770	.006770	.006770	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.014387
ETHYLENE	28.05	.000000	.000000	.000000	.000000	.000000	.000000	.980000	.699088	.979728	.980000	.980000	.000000	.000000	.000000	.000000
PROPANE	44.09	.000050	.000050	.000050	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.950000	.950000	.950000	.057125
ISOBUTANE	58.12	.000025	.000025	.000025	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.020000	.020000	.020000	.018533
N - BUTANE	58.12	.000010	.000010	.000010	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.030000	.030000	.030000	.005533
ISOPENTANE	72.15	.000010	.000010	.000010	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
N - PENTANE	72.15	.000010	.000010	.000010	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
NITROGEN	28.02	.007110	.007110	.007110	.009779	.010225	.030000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
ARGON	39.948	.000150	.000150	.000150	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
CARBON DIOXIDE	44.01	.000150	.000150	.000150	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
TOTAL LB/HR		471430	471430	471430	166332	163867	330140	731400	362878	371921	731400	731400	258700	258700	258700	831935
TOTAL MOL/HR		29197	29197	29197	10305	10136	20442	26104	13338	13365	26104	26104	5983	5983	5983	18735
MSCFD		265920	265920	265920	93857	92324	186182	240783	118757	121725	240783	240783	53558	53558	53558	172464
FLOW - GPM (MACFM)		(222.37)	(220.61)	(175.47)	(93.52)	(91.98)	(183.65)	3277	(201.25)	(200.57)	(332.80)	(327.86)	10.85	(22.10)/850	(48.72)	31421
PRESSURE - PSIG		643.7	636.7	631.7	586.4	586.4	567.4	2863	3348	3347	2373	2318	1366	415	415	415
TEMPERATURE - F		535	217	-255	850	811	223	-347	731	765	235	-107	501	168	226	168
AVG. MOL WEIGHT		16.14	16.14	16.14	16.16	16.16	16.16	27.81	27.81	27.81	27.81	27.81	43.25	43.25/442	43.25	44.21
DENSITY - LB/FT3		2.120	2.292	2.666	1.773	1.781	2.010	2.79	1.801	1.782	2.001	2.305	31.672	0.514/3.332	0.228	0.2268
VISCOSITY - CP		0.011	0.011	0.010	0.011	0.011	0.010	0.075	0.010	0.010	0.010	0.009	0.012	0.007/0.013	0.007	0.134
CP/CV		1.25	1.24	1.22	1.25	1.25	1.25		1.18	1.18	1.17	1.15		1.167	1.12	
HEAT CAPACITY BTU/LB F		0.613	0.627	0.677	0.597	0.597	0.610	0.6883	0.453	0.452	0.479	0.542	0.477	0.443/0.554	0.410	0.501
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.2400	0.2400	1.0000	1.0000	1.0000	0.8722	0.0000	1.0000

NO.	REVISION	BY	DATE
		CHK'D	APP'D
A	ISSUED FOR APPROVAL	1/11/91 PG	
C	ISSUED FOR DESIGN	3/20/91 PG	3/20/91 WEL

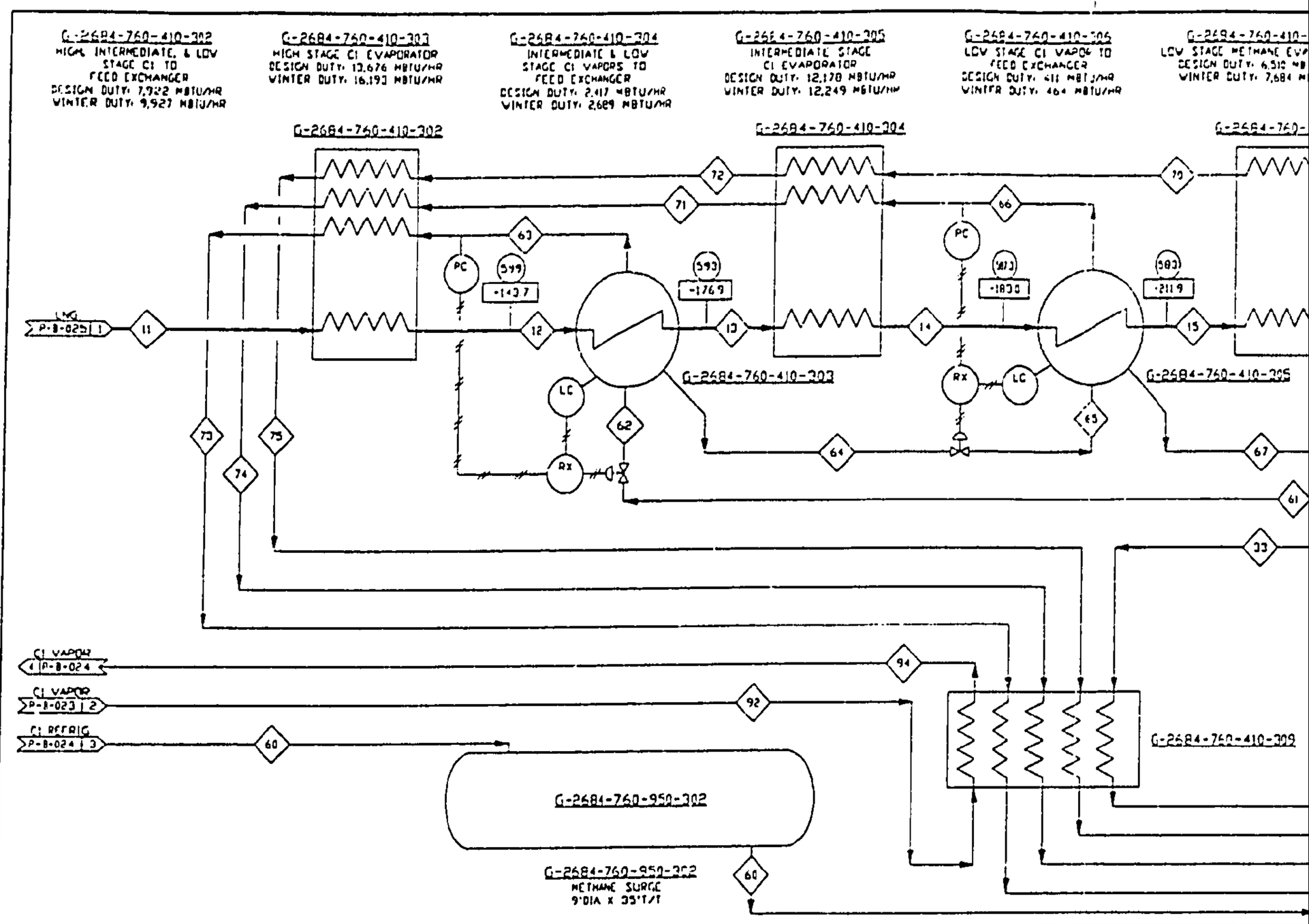


G-2684-760-410-209
ETHYLENE ECONOMIZER
DESIGN DUTY: 10,778 MBTU/HR
WINTER DUTY: 12,087 MBTU/HR

G-2684-760-410-208
ETHYLENE LIQUID SUBCOOLER
DESIGN DUTY: 6,836 MBTU/HR
WINTER DUTY: 6,861 MBTU/HR

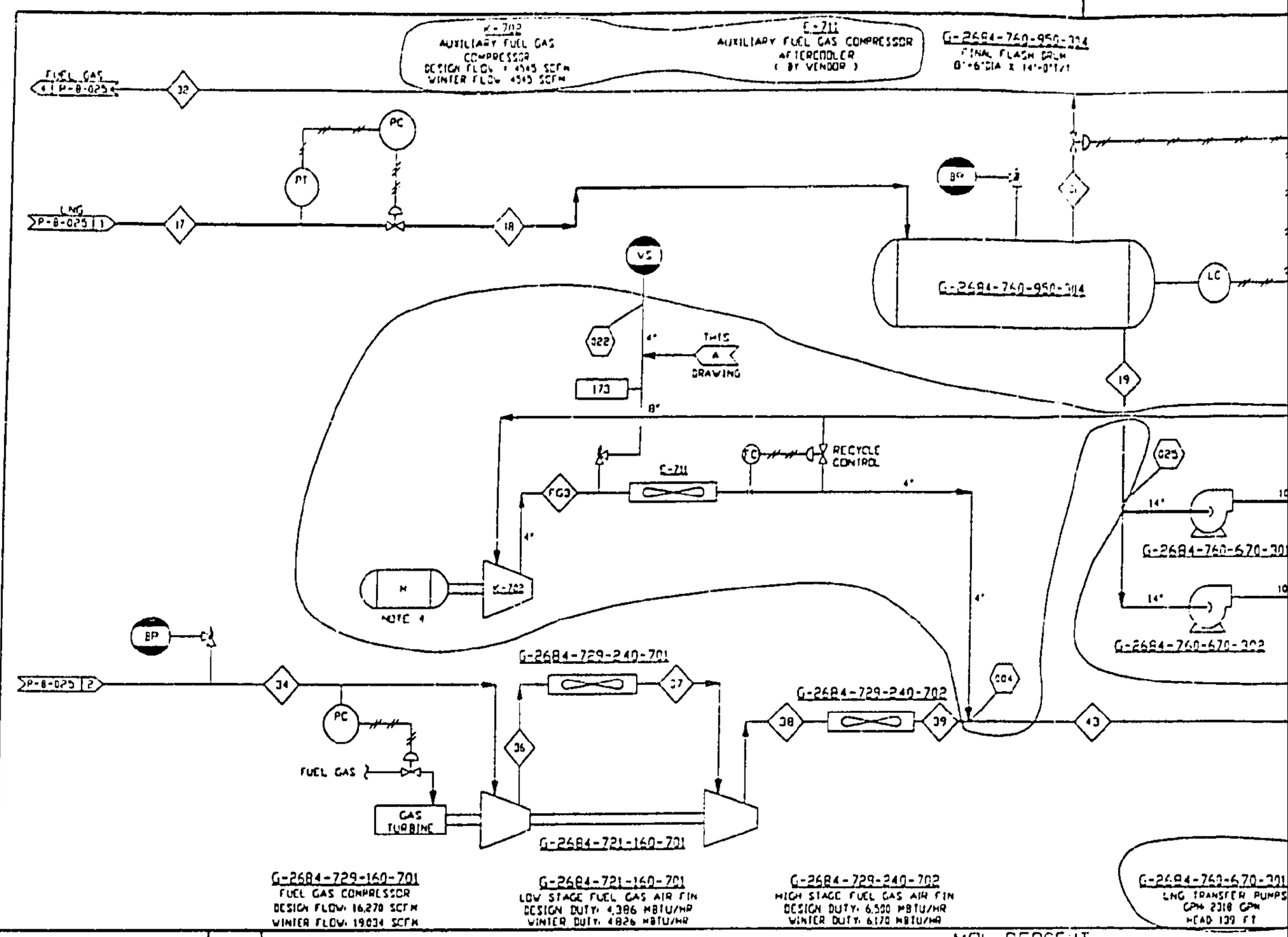
MATERIAL	MOL WT	MOL PERCENT														
		5	11	60	94	110	111	113	116	121	123	124	125	126	127	128
METHANE	16.04	.991920	.991920	.990000	.990000	.20000	.20000	.77364	.39888	.03468	.03468	.03468	.03468	.03468	.77364	.39888
ETHANE	30.07	.00670	.00670	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
ETHYLENE	28.05	.00000	.00000	.00000	.00000	.98000	.98000	.22636	.96112	.99632	.99632	.99632	.96112	.99632	.22636	.96112
PROPANE	44.09	.00050	.00050	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
ISOBUTANE	58.12	.00020	.00020	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
N - BUTANE	58.12	.00010	.00010	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
ISOPENTANE	72.15	.00010	.00010	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
N - PENTANE	72.15	.00010	.00010	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
NITROGEN	28.02	.07110	.07110	.10000	.10000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
ARGON	39.948	.00100	.00100	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
CARBON DIOXIDE	44.01	.00100	.00100	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
TOTAL LB/HR		471430	471430	333400	333400	734400	734400	94397	139793	224409	279800	279800	139793	279800	94397	139793
TOTAL MOL/HR		29197	29197	20442	20442	26404	26404	3480	4924	8311	9988	9988	4924	9988	3480	4924
MSCFD		265920	265920	186182	186182	240483	240483	31696	44851	72963	90972	90972	44851	90972	31696	44851
FLOW - GPM (MACFM)		(175.47)	346513	248473	(95.26)	323738	316637	(91.72)	(290.04)	(989.50)	(1133.01)	(1086.20)	(243.51)	(1224.55)	(111.01)	(428.41)
PRESSURE - PSIG		631.7	602.0	555.0	561.2	286.3	282.3	130.2	44.0	12.0	14.0	11.4	41.6	8.8	115.6	36.4
TEMPERATURE - F		-255	-128.9	-129.1	-98.0	-34.7	-48.7	-69.4	-106.4	-135.4	-132.9	-108.3	-7.6	-7.6	-28.4	-28.4
AVG MOL WEIGHT		16.14	16.14	16.16	16.16	27.81	27.81	27.12	27.57	28.01	28.01	28.01	27.57	28.01	27.12	27.57
DENSITY - LB/FT3		2.486	16.962	16.576	3.468	27.937	28.916	1.029	0.468	0.226	0.242	0.201	0.089	0.163	0.850	0.316
VISCOSITY - CP		0.010	0.033	0.033	0.009	0.075	0.083	0.007	0.006	0.006	0.006	0.006	0.007	0.007	0.008	0.008
CP/CV		1.22			1.15			1.21	1.25	1.28	1.28	1.28	1.26	1.27	1.22	1.25
HEAT CAPACITY BTU/LB F		0.677	1.817	2.136	0.933	0.688	0.655	0.414	0.352	0.319	0.321	0.319	0.344	0.324	0.391	0.351
MOL FRACT. LIQ.		0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO	REVISION	BY (CHK'D)	DATE (APP'D)
A	FOR APPROVAL	12/11/91	
0	ISSUED FOR DESIGN	7/16/91	7/16/91



MATERIAL	MOL WT	MOL PERCENT 11	17	32	33	34	60	61	63	66	69	70	71	72	73	74
METHANE	16.04	99.1920	99.1920	95.0142	95.0142	95.0142	99.0000	99.0000	99.5345	99.6343	99.9645	99.9645	99.6343	99.9645	99.5345	99.6343
ETHANE	30.07	0.0670	0.0670	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOBUTANE	58.12	0.0020	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - BUTANE	58.12	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ISOPENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
N - PENTANE	72.15	0.0010	0.0010	0.0000	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NITROGEN	28.02	0.7110	0.7110	4.9460	4.9460	4.9460	1.0000	1.0000	1.4455	0.3657	0.0356	0.0356	0.3657	0.0356	1.4455	0.3657
ARGON	39.948	0.0100	0.0100	0.0394	0.0394	0.0394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0002	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TOTAL LB/HR		471430	471430	55092	55092	55092	330400	330400	207279	82509	40610	40610	82509	40610	207279	82509
TOTAL MOL/HR		29197	29197	3009	3009	3009	20442	20442	12782	5129	2530	2530	5129	2530	12782	5129
MSCFD		265920	265920	27410	27410	27410	186182	186182	116419	46714	23048	23048	46714	23048	116419	46714
FLOW - GPM (MACFM)		346513	232478	(2899)	(4132)	(8988)	2484	2378	(1615)	(1638)	(1923)	(2448)	(2109)	(3429)	(2187)	(2722)
PRESSURE - PSIG		602.0	565	111	96	20	535	531	172	58	191	106	518	71	169	495
TEMPERATURE - F		-128.9	-231	-219	-130	74	-129	-132	-181	-216	-243	-222	-178	-178	-130	-130
AVG MOL WEIGHT		16.14	16.14	16.65	16.65	16.65	16.16	16.16	16.2	16.08	16.05	16.05	16.08	16.05	16.21	16.08
DENSITY - LB/FT3		16.962	23.28	0.173	0.110	0.055	16.57	17.3	1.283	0.503	0.211	0.165	0.291	0.118	0.947	0.303
VISCOSITY - CP		0.033	0.106	0.005	0.007	0.010	0.033	0.035	0.006	0.005	0.005	0.005	0.006	0.006	0.007	0.007
CP/CV				1.31	1.33	1.32			1.21	1.26	1.29	1.31	1.29	1.32	1.26	1.31
HEAT CAPACITY BTU/LB F		1.817	0.866	0.495	0.481	0.494	2.13	1.720	0.697	0.582	0.538	0.519	0.538	0.505	0.578	0.578
MOL FRACT. LIQ.		1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO	REVISION	BY / CHK'D	DATE / APP'D
A	FOR APPROVAL	12/11/75 / PG	
0	ISSUED FOR DESIGN	3/8/77 / PG	3/8/77 / [illegible]



G-2684-729-160-701
FUEL GAS COMPRESSOR
DESIGN FLOW: 16,270 SCFM
WINTER FLOW: 19,034 SCFM

G-2684-721-160-701
LOW STAGE FUEL GAS AIR FIN
DESIGN DUTY: 4,386 MBTU/HR
WINTER DUTY: 4826 MBTU/HR

G-2684-729-240-702
HIGH STAGE FUEL GAS AIR FIN
DESIGN DUTY: 6,500 MBTU/HR
WINTER DUTY: 6170 MBTU/HR

G-2684-760-670-301
LNG TRANSFER PUMPS
GPM 2318 GPM
HEAD 139 FT

MATERIAL	MOL WT	MOL PERCENT														
		17	18	19	20	30	30B	31	32	34	36	37	38	39	42	43
METHANE	16.04	99.1920	99.1920	99.5773	99.5773	96.7101	96.7101	94.3291	95.0142	95.0142	95.0142	95.0142	95.0142	95.0142	99.1920	95.3411
ETHANE	30.07	0.0670	0.0670	0.0723	0.0723	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0670	0.0602
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PROPANE	44.09	0.0050	0.0050	0.0054	0.0054	0.0003	0.0003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0050	0.0000
ISOBUTANE	58.12	0.0020	0.0020	0.0022	0.0022	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0020	0.0000
N - BUTANE	58.12	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000
ISOPENTANE	72.15	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000
N - PENTANE	72.15	0.0010	0.0010	0.0011	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0000
NITROGEN	28.02	0.7110	0.7110	0.3212	0.3212	3.2528	3.2528	5.6299	4.9460	4.9460	4.9460	4.9460	4.9460	4.9460	0.7110	4.6196
ARGON	39.984	0.0100	0.0100	0.0076	0.0076	0.0368	0.0368	0.0405	0.0394	0.0394	0.0394	0.0394	0.0394	0.0394	0.0100	0.0389
CARBON DIOXIDE	44.01	0.0100	0.0100	0.0108	0.0108	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0100	0.0002
TOTAL LB/HR		471430	471430	435547	435547	26052	14236	35856	50092	50092	50092	50092	50092	50092	319	61907
TOTAL MOL/HR		29197	29197	27053	27053	1584	865	2143	3009	3009	3009	3009	3009	3009	20	3728
MSCFD		265920	265920	246396	246396	14431	7884	19520	27410	27410	27410	27410	27410	27410	181	33955
FLOW - GPM (MACFH)		23247	(178)/2098	2098	2098	(1692)	(1105)	(1705)	(2899)	(8988)	(367)	(295)	(125)	(891)	(0153)	(1132)
PRESSURE - PSIG		5650	112	112	312	151	111	112	111	20	466	426	180	175	6437	175
TEMPERATURE - F		-2318	-247	-247	-247	-156	-147	-247	-219	74	2381	591	294	734	533	734
AVG MOL WEIGHT		16.14	16.8/16.1	16.10	16.10	16.44	16.44	16.7	16.65	16.65	16.65	16.65	16.65	16.65	16.14	16.61
DENSITY - LB/FT3		25.28	0.200/25.8	25.9	25.9	0.153	0.128	0.20	0.173	0.035	0.136	0.172	0.394	0.361	2.120	0.346
VISCOSITY - CP		0.106	0.005/0.125	0.125	0.125	0.006	0.006	0.004	0.005	0.010	0.014	0.011	0.015	0.011	0.011	0.011
CP/CV			1.303			1.32	1.32	1.30	1.31	1.31	1.26	1.33	1.25	1.29	1.25	1.29
HEAT CAPACITY BTU/LB F		0.866	0.507/0.875	0.875	0.875	0.492	0.498	0.538	0.495	0.494	0.568	0.559	0.595	0.526	0.613	0.532
MOL FRACT. LIQ.		1.0000	0.9467	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

NO.	REVISION	BY	DATE
		DMB	MM/DD
A	FOR APPROVAL	12/11/98	
		PG	
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		[illegible]	[illegible]

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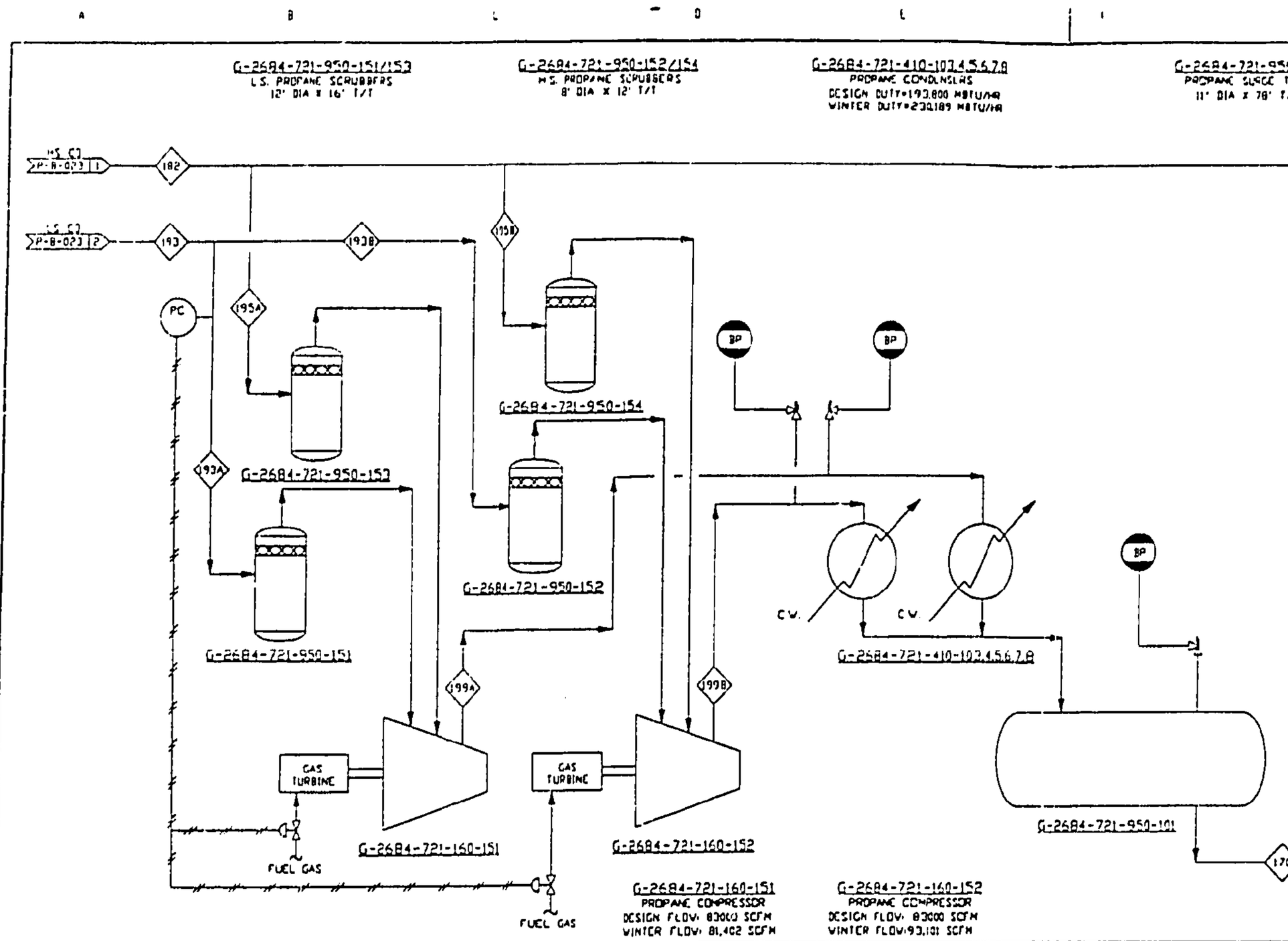

MATERIAL	MOL WT	MOL PERCENT														
		170	174	175	180	182	183	184	193	193A	193B	195A	195B	199A	199B	
METHANE	16.04	0.5000	0.5000	0.5000	0.5000	0.5000	3.1714	0.1087	0.1087	0.1087	0.1087	1.3562	1.3562	0.5035	0.4952	
ETHANE	30.07	2.0000	2.0000	2.0000	2.0000	2.0000	5.8323	1.4387	1.4387	1.4387	1.4387	3.2283	3.2283	2.0078	1.9931	
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
PROPANE	44.09	95.0000	95.0000	95.0000	95.0000	95.0000	90.1390	95.7120	95.7120	95.7120	95.7120	92.4420	92.4420	94.9900	95.0087	
ISOBUTANE	58.12	2.0000	2.0000	2.0000	2.0000	2.0000	0.7348	2.1853	2.1853	2.1853	2.1853	1.5545	1.5545	1.9974	2.0023	
N - BUTANE	58.12	0.5000	0.5000	0.5000	0.5000	0.5000	0.1225	0.5553	0.5553	0.5553	0.5553	0.3790	0.3790	0.4992	0.5007	
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
NITROGEN	28.02	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
ARGON	39.984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
CARBON DIOXIDE	44.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
TOTAL LB/HR		1214710	955810	258900	955810	258900	117909	837900	837900	388367	449533	178230	194578	566597	648112	
TOTAL MOL/HR		27590	21709	5880	21709	5880	2773	18935	18935	8776	10159	4093	4540	12870	14719	
MSCFD		251284	197726	53558	197726	53558	25262	172464	172464	79937	92527	37282	41338	117219	134065	
FLOW - GPM (MACFH)		47786	37601	10185	(2301/3140	(489.72)	(229.25)	3140	(4519.84)	(2094.94)	(2424.89)	(340.11)	(378.94)	(451.79)	(514.41)	
PRESSURE - PSIG		1386	1386	1386	415	415	415	415	37	37	37	415	415	1446	1438	
TEMPERATURE - F		500	500	500	168	226	168	160	-31.4	-31.4	-31.4	208	208	1431	1394	
AVG. MOL WEIGHT		44.02	44.02	44.02	225/44.2	44.02	42.50	44.24	44.24	44.24	44.24	43.54	43.54	44.02	44.02	
DENSITY - LB/F T3		31.692	31.692	31.692	0.514/333	0.528	0.514	33268	0.185	0.185	0.185	0.524	0.524	1.254	1.259	
VISCOSITY - CP		0.112	0.112	0.112	0.007/0.134	0.007	0.007	0.134	0.006	0.006	0.006	0.007	0.007	0.009	0.009	
CP/CV					1.12	1.12	1.12		1.14	1.14	1.14	1.12	1.12	1.09	1.09	
HEAT CAPACITY BTU/LB F		0.617	0.617	0.617	0.41/0.59	0.410	0.408	0.591	0.358	0.358	0.358	0.409	0.409	0.498	0.497	
MOL FRACT. LIQ.		1.0000	1.0000	1.0000	0.8732	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

NO.	REVISION	BY CHK'D	DATE APP'D
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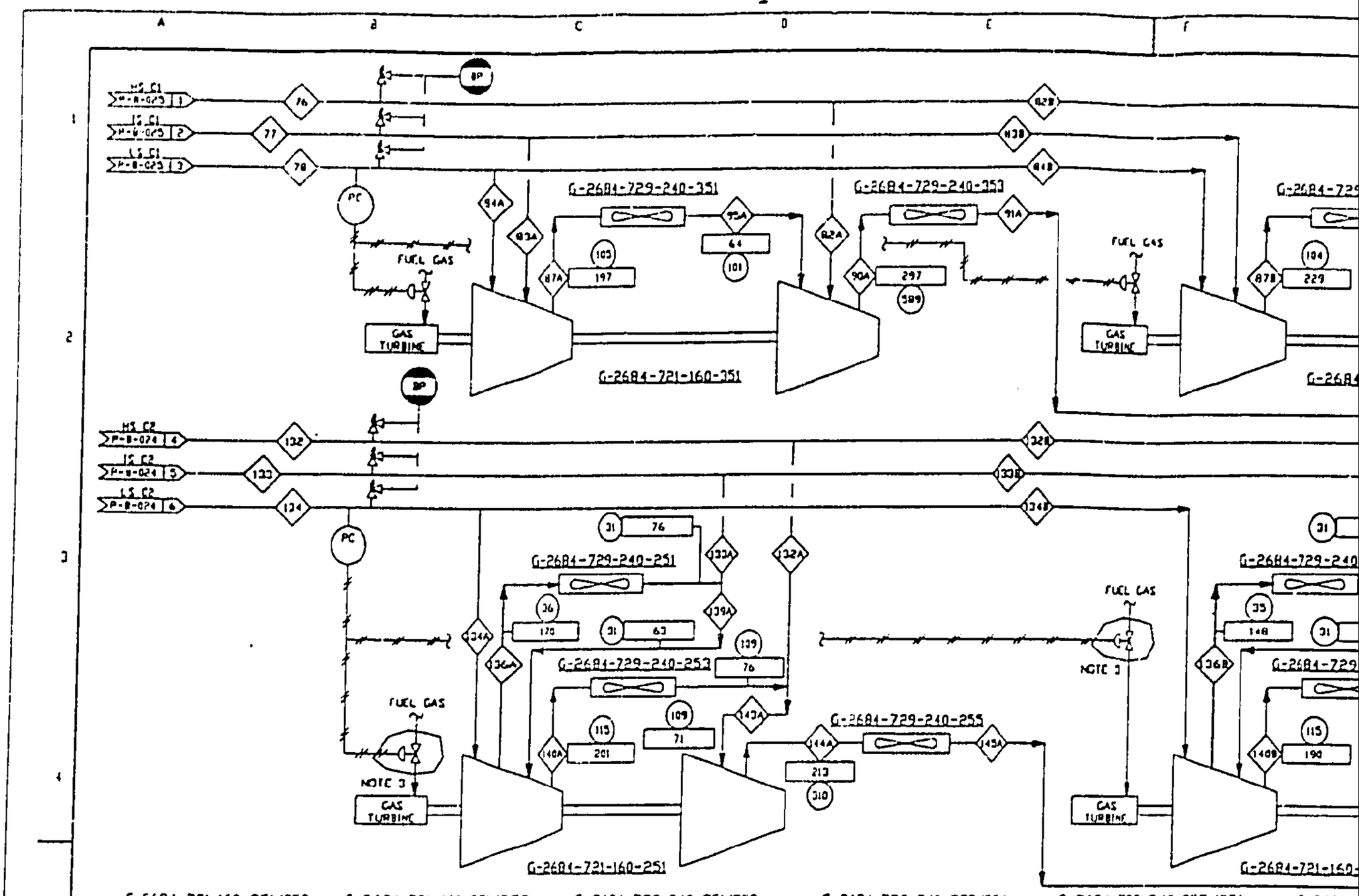


G-2684-721-160-251/252
ETHYLENE COMPRESSOR
DESIGN FLOW: 147,000 SCFM(TOTAL)
WINTER FLOW: 167,002 SCFM(TOTAL)

G-2684-721-160-351/352
METHANE COMPRESSOR
DESIGN FLOW: 123,500 SCFM(TOTAL)
WINTER FLOW: 129,293 SCFM(TOTAL)

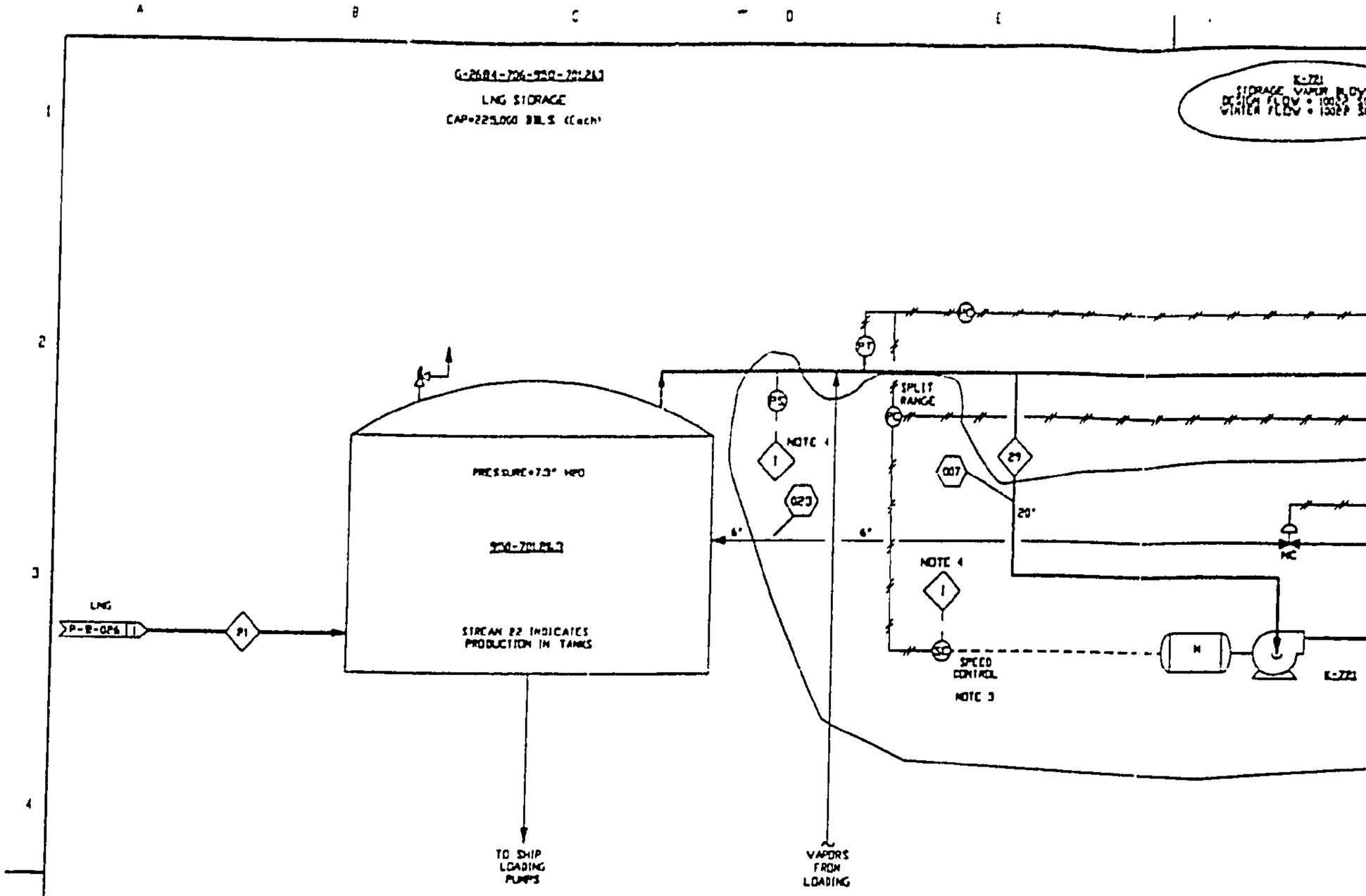
G-2684-729-240-251/252
LOW STAGE C2 AIR FIN
DESIGN DUTY: 6,850 MBTU/HR(each)
WINTER DUTY: 8,558 MBTU/HR(AVG)

G-2684-729-240-253/254
INTERSTAGE C2 AIR FIN
DESIGN DUTY: 14,800 MBTU/HR(each)
WINTER DUTY: 15,829 MBTU/HR(AVG)

G-2684-729-240-255/256
HIGH STAGE C2 AIR FIN
DESIGN DUTY: 21,400 MBTU/HR(each)
WINTER DUTY: 21,600 MBTU/HR(AVG)

MATERIAL	MOL WT	MOL PERCENT															
		76	77	78	132	133	134	91A	91B	145A	145B						
METHANE	16.04	.985545	.996343	.999645	.77364	.39888	.03463	.990221	.989775	1.9931	2.0062						
ETHANE	30.07	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ETHYLENE	28.05	0.0000	0.0000	0.0000	.922636	.960112	.996331	0.0000	0.0000	.980069	.979938						
PROPANE	44.09	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ISOBUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
N - BUTANE	58.12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
ISOPENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
N - PENTANE	72.15	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
NITROGEN	28.02	1.4455	.03657	.00356	0.0000	0.0000	0.0000	.09779	1.0225	0.0000	0.0000						
ARGON	39.984	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
CARBON DIOXIDE	44.01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
TOTAL LB/HR		207279	82509	40610	94097	135793	504209	166532	163867	362678	371721						
TOTAL MOL/HR		12782	5129	2530	3480	4924	17999	10305	10136	13039	13365						
MSCFD		116419	46714	23048	31696	44851	163935	93857	92324	118737	121725						
FLOW - GPM (MACFM)		(241.01)	(434.56)	(855.92)	(1005.8)	(520.65)	(494.32)	(93.92)	(91.98)	(201.29)	(208.37)						
PRESSURE - PSIG		1670	438	81	1110	318	36	583.4	583.4	304.8	304.7						
TEMPERATURE - F		79	79	79	135	135	135	830	811	731	765						
AVG. MOL WEIGHT		16.21	16.08	16.04	27.12	27.57	28.01	16.16	16.16	27.01	27.81						
DENSITY - LB/FT3		0.607	0.189	0.047	0.722	0.259	0.102	1.773	1.781	1.001	1.786						
VISCOSITY - CP		0.010	0.009	0.009	0.009	0.009	0.009	0.011	0.011	0.010	0.010						
CP/CV		1.29	1.30	1.31	1.23	1.24	1.25	1.25	1.25	1.18	1.18						
HEAT CAPACITY BTU/LB F		0.536	0.522	0.518	0.390	0.362	0.350	0.597	0.597	0.453	0.452						
MOL FRACT. LIQ.		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						

NO.	REVISION	BY CHKD	DATE APP'D
A	FOR APPROVAL	12/11/91 PG	
0	ISSUED FOR DESIGN	2/5/91 PG	2/19/91 W.R.L.



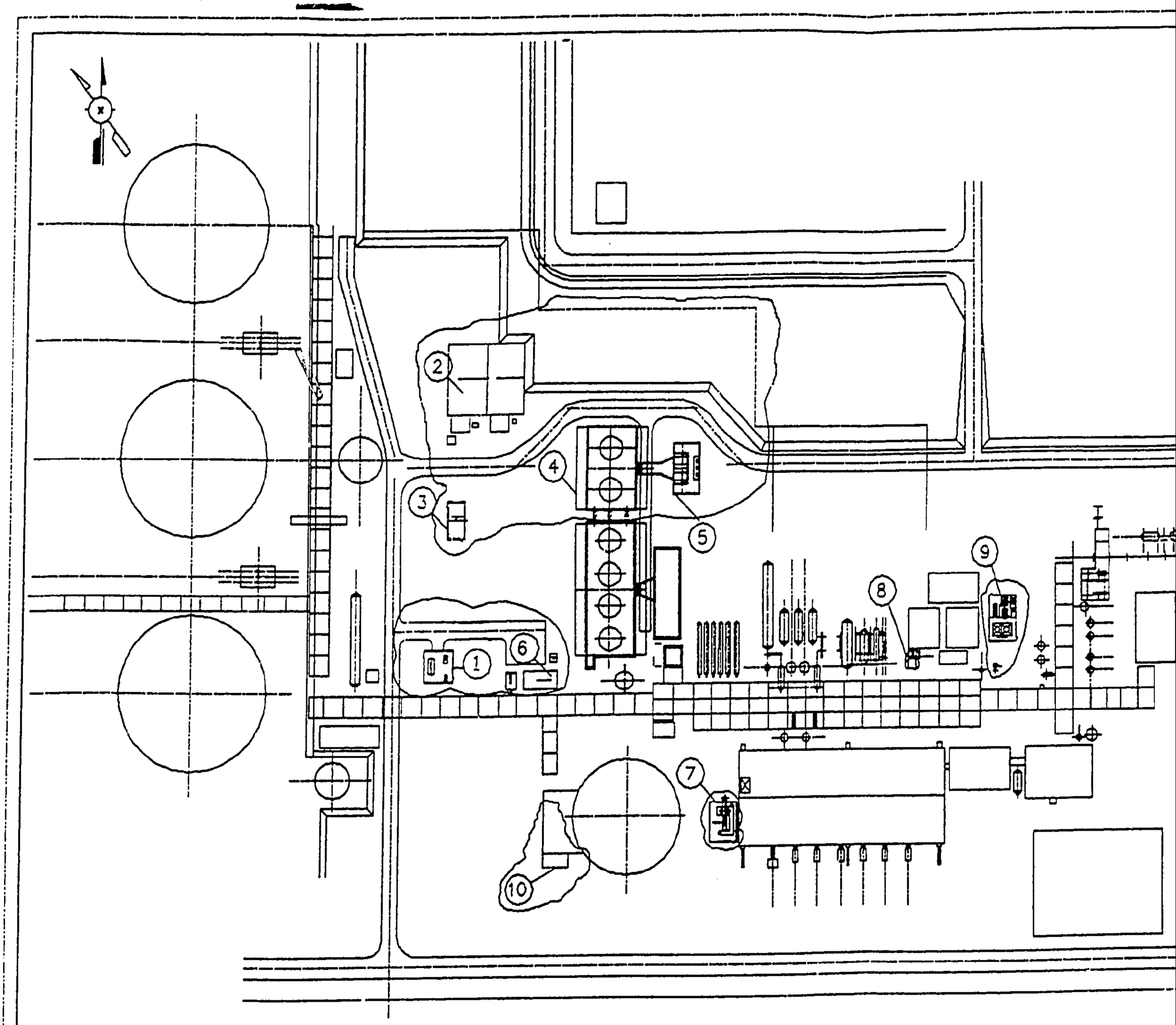
MATERIAL	MOL WT	MOL PERCENT															
		21	29	30	22												
METHANE	16.04	99.5773	96.7101	96.7101	99.7257												
ETHANE	30.07	0.0723	0.0001	0.0001	0.0768												
ETHYLENE	28.05	0.0000	0.0000	0.0000	0.0000												
PROPANE	44.09	0.0054	0.0000	0.0000	0.0057												
ISOBUTANE	58.12	0.0022	0.0000	0.0000	0.0023												
N - BUTANE	58.12	0.0011	0.0000	0.0000	0.0011												
ISOPENTANE	72.15	0.0011	0.0000	0.0000	0.0011												
N - PENTANE	72.15	0.0011	0.0000	0.0000	0.0011												
NITROGEN	28.02	0.3212	3.2528	3.2528	0.1389												
ARGON	39.944	0.0076	0.0068	0.0068	0.0058												
CARBON DIOXIDE	44.01	0.0108	0.0001	0.0001	0.0114												
TOTAL LB/HR		435547	26052	26052	409523												
TOTAL MOL/HR		27053	1584	1584	25469												
MSCFD		246396	14431	14431	231965												
FLOW - GPM (MACFH)			(268.2)	(169.2)	1922												
PRESSURE - PSIG			0108	151	0263												
TEMPERATURE - F		-247	-221.0	-154	-259.3												
AVG. MOL WEIGHT			16.44	16.44	16.08												
DENSITY - LB/FT3			0.097	0.153	26.5												
VISCOSITY - CP			0.005	0.006	0.211												
CP/CV			1.32	1.32													
HEAT CAPACITY BTU/LB F			0.492	0.492	0.8751												
MOL FRACT. LIQ.			0.0000	0.0000	1.0000												

NO.	REVISION	BY / DATE
A	FOR APPROVAL	Chk'd 1/11/91
		APP'D
		PG
0	ISSUED FOR DESIGN	3/4/91 3/4/91
		PG GAL
1	CHANGED TO ONE BLOWER	9/13/91 11/21/91
		PG

ATTACHMENT 4

KENAI LNG PLANT EFFICIENCY STUDY

EFFICIENCY STUDY OVERALL PLOT



REFERENCE DRAWINGS

DESCRIPTION	DWG. NO.	
NEW COOLING TOWER AND PUMP HOUSE.	D-A-002	NEW MCC AND VF
VAPOR BLOWER & C.T. CHEMICAL TREATMENT BLDG.	D-A-003	
WASTE HEAT BOILER.	D-A-004	
TRANSFER PUMPS AND FUEL GAS COMPRESSOR.	D-A-005	

Department of Energy
Washington, DC 20585

December 19, 1991

Mr. Larry Pain
Attorney
Phillips Alaska Natural Gas Corporation
1256 Adams Building
Bartlesville, Oklahoma 74004

RE: Transfer Existing Export Authorization in FE Docket Nos. 88-22-LNG, 91-10-LNG and 91-103-LNG

Dear Mr. Pain:

This is in response to your request, submitted as part of your application filed on November 26, 1991, for the transfer of the export authorization currently held by Phillips 66 Natural Gas Company (Phillips) and Marathon Oil Company (Marathon) to Phillips Alaska Natural Gas Corporation (PANGC) and Marathon. See DOE/ERA Opinion and Order No. 261, 1 ERA ¶70,130 DOE/FE, and Opinion and Order 261-A (Order 261-A), 1 FE ¶70,454. Orders 261 and 261-A give Phillips and Marathon long-term authorization to export liquefied natural gas (LNG) from the Kenai peninsula of Alaska to Japan.

In your application you indicate that as a result of a corporation restructuring designed to closely align operating group responsibilities with ownership of business assets and to better identify results of its operating groups PANGC has assumed responsibilities for the Kenai LNG operations.

Based on the information you furnished, I find that transferring the authorization granted in Orders 261 and 261-A in the referenced dockets from Phillips 66 Natural Gas Company and Marathon Oil Company to Phillips Alaska Natural Gas Corporation and Marathon Oil Company, is not inconsistent with the public interest. Accordingly, I have signed the enclosed order

transferring that authority effective the date of issuance of that order. A copy of this letter and the enclosed order are being served on all parties to Docket Nos. 88-22-LNG, 91-10-LNG and 91-103-LNG.

Sincerely,

Clifford P. Tomaszewski
Acting Deputy Assistant Secretary
for Fuels Programs
Office of Fossil Energy

Enclosure

0013 0002 0001

O R

UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY

PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPANY	FE DOCKET NO. 91-103-LNG

DEC 19 AM 10:19

RECD DOE/FE/OAP

ORDER TRANSFERRING AUTHORIZATION TO EXPORT LIQUEFIED NATURAL GAS

DOE/FE OPINION AND ORDER NO. 261-B

ORDER

Pursuant to section 3 of the Natural Gas Act and 10 CFR Sec. 590.405, it is hereby ordered that:

The authorization granted to Phillips 66 Natural Gas Company and Marathon Oil Company to export liquefied natural gas from Alaska to Japan, pursuant to DOE/FE Opinion and Order Nos. 261 and 261-A, FE Docket Nos. 88-22-LNG and 91-10-LNG, is hereby transferred to Phillips Alaska Natural Gas Corporation and Marathon Oil Company effective the date of issuance of this order.

Issued in Washington, D.C., on December 19, 1991.

Clifford P. Tomaszewski
Acting Deputy Assistant Secretary
for Fuels Programs
Office of Fossil Energy

Ηπ

UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

OFFICE OF FOSSIL ENERGY 1992 JUL 15 P 4:36

REC'D DOE/FE

PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPANY	FE DOCKET NO. 91-103-LNG

ORDER AMENDING AUTHORIZATION TO EXPORT
LIQUEFIED NATURAL GAS TO JAPAN

DOE/FE OPINION AND ORDER NO. 261-C

JULY 15, 1992

I. BACKGROUND

On November 26, 1991, Phillips Alaska Natural Gas Corporation (PANGC) and Marathon Oil Company (Marathon) filed an application with the Office of Fossil Energy (FE) of the Department of Energy (DOE), under section 3 of the Natural Gas Act (NGA), requesting an amendment to their existing export authorization to permit a twelve percent increase in annual exports of Alaskan liquefied natural gas (LNG) to Japan.

Marathon is an Ohio corporation with principal offices in Houston, Texas, and is unaffiliated with PANGC. PANGC, a Delaware corporation with principal offices in Bartlesville, Oklahoma, is a wholly-owned subsidiary of Phillips 66 Natural Gas Company (P66NGC), which in turn is a subsidiary of Phillips Petroleum Company. DOE/FE Opinion and Order 261-B, issued December 19, 1991, transferred from P66NGC to PANGC the export authority held with Marathon.

The export authorization, which originally was granted by the Federal Power Commission in 1967, has been extended and amended by DOE. Under DOE/ERA Opinion and Order 261, 1 ERA ¶70,130, and DOE/FE Opinion and Order 261-A, 1 FE ¶70,454, the applicants currently are authorized to export 52.0 TBtu of LNG per year, through March 31, 2004, under a pricing formula that is market responsive to other world energy, including LNG, prices.

Parties to this arrangement amended their gas purchase agreement on February 19, 1992. The amendment provides for a twelve percent increase in export volumes between April 1, 1993, and March 31, 2004. Beginning April 1, 1993, the annual contract quantity (ACQ) would increase to 56.0 TBtu for the contract year 1993. The ACQ would be further increased to 64.4 TBtu beginning in the 1994 contract year, corresponding to when new tankers are expected to be in service, through the end of the contract term. The new agreement provides sellers with an option, if exercised by March 31, 1994, to cancel the 64.4 TBtu ACQ. In addition, currently authorized provisions for annual sales of up to 106 percent of the ACQ remain unchanged.

A notice of the application was published in the Federal Register on February 12, 1992, inviting protests, motions to intervene, notices of intervention, and comments to be filed by March 13, 1992.[1/] No protests, motions to intervene, or notices of intervention were received.

DECISION

The application filed by PANGC and Marathon has been evaluated to determine if the proposed amendment meets the public interest requirements of section 3 of NGA. Under section 3, an export must be authorized unless there is a finding that it "will not be consistent with the public interest."[2/] In reviewing

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1/ 57 FR 5154.

2/ 15 U.S.C. Sec. 717b.

natural gas exports, DOE considers domestic need for the gas and any other issue determined to be appropriate.

The applicants' uncontested proposal to amend their existing export authorization to permit a twelve percent increase in export volumes, as set forth in the application, is consistent with section 3 of the NGA and DOE's international gas trade policy. In support of its proposal, the applicants assert that the existing Alaskan LNG export project has been a safe and reliable operation that has benefitted all parties concerned for over twenty-one years. PANGC and Marathon assert there is no evidence of domestic need, either national or regional, for the increased volumes of natural gas which is requested, and the Cook Inlet area has ample natural gas reserves to supply regional needs well beyond the current term of the export authority. Applicants also emphasize the benefits to Alaska and the Federal Government through continuing royalty payments and an improved U.S. balance of payments with Japan.

After taking into consideration all of the information in the record of this proceeding, I find that approving the proposed amendment, as requested by the joint applicants, is not inconsistent with the public interest.[3/]

3/ Because the export of LNG uses existing facilities, DOE has determined that granting this application is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (42 U.S.C. 4321, et seq.) and therefore an environmental impact statement or environmental assessment is not required. See 40 CFR Sec. 1508.4 and 57 FR 15122 (April 24, 1992).

ORDER

For the reasons set forth above, under section 3 of the National Gas Act, it is ordered that:

A. Phillips Alaska Natural Gas Corporation (PANGC) and Marathon Oil Company (Marathon) are authorized to increase their aggregate export volume, from 52.0 TBtu to 56.0 TBtu beginning April 1, 1993, and a further increase to 64.4 TBtu beginning in the April 1, 1994, contract year.

B. All other conditions as set by Order Nos. 261, 261-A and 261-B remain in effect.

Issued in Washington, D.C., on July 15, 1992.

Charles F. Vacek
Deputy Assistant Secretary
for Fuels Programs
Office of Fossil Energy

UNITED STATES OF AMERICA

[6450-01]

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

[FE DOCKET NO 91-103-LNG]

PHILLIPS ALASKA NATURAL GAS CORPORATION
AND MARATHON OIL COMPANY

ORDER AMENDING EXISTING AUTHORIZATION
TO EXPORT LIQUEFIED NATURAL GAS TO JAPAN

AGENCY: Office of Fossil Energy, DOE.

ACTION: Notice of Order.

SUMMARY: The Office of Fossil Energy of the Department of Energy gives notice that it has issued an order amending the authorization of Phillips Alaska Natural Gas Corporation and Marathon Oil Company to increase by twelve percent the volume of liquefied natural gas the applicants are authorized to export from Alaska to Japan beginning April 1, 1993, through March 31, 2004.

A copy of this order is available for inspection and copying in the Office of Fuels Programs Docket Room, 3F-056, Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C. 20585, (202) 586-9478. The docket room is open between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Issued in Washington, D.C., July 15 1992.

Charles F. Vacek
Deputy Assistant Secretary
for Fuels Programs
Office of Fossil Energy

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The decision on the application for import authority will be made consistent with DOE's gas import policy guidelines, under which the competitiveness of an import arrangement in the market served is the primary consideration in determining whether it is in the public interest (49 FR 6684, February 22, 1984). In reviewing natural gas export applications, DOE considers the domestic need for the gas to be exported and any other issues determined to be appropriate, including whether the arrangement is consistent with the DOE policy of promoting competition in the natural gas marketplace by allowing commercial parties to freely negotiate their own trade arrangements. Parties that may oppose the application should comment in their responses on these issues.

NEPA Compliance. The Natural Environmental Policy Act (NEPA) 42 U.S.C. 4321 *et seq.*, requires DOE to give appropriate consideration to the environmental effects of its proposed actions. No final decision will be issued in this proceeding until DOE has met its NEPA responsibilities.

Public Comment Procedures. In response to this notice, any person may file a protest, motion to intervene or notice of intervention, as applicable, and written comments. Any person wishing to become a party to the proceeding and to have their written comments considered as the basis for any decision on the application must, however, file a motion to intervene or notice of intervention, as applicable. The filing of a protest with respect to this application will not serve to make the protestant a party to the proceeding, although protests and comments received from persons who are not parties will be considered in determining the appropriate action to be taken on the application. All protests, motions to intervene, notices of intevention, and written comments must meet the requirements that are specified by the regulations in 10 CFR Part 590. Protests, motions to intervene, notices of intervention, requests for additional procedures, and written comments should be filed with the Office of Fuels Programs at the address listed above.

It is intended that a decisional record on the application will be developed through responses to this notice by parties, including the parties' written comments and replies thereto. Additional procedures will be used as necessary to achieve a complete understanding of the facts and issues. A party seeking intervention may request that additional procedures be provided, such as additional written comments, an oral presentation, a conference, or trial-type hearing. Any request to file additional written comments should explain why they are necessary. Any request for an oral presentation should identify the substantial question of fact, law, or policy at issue, show that it is material and relevant to a decision in the proceeding, and demonstrate why an oral presentation is needed. Any request for a conference should demonstrate why the conference would materially advance the proceeding. Any request for a trial-type hearing must show that there are factual issues genuinely in dispute that are relevant and material to a decision and that a trial-type hearing is necessary for a full and true disclosure of the facts.

If an additional procedure is scheduled, notice will be provided to all parties. If no party requests additional procedures, a final opinion and order may be issued based on the official record, including the application and responses filed by parties pursuant to this notice, in accordance with 10 CFR 590.316.

A copy of L.D. Natural Gas's application is available for inspection and copying in the Office of Fuels Programs Docket Room, 3F-056, at the above address. The docket room is open between the hours of 8 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Issued in Washington, DC, on July 16, 1992.

Charles F. Vacek,

Deputy Assistant Secretary for Fuels Programs, Office of Fossil Energy.

[FR Doc. 92-17277 Filed 7-21-92; 8:45 am]

BILLING CODE 6450-01-M

[FE Docket No. 91-103-LNG]

Phillips Alaska Natural Gas Corp. and Marathon Oil Company; Order Amending Existing Authorization To Export Liquefied Natural Gas to Japan

AGENCY: Office of Fossil Energy, DOE.

ACTION: Notice of order.

SUMMARY: The Office of Fossil Energy of the Department of Energy gives notice that it has issued an order amending the authorization of Phillips Alaska Natural Gas Corporation and Marathon Oil Company to increase by twelve percent the volume of liquefied natural gas the applicants are authorized to export from Alaska to Japan beginning April 1, 1993, through March 31, 2004.

A copy of this order is available for inspection and copying in the Office of Fuels Programs Docket Room, 3F-056, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9478. The docket room is open between the hours of 8 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Issued in Washington, DC, July 15, 1992.

Charles F. Vacek,

Deputy Assistant Secretary for Fuels Programs, Office of Fossil Energy.

[FR Doc. 92-17276 Filed 7-21-92; 8:45 am]

BILLING CODE 6450-01-M

Western Area Power Administration

Floodplain/Wetlands Involvement for the Sterling Substation Transformer and Fuse Replacement Project, Logan County, CO

AGENCY: Western Area Power Administration, DOE.

ACTION: Floodplain/wetland involvement and opportunity to comment.

SUMMARY: The Department of Energy, Western Area Power Administration (Western), is proposing to remove and replace a transformer and transformer fuses, and provide oil spill containment for all oil-filled equipment at the Sterling Substation near Sterling, Colorado, in Logan County. Because the substation is within the floodplain of the South Platte River, Western will prepare a Floodplain/Westlands Assessment.

DATES: Public comments or suggestions concerning the floodplain involvement of Western's proposed actions are invited. Comments are due within 15 days after the date of publication of this notice in the **Federal Register**.

ADDRESSES: Comments or suggestions should be sent to: Mr. Robert H. Jones, Acting Area Manager, Loveland Area Office, Western Area Power Administration, P.O. Box 3700, Loveland, CO 80539, (303) 490-7200.

FOR FURTHER INFORMATION CONTACT: Rodney D. Jones, Environmental Specialist, Loveland Area Office, Western Area Power Administration, P.O. Box 3700, Loveland, CO 80539, (303) 490-7371.

SUPPLEMENTARY INFORMATION: Pursuant to DOE's "Compliance with Floodplain/Wetlands Environmental Review Requirements," 10 CFR part 1022, Western has determined this proposed project may involve activities within a floodplain area. Western will prepare a floodplain/wetlands assessment in accordance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands. The assessment will address the

proposed activity in the South Platte River floodplain.

Removing and replacing the Sterling Substation transformer has become necessary due to the age of the existing transformer and the unavailability of replacement parts. These factors have made maintaining this transformer increasingly difficult. The new transformer would require less maintenance time and increase reliability by reducing the risk of potential failure. The existing transformer and foundation would be removed and a new transformer with a new concrete foundation installed. The 69 kilovolt (kV) fuses would be replaced with a three-phase interrupter to prevent single-phase conditions. Single-phase operation has caused severe low voltages to customers in the area. In addition, three instrument transformers would be replaced and one circuit breaker would be removed.

Based on U.S. Geological Survey topographic maps and Federal Emergency Management Agency (FEMA) maps, the existing substation lies within the known boundaries of the 100-year floodplain of the South Platte River. All construction activity associated with the project would take place within the 10-acre fenced boundary of the substation facility. Oil spill containment for all oil-filled equipment would be installed at the substation. Oil spill containment design will consider potential oil spill impacts to the South Platte River and floodplain.

Issued at Golden, Colorado, July 10, 1992.

William H. Clagett,

Administrator.

[FR Doc. 92-17279 Filed 7-21-92; 8:45 am]

BILLING CODE 6450-01-M

ENVIRONMENTAL PROTECTION AGENCY

[OPP-300224A; FRL-4070-2]

Abandoned and Incomplete Pesticide Petitions That are Being Withdrawn

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice; Withdrawn Petitions.

SUMMARY: This notice announces the withdrawal without prejudice to future filings of certain pesticide petitions for tolerances or food or feed additive petitions that have been pending with the Agency.

ADDRESSES: By mail, submit written comments to: Public Docket and Freedom of Information Section, Field Operations Division (H7506C), Office of Pesticide Programs, Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. In person, deliver comments to: Rm. 248, Crystal Mall #2, 1921 Jefferson Davis Hwy., Arlington, VA 22202.

FOR FURTHER INFORMATION CONTACT: By mail, James A. Tompkins, Registration Support Branch, Registration Division (H7505C), Environmental Protection Agency, 401 M St., SW., Washington, DC 20460. Office location and telephone number: Rm. 724A, CM #2, 1921 Jefferson Davis Hwy., Arlington, VA 22202, (703)-305-7700.

SUPPLEMENTARY INFORMATION: In the **Federal Register** of September 4, 1991 (56 FR 43759), EPA issued a notice which announced certain policies concerning abandoned and incomplete pesticide petitions for tolerances and food or feed additive petitions (FAP's) currently pending with the Agency. In response to the notice, certain registrants have requested the Agency to withdraw their pesticide petitions or food or feed additive petitions without prejudice to future filings. Accordingly, the petitions listed in the tables below have been withdrawn by the Agency on the dates indicated.

List of Petitions Withdrawn per Correspondence Received

Petition	Chemical	Petitioner	Crop	Date
1F1074	Dichlobenil	Thompson-Hayward	Fish	12-02-91
2G1241	Methomyl	E. I. du Pont	Pineapple et al.	09-17-91
3F1417	Dacthal	Diamond Shamrock	RACs	11-18-91
5F1554	Oxadiazon	Rhodia, Inc.	Soybeans et al.	09-09-91
5F1647	Glyoxime	Ciba-Geigy	Oranges	11-08-91
6F1702	Fensulfothion	Mobay Chemical	Beans et al.	11-15-91
6F1716	Asulam	Rhodia, Inc.	Alfalfa forage et al.	09-13-91
6F1717	Asulam	Rhodia, Inc.	Grasses et al.	09-13-91
6F1766	Asulam	Rhodia, Inc.	Flaxseed et al.	09-13-91
6F1810	Benomyl	E.I. du Pont	Lettuce	11-15-91
6F1814	Propargite	Uniroyal Chemical	Almonds	12-02-91
8F2043	Aldoxycarb	Union Carbide	Cottonseed	11-11-91
8F2077	Oxadiazon	Rhodia, Inc.	Almonds et al.	09-09-91
8F2096	Aldicarb	Union Carbide	Tomatoes	11-15-91
8F2117	Oxamyl	E.I. du Pont	Field corn	10-18-91
9F2186	Aldoxycarb	Union Carbide	Peanuts et al.	11-11-91
9G2227	1-12-(2,4-D)	Ciba-Geigy	Apples et al.	09-24-91
0E2276	Methomyl	IR-4	Forage grasses et al.	10-04-91
0F2316	Oxamyl	E.I. du Pont	Beans	10-18-91
0G2318	Aldicarb	Union Carbide	Grapes	11-11-91
0G2342	Ethephon	GAF Corp.	Cottonseeds	11-01-91
0E2393	Triadimefon	Mobay Chemical	Cucumbers et al.	01-28-92
0F2405	Chlorothalonil	Diamond Shamrock	Oranges	11-18-91
0F2416	Metolachlor	Ciba-Geigy	Sunflowers	10-16-91
0E2419	DCNA	IR-4	Tomatoes	10-04-91
1F2436	Bromopropylate	Ciba-Geigy	Citrus fruit et al.	10-01-91
1E2445	Propachlor	IR-4	Onions	10-04-91
1E2486	Linuron	IR-4	Lettuce	10-14-91
1G2489	Fenvalerate	Shell Chemical	Sorghum grain	11-15-91
1F2553	Bendiocarb	BFC Chemicals	Corn	09-23-91
1G2558	Bendiocarb	BFC Chemicals	Range grass	09-23-91
2F2597	Aldicarb	Union Carbide	Grapes	11-11-91
2E2649	Fenvalerate	IR-4	Trefoil	10-04-91
2F2657	Fenvalerate	Shell Chemical	Raisins et al.	11-15-91
2G2660	Chlorothalonil	Diamond Shamrock	Apples	11-18-91
2F2679	Aldicarb	Union Carbide	Field grain	11-11-91
2F2700	Etridiazole	Olin Chemical	Peanuts	11-27-91

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UNITED STATES OF AMERICA

[6450-01]

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

FE DOCKET NO. 91-103-LNG

PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPAN

APPLICATION TO AMEND AUTHORIZATION TO EXPORT
LIQUEFIED NATURAL GAS

AGENCY: Department of Energy
Office of Fossil Energy

ACTION: Notice of an Application to Amend Authorization to Export Liquefied Natural Gas

SUMMARY: The Office of Fossil Energy (FE) of the Department of Energy (DOE) gives notice of receipt on November 26, 1991, of an application filed by Phillips Alaska Natural Gas Corporation (PANGC) and Marathon Oil Company (Marathon) to amend their existing export authorization to permit a twelve percent increase in exports of Alaskan liquefied natural gas (LNG) to Japan.

The application is filed under section 3 of the Natural Gas Act and DOE Delegation Order Nos. 0204-111 and 0204-127. Protests, motions to intervene, notices of intervention, and written comments are invited.

DATE: Protests, motions to intervene or notices of intervention, as applicable, requests for additional procedures and written comments are to be filed at the address listed below no later than 4:30 p.m., eastern time,_____ (30 days after date of publication).

CONCURRENCES

RTG SYMBOL FE-53
INITIALS/SIG
DATE 12-12-91

RTG SYMBOL FE-532
INITIALS/SIG
DATE 12/12/91

RTG SYMBOL FE-532
INITIALS/SIG
DATE

RTG SYMBOL GC-14
INITIALS/SIG
DATE 12/16/91

RTG SYMBOL GC-41
INITIALS/SIG
DATE 12/4/91

RTG SYMBOL FE-532
INITIALS/SIG
DATE 12/13/91

RTG SYMBOL FE-50
INITIALS/SIG
DATE

RTG SYMBOL
INITIALS/SIG
DATE

RTG SYMBOL
INITIALS/SIG
DATE

UNITED STATES OF AMERICA

[6450-01]

DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

FE DOCKET NO. 91-103-LNG

PHILLIPS ALASKA NATURAL GAS CORPORATION AND MARATHON OIL COMPANY

APPLICATION TO AMEND AUTHORIZATION TO EXPORT
LIQUEFIED NATURAL GAS

AGENCY: Department of Energy
Office of Fossil Energy

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DATE: Protests, motions to intervene or notices of intervention, as applicable, requests for additional procedures and written comments are to be filed at the address listed below no later than 4:30 p.m., eastern time,_____ (30 days after date of publication).

ADDRESS:

Office of Fuels Programs
Fossil Energy
U.S. Department of Energy
Forrestal Building, Room 3F-056, FE-50
1000 Independence Avenue, S.W.
Washington, D.C. 20585

FOR FURTHER INFORMATION:

Allyson C. Reilly
Office of Fuels Programs
Fossil Energy
U.S. Department of Energy
Forrestal Building, Room 3F-094, FE-53
1000 Independence Avenue, S.W.
Washington, D.C. 20585
(202) 586-9394

Diane Stubbs
Office of Assistant General Counsel
for Fossil Energy
U.S. Department of Energy
Forrestal Building, Room 6E-042, GC-14
1000 Independence Avenue, S.W.
Washington, D.C. 20585
(202) 586-6667

SUPPLEMENTARY INFORMATION:

Marathon is an Ohio corporation with principal offices in Houston, Texas, and is unaffiliated with PANGC. PANGC, a Delaware corporation with principal offices in Bartlesville, Oklahoma, is a wholly-owned subsidiary of Phillips 66 Natural Gas Company (P66NGC), which in turn is a subsidiary of Phillips Petroleum Company. DOE/FE Opinion and Order 261-B, issued December 19, 1991, transferred from P66NGC to PANGC the export authority held with Marathon.

Originally authorized by the Federal Power Commission in 1967, the PANGC-Marathon LNG exports have been extended and

amended from time-to-time by DOE. Under DOE/ERA Opinion and Order 261, 1 ERA ¶70,130, and DOE/FE Opinion and Order 261-A, 1 FE ¶70,454, the applicants currently are authorized to export 52.0 TBtu of LNG per year, through March 31, 2004, under a pricing formula that is market responsive to other LNG prices and world energy prices. The LNG is exported from the applicants' Kenai liquefaction plant in the Cook Inlet area of Alaska to two Japanese customers, the Tokyo Electric Power Company, Inc., and the Tokyo Gas Company, Ltd.

The parties to this export arrangement signed a letter of intent on October 31, 1991, to amend their gas purchase agreement. The new agreement provides for a twelve percent increase in exports between April 1, 1993, and March 31, 2004. Beginning April 1, 1993, the annual contract quantity (ACQ) would increase to 56.0 TBtu for the contract year 1993. The ACQ would be further increased to 64.4 TBtu beginning in the 1994 contract year, when new tankers are expected to be in service, through the end of the contract term. The new agreement provides sellers with an option, if exercised by March 31, 1994, to cancel the 64.4 TBtu ACQ. In addition, currently authorized provisions for annual sales of up to 106 percent of the ACQ remain unchanged.

In support of their application, PANGC and Marathon assert there is no evidence of domestic need, either national or regional, for the increased volumes of natural gas which is requested, and the Cook Inlet area has ample natural gas reserves to supply regional needs well beyond the current term of the

export authority. Applicants also emphasize the benefits to Alaska and the Federal Government through continuing royalty payments and an improved U.S. balance of payments with Japan.

The export application will be reviewed under section 3 of the Natural Gas Act and the authority contained in DOE Delegation Order Nos. 0204-111 and 0204-127. In deciding whether the proposed export is in the public interest, domestic need for the natural gas will be considered, and any other issue determined to be appropriate, including whether the arrangement is consistent with DOE policy of promoting competition in the natural gas marketplace by allowing commercial parties to freely negotiate their own trade arrangements. Parties, especially those that may oppose this application, should comment on these matters as they relate to the requested export authority. PANGC and Marathon assert the amendment is not inconsistent with the public interest for the reasons briefly described herein. Parties opposing the arrangement bear the burden of overcoming this assertion.

NEPA Compliance. The National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq., requires DOE to give appropriate consideration to the environmental effects of its proposed actions. No final decision will be issued in this proceeding until DOE has met its NEPA responsibilities.

Public Comment Procedures. In response to this notice, any person may file a protest, motion to intervene or notice of intervention, as applicable, and written comments. Any person wishing to become a party to the proceeding and to have their

written comments considered as the basis for any decision on the application must, however, file a motion to intervene or notice of intervention, as applicable. The filing of a protest with respect to this application will not serve to make the protestant a party to the proceeding, although protests and comments received from persons who are not parties will be considered in determining the appropriate action to be taken on the application. All protests, motions to intervene, notices of intervention, and written comments must meet the requirements that are specified by the regulations in 10 CFR Part 590. Protests, motions to intervene, notices of intervention, requests for additional procedures, and written comments should be filed with the Office of Fuels Programs at the above address.

It is intended that a decisional record will be developed on the application through responses to this notice by parties, including the parties' written comments and replies thereto. Additional procedures will be used as necessary to achieve a complete understanding of the facts and issues. A party seeking intervention may request that additional procedures be provided, such as additional written comments, an oral presentation, a conference, or trial-type hearing. Any request to file additional written comments should explain why they are necessary. Any request for an oral presentation should identify the substantial question of fact, law, or policy at issue, show that it is material and relevant to a decision in the proceeding, and demonstrate why an oral presentation is needed. Any request

for a conference should demonstrate why the conference would materially advance the proceeding. Any request for a trial-type hearing must show that there are factual issues genuinely in dispute that are relevant and material to a decision and that a trial-type hearing is necessary for a full and true disclosure of the facts.

If an additional procedure is scheduled, notice will be provided to all parties. If no party requests additional procedures, a final opinion and order may be issued based on the official record, including the application and responses filed by parties pursuant to this notice, in accordance with 10 CFR Sec. 590.316.

A copy of PANGC's and Marathon's application is available for inspection and copying in the Office of Fuels Programs Docket Room, 3F-056, at the above address. The docket room is open between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Issued in Washington, D.C., February 6, 1992.

Anthony J. Como
Director
Office of Coal and Electricity
Office of Fuels Programs
Office of Fossil Energy

[redacted]

[redacted]

[redacted]

[redacted]

[Project No. 2471—Michigan]

Wisconsin Electric Power Co.; Notice Soliciting Applications

February 5, 1992.

On December 19, 1988, Wisconsin Electric Power Company, the existing licensee for the Sturgeon Hydroelectric Project No. 2471, filed a notice of intent to file an application for a new license, pursuant to section 15(b)(1) of the Federal Power Act (Act), 16 U.S.C. 808, as amended by section 4 of the Electric Consumers Protection Act of 1986, Public Law 99-495. The original license for Project No. 2471 was issued effective April 1, 1982, and expires December 31, 1993.

The project is located on the Sturgeon River in Dickinson County, Michigan. The principal project works consist of: (a) A 217-foot-long concrete arch dam, a 14-foot-wide penstock intake, and a 7.5-foot-wide trash gate; (b) a reservoir of 248 acres; (c) a 7-foot-diameter, 260-foot-long penstock; (d) a powerhouse with an installed capacity of 800 kW; (e) a transmission line connection; and (f) appurtenant facilities.

Pursuant to § 16.20 of the Commission's regulations, the deadline for filing an application for new license and any competing license applications was December 31, 1991. No applications for license for this project were filed. Therefore, pursuant to § 16.25 of the Commission's regulations, the Commission is soliciting applications from potential applicants other than the existing licensee.

Pursuant to § 16.19 of the Commission's regulations, the licensee is required to make available certain information described in § 16.7 of the Commission's regulations. Such information is available from the licensee at Real Estate Department, Public Service Building, room 452, 231 West Michigan Street, Milwaukee, WI 53201.

A potential applicant that files a notice of intent within 90 days from the date of issuance of this notice: (1) May apply for a license under part I of the Act and part 4 (except § 4.38) of the Commission's regulations within 18 months of the date on which it files its notice; and (2) must comply with the requirements of § 16.8 of the Commission's regulations.

Lois D. Cashell,

Secretary.

[FR Doc. 92-3274 Filed 2-11-92; 8:45 am]

BILLING CODE 6717-01-M

Office of Fossil Energy

[FE Docket No. 91-103-LNG]

Phillips Alaska Natural Gas Corporation and Marathon Oil Co.; Application To Amend Authorization to Export Liquefied Natural Gas

AGENCY: Department of Energy, Office of Fossil Energy.

ACTION: Notice of an application to amend authorization to export liquefied natural gas.

SUMMARY: The Office of Fossil Energy (FE) of the Department of Energy (DOE) gives notice of receipt on November 26, 1991, of an application filed by Phillips Alaska Natural Gas Corporation (PANGC) and Marathon Oil Company (Marathon) to amend their existing export authorization to permit a twelve percent increase in exports of Alaskan liquefied natural gas (LNG) to Japan.

The application if filed under section 3 of the Natural Gas Act and DOE Delegation Order Nos. 0204-111 and 0204-127. Protests, motions to intervene, notices of intervention, and written comments are invited.

DATES: Protests, motions to intervene or notices of intervention, as applicable, requests for additional procedures and written comments are to be filed at the address listed below no later than 4:30 p.m., eastern time, March 13, 1992.

ADDRESSES: Office of Fuels Programs, Fossil Energy, U.S. Department of Energy, Forrestal Building, room 3F-056, FE-50, 1000 Independence Avenue, SW., Washington, DC 20585.

FOR FURTHER INFORMATION CONTACT:

Allyson C. Reilly, Office of Fuels Programs, Fossil Energy, U.S. Department of Energy, Forrestal Building, room 3F-094, FE-53, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9394.

Diane Stubbs, Office of Assistant General Counsel for Fossil Energy, U.S. Department of Energy, Forrestal Building, room 6E-042, GC-14, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-6667.

SUPPLEMENTARY INFORMATION:

Marathon is an Ohio corporation with principal offices in Houston, Texas, and is unaffiliated with PANGC. PANGC, a Delaware corporation with principal offices in Bartlesville, Oklahoma, is a wholly-owned subsidiary of Phillips 66 Natural Gas Company (P66NGC), which in turn is a subsidiary of Phillips Petroleum Company. DOE/FE Opinion and Order 261-B, issued December 19, 1991, transferred from P66NGC to PANGC the export authority held with Marathon.

Originally authorized by the Federal Power Commission in 1967, the PANGC-Marathon LNG exports have been extended and amended from time-to-time by DOE. Under DOE/ERA Opinion and Order 261, 1 ERA ¶70,130, and DOE/FE Opinion and Order 261-A, 1 FE ¶70,454, the applicants currently are authorized to export 52.0 TBtu of LNG per year, through March 31, 2004, under a pricing formula that is market responsive to other LNG prices and world energy prices. The LNG is exported from the applicant's Kenai Liquefaction plant in the Cook Inlet area of Alaska to two Japanese customers, the Tokyo Electric Company, Inc., and the Tokyo Gas Company, Ltd.

The parties to this export arrangement signed a letter of intent on October 31, 1991, to amend their gas purchase agreement. The new agreement provides for a twelve percent increase in exports between April 1, 1993, and March 31, 2004. Beginning April 1, 1993, the annual contract quantity (ACQ) would increase to 56.0 TBtu for the contract year 1993. The ACQ would be further increased to 64.6 TBtu beginning in the 1994 contract year, when new tankers are expected to be in service, through the end of the contract term. The new agreement provides sellers with an option, if exercised by March 31, 1994, to cancel the 64.4 TBtu ACQ. In addition, currently authorized provisions for annual sales of up to 106 percent of the ACQ remain unchanged.

In support of their application, PANGC and Marathon assert there is no evidence of domestic need, either national or regional, for the increased volumes of natural gas which is requested, and the Cook Inlet area has ample natural gas reserves to supply regional needs well beyond the current term of the export authority. Applicants also emphasize the benefits to Alaska and the Federal Government through continuing royalty payments and an improved U.S. balance of payments with Japan.

The export application will be reviewed under section 3 of the Natural Gas Act and the authority contained in DOE Delegation Order Nos. 0204-111 and 0204-127. In deciding whether the proposed export is in the public interest, domestic need for the natural gas will be considered, and any other issue determined to be appropriate, including whether the arrangement is consistent with DOE policy of promoting competition in the natural gas marketplace by allowing commercial parties to freely negotiate their own trade arrangements. Parties, especially those that may oppose this application,

should comment on these matters as they relate to the requested export authority. PANGC and Marathon assert the amendment is not inconsistent with the public interest for the reasons briefly described herein. Parties opposing the arrangement bear the burden of overcoming this assertion.

NEPA Compliance

The National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*, requires DOE to give appropriate consideration to the environmental effects of its proposed actions. No final decision will be issued in this proceeding until DOE has met its NEPA responsibilities.

Public Comment Procedures

In response to this notice, any person may file a protest, motion to intervene or notice of intervention, as applicable, and written comments. Any person wishing to become a party to the proceeding and to have their written comments considered as the basis for any decision on the application must, however, file a motion to intervene or notice of intervention, as applicable. The filing of a protest with respect to this application will not serve to make the protestant a party to the proceeding, although protests and comments received from persons who are not parties will be considered in determining the appropriate action to be taken on the application. All protests, motions to intervene, notices of intervention, and written comments must meet the requirements that are specified by the regulations in 10 CFR part 590. Protests, motions to intervene, notices of intervention, requests for additional procedures, and written comments should be filed with the Office of Fuels Programs at the above address.

It is intended that a decisional record will be developed on the application through responses to this notice by parties, including the parties' written comments and replies thereto. Additional procedures will be used as necessary to achieve a complete understanding of the facts and issues. A party seeking intervention may request that additional procedures be provided, such as additional written comments, an oral presentation, a conference, or trial-type hearing. Any request to file additional written comments should explain why they are necessary. Any request for an oral presentation should identify the substantial question of fact, law, or policy at issue, show that it is material and relevant to a decision in the proceeding, and demonstrate why an oral presentation is needed. Any request for a conference should demonstrate why the conference would materially advance the proceeding. Any request for a trial-type hearing must show that there are factual issues genuinely in dispute that are relevant and material to a decision and that a trial-type hearing is necessary for a full and true disclosure of the facts.

If an additional procedure is scheduled, notice will be provided to all parties. If no party requests additional procedures, a final opinion and order may be issued based on the official record, including the application and responses filed by parties pursuant to this notice, in accordance with 10 CFR 590.316.

A copy of PANGC's and Marathon's application is available for inspection and copying in the Office of Fuels Programs Docket Room, 3F-056, at the above address. The docket room is open between the hours of 8 a.m. and 4:30 p.m., Monday through Friday, except Federal holidays.

Issued in Washington, DC, February 6, 1992.

Anthony J. Como,

Director, Office of Coal and Electricity, Office of Fuels Programs, Office of Fossil Energy.

[FR Doc. 92-3378 Filed 2-11-92; 8:45 am]

BILLING CODE 6450-01-M

[FE Docket No. 91-113-NG]

Tangram Transmission Corporation; Application to Export Natural Gas to Mexico

AGENCY: Department of Energy, Office of Fossil Energy.

ACTION: Notice of application for blanket authorization to export natural gas to Mexico.

SUMMARY: The Office of Fossil Energy (FE) of the Department of Energy (DOE) gives notice of receipt on December 23, 1991, of an application filed by Tangram Transmission Corporation (Tangram) for blanket authorization to export up to 72 Bcf of natural gas to Mexico annually or up to 146 Bcf over a two-year term beginning on the date of first delivery.

Tangram intends to utilize existing pipeline facilities for the transportation of the volumes to be exported and submit quarterly reports detailing each transaction.

The application is filed under section 3 of the Natural Gas Act (NGA) and DOE Delegation Order Nos. 0204-111 and 0204-127. Protests, motions to intervene, notices of intervention, and written comments are invited.

DATE: Protests, motions to intervene or notices of intervention, as applicable, requests for additional procedures and written comments are to be filed at the address listed below no later than 4:30 p.m., eastern time, March 13, 1992.

ADDRESSES: Office of Fuels Programs, Fossil Energy, U.S. Department of Energy, Forrestal Building, room 3F-056, FE-50, 1000 Independence Avenue, SW., Washington, DC 20585.

FOR FURTHER INFORMATION CONTACT:

Allyson C. Reilly, Office of Fuels Programs, Fossil Energy, U.S. Department of Energy, Forrestal Building, room 3F-094, FE-53, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9394.

Diane Stubbs, Office of Assistant General Counsel for Fossil Energy, U.S. Department of Energy, Forrestal Building, room 6E-042, GC-14, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-6667.

SUPPLEMENTARY INFORMATION: Tangram is a corporation organized under the laws of the State of Texas with its principal place of business at The Woodlands, Texas. Tangram requests authorization to export natural gas to Mexico for sale to a variety of purchasers. The natural gas would be supplied by various U.S. producers and exported under arrangements negotiated in response to market conditions.

The decision on the application for export authority will be made consistent with section 3 of NGA and the authority contained in DOE Delegation Order Nos. 0204-111 and 0204-127. In deciding whether the proposed export of natural gas is in the public interest, domestic need for the gas will be considered, and any other issue determined to be appropriate, including whether the arrangement is consistent with the DOE policy of promoting competition in the natural gas marketplace by allowing commercial parties to freely negotiate their own trade arrangements. Parties, especially those that may oppose this application should comment on these matters as they relate to the requested export authority. The applicant asserts that there is no current need for the domestic gas that would be exported under the proposed arrangements. Parties opposing this arrangement bear the burden of overcoming this assertion.

NEPA Compliance

The National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*, requires DOE to give appropriate consideration to the environmental effects of its proposed actions. No final decision will be issued in this proceeding until DOE has met its NEPA responsibilities.

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0013 0008 0002

DOE F 1325.8
(8-89)
EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: DEC 16 1991

REPLY TO ATTN OF: FE-50

SUBJECT: Categorical Exclusion (CX) Determination for Export Authorization -- Phillips Alaska Natural Gas Corporation (PANGC) and Marathon Oil Company (Marathon) (FE Docket No. 91-103-LNG)

TO: Carol Borgstrom, Director, EH-25

Proposed action: Issue PANGC and Marathon authorization under section 3 of the Natural Gas Act (NGA) to increase its export to Japan from 52.0 Trillion Btu's of liquefied natural gas (LNG) to 64.4 Trillion Btu's for the term of its authorization, utilizing existing pipeline and LNG facilities to transport the gas, thus only increasing throughput.

Location: Any point on the international borders of the United States where commercial natural gas and LNG facilities exist. No DOE plants or installations are involved.

CX to be applied: Section D, DOE NEPA Guidelines (54 FR 12474, March 27, 1989); specifically, the CX for actions applicable to natural gas import/export authorizations under section 3 of the NGA not normally requiring an environmental assessment or environmental impact statement and not involving new construction.

James G. Randolph
Assistant Secretary for Fossil Energy

EH-25 has reviewed this determination and has no objection.

Dated: _____, 1991, by _____

1000 6000 E1 0C

PHILLIPS PETROLEUM COMPANY
BARTLESVILLE, OKLAHOMA 74004 918 661-6600

LEGAL

March 25, 1992

MAR 25 1992

Ms. Allyson C. Reilly
U.S. Office of Fuels Programs
Department of Energy
Forrestal Building, Room 3F-094
1000 Independence Avenue, SW
Washington, DC 20585

Re: Application to Amend Authorization to Export Liquefied Natural Gas; FE Docket No. 91-103-LNG

Dear Ms. Reilly:

Enclosed pursuant to our telephone conference are three copies of the Second Amendatory Agreement which was executed February 19, 1992.

Sincerely yours,

Larry Pain

Larry Pain, Attorney
1256 Adams Building
Bartlesville, OK 74004
(918) 661-6355

LP/jk
Enclosures

SECOND AMENDATORY AGREEMENT

THIS AGREEMENT made and entered into by and between Phillips Alaska Natural Gas Corporation (Phillips) as successor to Phillips 66 Natural Gas Company and Phillips Petroleum Company, corporations incorporated under the laws of the State of Delaware, the United States of America and Marathon Oil Company (Marathon), a corporation incorporated under the laws of the State of Ohio, the United States of America, hereinafter collectively referred to as "Sellers", and The Tokyo Electric Power Company, Incorporated (Tokyo Electric) and Tokyo Gas Co., Ltd. (Tokyo Gas), corporations incorporated under the laws of Japan, hereinafter collectively referred to as "Buyers".

WITNESSETH:

Sellers and Buyers have discussed increasing annual contract quantity (ACQ) applicable under the Liquefied Natural Gas Sale and Purchase Extension Agreement dated the 17th day of June, 1988, (hereinafter referred to as "Extension Agreement"). Sellers are undertaking modifications to manufacture incremental LNG and will have surplus shipping capacity upon delivery of the new LNG tankers now under construction. Buyers have expressed their interest in purchasing such incremental LNG. NOW, THEREFORE, in consideration of the mutual and dependent promises herein contained, Sellers and Buyers hereby agree as follows:

1. Article V, Sections 5.1 and 5.2c in the Extension Agreement shall be deleted and replaced with the following respectively:

"5.1 Annual Contract Quantity

The annual contract quantity of LNG which Sellers agree to sell and deliver and Buyers agree to purchase and receive under this Extension Agreement shall be denominated in BTU's and shall be as per the following table for the contract years commencing April 1 of the years shown:

	Total		Tokyo Electric		Tokyo Gas	
	Btu's	Metric Tons	Btu's	Metric Tons	Btu's	Metric Tons
Contract Year	Trillion	Thousand	Trillion	Thousand	Trillion	Thousand
1989-1992	52.0	988.0	39.0	741.0	13.0	247.0
1993	56.0	1,064.0	42.0	798.0	14.0	266.0
1994-2003	64.4	1,224.0	48.3	918.0	16.1	306.0

Metric Tons are approximations for information purposes and shall in no way affect this Extension Agreement.

In reference to Section 4.1 of the Extension Agreement, Sellers have contracted for the purchase of two (2) new LNG tankers scheduled for delivery during June and December 1993. If Sellers anticipate any material delay in new LNG tankers introduction beyond these dates, Sellers shall notify Buyers of the delay, and Sellers and Buyers shall meet and discuss the necessary changes to the annual contract quantity for the contract years 1993 and 1994.

On or before March 31, 1994, Sellers shall have the option, upon written notice to Buyers, to change the annual contract quantity from contract year 1997 through contract year 2003. Prior to providing such written notice to Buyers, Sellers and Buyers shall meet to discuss Sellers' election to change the annual contract quantity. Thereafter, upon providing the written notice to Buyers, the annual contract quantity of LNG from contract year 1997 through contract year 2003 which Sellers agree to sell and deliver and Buyers agree to purchase and receive under this Extension Agreement shall be as per the following table:

Total		Tokyo Electric		Tokyo Gas	
Btu's	Metric Tons	Btu's	Metric Tons	Btu's	Metric Tons
Trillion	Thousand	Trillion	Thousand	Trillion	Thousand
57.5	1,092.0	43.125	819.0	14.375	273.0

Metric Tons are approximations for information purposes and shall in no way affect this Extension Agreement.

Prior to the arrival of a cargo of LNG at the LNG berthing facilities used jointly by Buyers, Buyers shall declare together to Sellers the ratio, totalling one hundred (100) percent, in which such cargo is to be allocated between Buyers.

For the purpose of calculating the quantity delivered in a contract year, delivery and receipt of all LNG unloaded from any LNG tanker shall be deemed to have been made on the day on which unloading of that LNG was commenced."

"5.2c Accumulated Annual Underlift Quantity

All annual underlift quantities and annual overlift quantities shall be accumulated at the end of each contract year and the accumulated annual overlift quantity shall be subtracted from the accumulated annual underlift quantity to determine the net accumulated underlift quantity, if any. Buyers shall limit the net accumulated underlift quantity to a maximum of sixty trillion, five hundred thirty-four billion (60,534,000,000,000) Btu's, as for Tokyo Electric to a maximum of forty-five trillion,

four hundred billion, five hundred million (45,400,500,000,000) Btu's and as for Tokyo Gas to a maximum of fifteen trillion, one hundred thirty-three billion, five hundred million (15,133,500,000,000) Btu's. If pursuant to Section 5.1 above, Sellers provide notice to change the annual contract quantity from the contract year 1997, Buyers shall limit the net accumulated underlift quantity to a maximum of fifty-seven trillion, three hundred fourteen billion (57,314,000,000,000) Btu's, as for Tokyo Electric to a maximum of forty-two trillion, nine hundred eighty-five billion, five hundred million (42,985,500,000,000) Btu's and as for Tokyo Gas to a maximum of fourteen trillion, three hundred twenty-eight billion, five hundred million (14,328,500,000,000) Btu's.

Buyers shall not exercise their rights under Section 5.2a above at any time during any contract year if such exercise would result in a net accumulated underlift quantity exceeding the maximums mentioned above at the end of that contract year. Buyers shall endeavor to bring the net accumulated underlift quantity to zero (0) by the end of this Extension Agreement."

2. The provisions of the Extension Agreement other than those specified in this Agreement shall remain as they are.

3. **APPROVAL AND AUTHORIZATION OF GOVERNMENTAL REGULATORY BODIES:**

3.1 Endeavors to obtain Approvals and Authorizations

Sellers shall use their best endeavors to obtain forthwith any and all approvals and authorizations required by any legally constituted regulatory bodies of the United States of America, or deemed necessary by Sellers to allow Sellers to commence and continue deliveries of LNG to Buyers under this Agreement, furnishing Buyers with certified copies of all such governmental approvals and authorizations, together with certified copies of rules, regulations and restrictions promulgated by each regulatory body in connection with such approvals and authorizations.

If Sellers fail to obtain by December 31, 1992, the necessary governmental approvals and authorizations to modify the plant as necessary and to increase the annual contract quantity in conformance with this Agreement, Sellers or Buyers may terminate this Agreement at any time thereafter by written notice to the other of their intent to terminate, so long as such notice is given prior to obtaining of such approvals and authorizations. Such termination will not affect the terms and conditions of the Extension Agreement. Further, if any governmental approval or authorization issued imposes terms or conditions unreasonable to Sellers, then Sellers may terminate this Agreement by written notice to Buyers within thirty (30) days after issuance of the said final governmental approval or authorization.

Both of Sellers or both of Buyers shall act jointly in terminating this Agreement under this Section.

3.2 Liability of Termination

Should either Sellers or Buyers exercise the right under Section 3.1 to terminate this Agreement, the parties exercising the right shall not be liable to the other parties for any losses, damages or expenses incurred by such other parties as a result of the termination of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in good faith, by their respective duly authorized officers as of the date set forth below.

BUYERS:

THE TOKYO ELECTRIC POWER COMPANY, INCORPORATED

By: _____
President & Director

SELLERS:

PHILLIPS ALASKA NATURAL GAS CORPORATION

By: _____
President

TOKYO GAS CO., LTD.

By: _____
President & Director

MARATHON OIL COMPANY

By: _____
Executive Vice President

DATED: February 19th, 1992.

SECOND AMENDATORY AGREEMENT

THIS AGREEMENT made and entered into by and between Phillips Alaska Natural Gas Corporation (Phillips) as successor to Phillips 66 Natural Gas Company and Phillips Petroleum Company, corporations incorporated under the laws of the State of Delaware, the United States of America and Marathon Oil Company (Marathon), a corporation incorporated under the laws of the State of Ohio, the United States of America, hereinafter collectively referred to as "Sellers", and The Tokyo Electric Power Company, Incorporated (Tokyo Electric) and Tokyo Gas Co., Ltd. (Tokyo Gas), corporations incorporated under the laws of Japan, hereinafter collectively referred to as "Buyers".

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On or before March 31, 1994, Sellers shall have the option, upon written notice to Buyers, to change the annual contract quantity from contract year 1997 through contract year 2003. Prior to providing such written notice to Buyers, Sellers and Buyers shall meet to discuss Sellers' election to change the annual contract quantity. Thereafter, upon providing the written notice to Buyers, the annual contract quantity of LNG from contract year 1997 through contract year 2003 which Sellers agree to sell and deliver and Buyers agree to purchase and receive under this Extension Agreement shall be as per the following table:

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Buyers shall not exercise their rights under Section 5.2a above at any time during any contract year if such exercise would result in a net accumulated underlift quantity exceeding the maximums mentioned above at the end of that contract year. Buyers shall endeavor to bring the net accumulated underlift quantity to zero (0) by the end of this Extension Agreement."

2. The provisions of the Extension Agreement other than those specified in this Agreement shall remain as they are.

3. **APPROVAL AND AUTHORIZATION OF GOVERNMENTAL REGULATORY BODIES:**

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If Sellers fail to obtain by December 31, 1992, the necessary governmental approvals and authorizations to modify the plant as necessary and to increase the annual contract quantity in conformance with this Agreement, Sellers or Buyers may terminate this Agreement at any time thereafter by written notice to the other of their intent to terminate, so long as such notice is given prior to obtaining of such approvals and authorizations. Such termination will not affect the terms and conditions of the Extension Agreement. Further, if any governmental approval or authorization issued imposes terms or conditions unreasonable to Sellers, then Sellers may terminate this Agreement by written notice to Buyers within thirty (30) days after issuance of the said final governmental approval or authorization.

Both of Sellers or both of Buyers shall act jointly in terminating this Agreement under this Section.

3.2 Liability of Termination

Should either Sellers or Buyers exercise the right under Section 3.1 to terminate this Agreement, the parties exercising the right shall not be liable to the other parties for any losses, damages or expenses incurred by such other parties as a result of the termination of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed in good faith, by their respective duly authorized officers as of the date set forth below.

BUYERS:

THE TOKYO ELECTRIC POWER COMPANY, INCORPORATED

By: _____
President & Director

SELLERS:

PHILLIPS ALASKA NATURAL GAS CORPORATION

By: _____
President

TOKYO GAS CO., LTD.

By: _____
President & Director

MARATHON OIL COMPANY

By: _____
Executive Vice President

DATED: February 19th, 1992.

PHILLIPS PETROLEUM COMPANY
HOUSTON, TEXAS 77251-1967
BOX 1967

NORTH AMERICA
EXPLORATION AND PRODUCTION

BELLAIRE, TEXAS
6330 WEST LOOP SOUTH
PHILLIPS BUILDING

April 30, 1992

Office of Fuels Programs,
Fossil Energy
Forrestal Bldg., Rm. 3F-056, FE-50
1000 Independence Ave., S.W.
Washington, D.C. 20585

RE: Phillips Petroleum Company
Marathon Oil Co. Docket No. 88-22-LNG

Gentlemen:

Pursuant to Ordering Paragraph B of Opinion No. 261, issued July 28, 1988, Phillips Petroleum Company reports the monthly prices and exported volumes of LNG to Japan for the first quarter, 1992 as follows:

	Volumes		Price	
Month/1992	(MCF)	(MMBtu)	(¢/MCF)	(¢/MMBtu)
January	3,026,151	3,054,899	357.6	354.2
February	3,054,836	3,083,857	343.8	340.6
March	3,079,357	3,108,611	350.2	346.9

The reported prices and/or volumes for April, 1991, through December, 1991, have been revised as follows:

Month/1992	Volumes (MCF)	Volumes (MMBtu)	Price (¢/MCF)	Price (¢/MMBtu)
April	4,083,253	4,122,045	358.8	355.4
May	2,067,768	2,087,412	323.2	320.2
June	2,002,530	2,021,554	317.7	314.7
July	3,120,159	3,149,800	320.3	317.3
August	4,130,768	4,170,010	325.5	322.4
September	3,040,151	3,069,033	330.5	327.4
October	3,077,977	3,107,218	338.7	335.5
November	3,065,938	3,095,065	350.2	346.9
December	4,062,168	4,100,758	360.9	357.5

Respectfully,

Virgil Spurgeon

V. R. Spurgeon
Director of Rates
(713) 669-7993

VRS:JWN:sw
88-22LNG

Richard G. Grammens
Vice President
Natural Gas Marketing & Transportation

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/296-2226
Telex 166438

April 27, 1992

Office of Fuels Program
Fossil Energy FE-50
Forrestal Building, Room 3H087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

MAY 04 1992

Attn: Mr. Clifford Tomaszewski

Re: Phillips Petroleum Company
Marathon Oil Company
~~ERA~~ Docket No. ~~82-22-LNG~~
FE 91-10

Gentlemen:

In compliance with ordering Paragraph B of DOE/ERA Opinion and Order No. 261 issued on July 28, 1988, in the above Docket, Marathon Oil Company hereby submits a schedule of its exported volumes and the prices for LNG at the delivery point in Japan for the months January 1992 through March 1992:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
January	1992	1,355,041	1,342,290	354.2	357.6
February	1992	1,326,473	1,313,991	346.9	350.2
March	1992	1,299,620	1,287,391	346.9	350.2

Subsequent to our letter of January 27, 1992, the applicable volumes and/or prices for the following months were retroactively changed with the terms of the contract as follows:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
April	1991	1,761,909	1,745,328	355.4	358.8
May	1991	887,124	878,776	320.2	323.2
June	1991	921,608	912,935	314.7	317.7
July	1991	1,291,673	1,279,517	317.3	320.3
August	1991	1,754,511	1,738,001	322.4	325.5
September	1991	1,342,363	1,329,731	327.4	330.5
October	1991	1,305,809	1,293,521	335.5	338.7
November	1991	1,317,119	1,304,724	346.9	350.2
December	1991	1,775,021	1,758,316	357.5	360.9

It would be appreciated if you would date stamp the duplicate copy of this letter and return same in the self-addressed envelope enclosed.

Very truly yours,

R. G. Grammens

RGG/JRG:hf

Enclosures (2)

cc: Phillips Petroleum Company
Attn: Virgil R. Spurgeon
6330 West Loop South
Bellaire, TX 77251-1967

0 13 00 10 2000 1

C R

PHILLIPS ALASKA NATURAL GAS CORPORATION
HOUSTON, TEXAS 77251-1967
BOX 1967

BELLAIRE, TEXAS
6330 WEST LOOP SOUTH
PHILLIPS BUILDING

May 29, 1992

Office of Fuels Programs
Fossil Energy, U. S. Department of Energy
Docket Room 3F-056, FE50
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D. C. 20585

RE: FE Docket No. 91-103-LNG
Phillips Alaska Natural Gas Corporation
and Marathon Oil Company Application for
Increase in LNG Export Volume

Ladies and Gentlemen:

Per your request, enclosed are three (3) copies of a letter from the Department of Transportation's Research and Special Programs Administration ("RSPA of DOT"). The letter is in response to a PANGC and Marathon petition requesting a finding of continued exemption from the design, construction, and siting regulations of the DOT in 49 CFR Part 193 as a result of certain proposed modifications at the Kenai LNG Plant.

The RSPA of DOT letter stated "grandfathered LNG facilities at the Kenai LNG Plant that are not replaced, relocated or significantly altered are not covered by § 193.2005(b), and would retain their grandfather status". The only LNG facilities proposed to be replaced were the existing LNG transfer pumps. The letter indicates that while these pumps would lose their grandfathered status, they would not be required by § 193.2005(b) to meet any siting requirements.

The letter further indicates that other planned modifications consisting primarily of new components at the Kenai plant would be subject to all applicable requirements governing siting, design, installation, and construction. However, due to the nature of these new facilities, which must be located at the existing Kenai LNG Plant, the siting requirements of 49 CFR Part 193 are not applicable. The new facilities will comply with the design, installation and construction standards of 49 CFR Part 193.

Based on the positive response received in RSPA of DOT's letter to the PANGC and Marathon petition, construction of the planned modifications has been initiated at the Kenai facility.

Please indicate the date and time this letter was received by stamping on the enclosed copy of this letter and returning the same to the undersigned:

Very truly yours,

PHILLIPS ALASKA NATURAL GAS CORPORATION

Virgil Spurgeon

Virgil R. Spurgeon
Regulatory Affairs Agent
P. O. Box 1967
Houston, Texas 77251-1967
(713) 669-7993

VRS:sw
05-22.04

cc: Marathon Oil Company
Lauren D. Boyd, Attorney
P. O. Box 4813
Houston, Texas 77210
(713) 296-2539

U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street S.W.
Washington D.C. 20590

Mr. Larry Pain
Attorney for Phillips Alaska
Natural Gas Corporation
1256 Adams Building
Bartlesville, OK 74004

Dear Mr. Pain:

This letter responds to your petition dated August 26, 1991, regarding the Kenai LNG Plant (Docket No. P-47). Although you filed the petition under 49 CFR 193.2015, we are treating the petition as a request for information. Section 193.2015 is a procedural rule governing petitions for findings or approvals that are specifically authorized by substantive rules in Part 193, such as § 193.2059(e). Your petition does not request such a finding or approval.

You asked whether modifications (described in the petition) that are planned for the Kenai LNG Plant would cause the plant to lose its grandfather status under the siting, design, installation, and construction requirements of Part 193. The modifications that are planned would not cause the entire Kenai LNG Plant to lose its grandfather status under the siting, design, installation, and construction requirements of Part 193.

While the entire plant may not lose its grandfather status, § 193.2005(b) provides that LNG facilities (defined in § 193.2007) that are replaced, relocated, or significantly altered are subject to Part 193 standards governing siting, design, installation, and construction (with certain exceptions). Thus, if an LNG facility at the Kenai LNG Plant is replaced, relocated, or significantly altered by the planned modifications, that facility would lose its grandfather status to the extent prescribed by § 193.2005(b). In contrast, grandfathered LNG facilities at the Kenai LNG Plant that are not replaced, relocated, or significantly altered are not covered by § 193.2005(b), and would retain their grandfather status.

It appears that of the planned modifications in your petition, the replacement of one or both existing LNG transfer pumps is the only LNG facility that will be replaced, relocated, or significantly altered and would lose its grandfather status to

the extent prescribed by § 193.2005(b). However, this modification would not have to meet the siting requirements since, in accordance with § 193.2005(b)(1), only an LNG storage tank that is relocated or significantly altered by increasing the original storage capacity would have to meet the siting requirements.

Your petition indicates that the planned modifications may include installation or construction of new components that do not constitute replacements or significant alterations of grandfathered facilities. If so, these new components would be subject to all applicable requirements governing siting, design, installation, and construction.

You also asked us to determine that the designs for the planned modifications are consistent with 49 CFR Part 193 or are otherwise acceptable. The Part 193 regulations allow operators to construct and operate LNG facilities without prior approval by this agency. We normally do not review operators' design and construction plans except during, or in preparation for, routine compliance inspections, which are handled by our regional offices. Therefore, we are not at this time determining whether the planned modifications comply with Part 193 or would otherwise be acceptable.

I apologize for the tardiness of this response. Do not hesitate to contact us again if you have further concerns about the Part 193 regulations.

Sincerely,

Cesar De Leon, Director
Regulatory Programs
Office of Pipeline Safety

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U.S. Department
of Transportation

**Research and
Special Programs
Administration**

[illegible] Seventh Street S.W.
[illegible]shington D.C. 20590

Mr. Larry Pain
Attorney for Phillips Alaska
Natural Gas Corporation
1256 Adams Building
Bartlesville, OK 74004

Dear Mr. Pain:

This letter responds to your petition dated August 26, 1991, regarding the Kenai LNG Plant (Docket No. P-47). Although you filed the petition under 49 CFR 193.2015, we are treating the petition as a request for information. Section 193.2015 is a procedural rule governing petitions for findings or approvals that are specifically authorized by substantive rules in Part 193, such as § 193.2059(e). Your petition does not request such a finding or approval.

You asked whether modifications (described in the petition) that are planned for the Kenai LNG Plant would cause the plant to lose its grandfather status under the siting, design, installation, and construction requirements of Part 193. The modifications that are planned would not cause the entire Kenai LNG Plant to lose its grandfather status under the siting, design, installation, and construction requirements of Part 193.

While the entire plant may not lose its grandfather status, § 193.2005(b) provides that LNG facilities (defined in § 193.2007) that are replaced, relocated, or significantly altered are subject to Part 193 standards governing siting, design, installation, and construction (with certain exceptions). Thus, if an LNG facility at the Kenai LNG Plant is replaced, relocated, or significantly altered by the planned modifications, that facility would lose its grandfather status to the extent prescribed by § 193.2005(b). In contrast, grandfathered LNG facilities at the Kenai LNG Plant that are not replaced, relocated, or significantly altered are not covered by § 193.2005(b), and would retain their grandfather status.

It appears that of the planned modifications in your petition, the replacement of one or both existing LNG transfer pumps is the only LNG facility that will be replaced, relocated, or significantly altered and would lose its grandfather status to

the extent prescribed by § 193.2005(b). However, this modification would not have to meet the siting requirements since, in accordance with § 193.2005(b)(1), only an LNG storage tank that is relocated or significantly altered by increasing the original storage capacity would have to meet the siting requirements.

Your petition indicates that the planned modifications may include installation or construction of new components that do not constitute replacements or significant alterations of grandfathered facilities. If so, these new components would be subject to all applicable requirements governing siting, design, installation, and construction.

You also asked us to determine that the designs for the planned modifications are consistent with 49 CFR Part 193 or are otherwise acceptable. The Part 193 regulations allow operators to construct and operate LNG facilities without prior approval by this agency. We normally do not review operators' design and construction plans except during, or in preparation for, routine compliance inspections, which are handled by our regional offices. Therefore, we are not at this time determining whether the planned modifications comply with Part 193 or would otherwise be acceptable.

I apologize for the tardiness of this response. Do not hesitate to contact us again if you have further concerns about the Part 193 regulations.

Sincerely,

Cesar De Leon, Director
Regulatory Programs
Office of Pipeline Safety

PHILLIPS ALASKA NATURAL GAS CORPORATION
HOUSTON, TEXAS 77251-1967
BOX 1967

BELLAIRE, TEXAS
6330 WEST LOOP SOUTH
PHILLIPS BUILDING

July 10, 1992

Office of Fuels Programs
Fossil Energy
U.S. Department of Energy
Docket Room 3F-056, FE 50
Forrestal Building
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: **FE Docket No. 91-103-LNG**
Phillips Alaska Natural Gas Corporation
and Marathon Oil Company Application
For Increase In LNG

Gentlemen:

In the interest of expediting our application, Phillips/Marathon offer the following points to clarify its application:

Item No. 1: No modification or construction to Phillips/Marathon's existing Kenai facility is needed or required to effectuate delivery of the additional volume requested in the captioned FE application for increase in LNG export volumes.

Item No. 2: Phillips/Marathon's intent in its request for modifications to its Kenai facility was solely an effort to improve the efficiency, flexibility, and reliability of the Kenai plant. The request to make modifications is made as a prudent business practice designed to maximize operations at Kenai. As recited on page 4 of our DOT, RSPA Petition for Approval of Modifications at its Kenai LNG plant, Phillips/Marathon's goal was solely to "increase its (Kenai Plant) efficiency and reliability."

Item No. 3: To avoid any ambiguity on our application, we refer to section V. Environmental Impact on page 18 of the FE application, wherein Phillips/ Marathon state that "the manufacturing facilities will require modification to accommodate the incremental increase of LNG production", we respectfully request that FE read this sentence in concert with the following sentence to capture the true spirit of our intent. Specifically, the language reads, "The modification planned for the Kenai plant will increase its efficiency and reliability." As mentioned above in Item No. 2, our goal is to maintain plant operations in the most efficient manner and that is the reason for the plant modifications. As stated above in Item No. 1, we again confirm that Phillips/Marathon's existing Kenai plant would handle the increased volumes requested in the captioned FE application for increase in LNG exports without any plant modification or construction being made.

Thank you for your timely review in this matter.

Sincerely,

PHILLIPS ALASKA NATURAL GAS CORPORATION

Dennis J. Ryan
Regulatory Affairs Agent
(713) 669-7027

\DJR\KENAI.LNG

DJR:jh
Attachment

cc: Lauren Boyd
Marathon Oil Company

File - RC

Richard G. Grammens
Vice President
Natural Gas Marketing & Transportation

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/296-2226
Telex 166438

92 JUL 27 A 11:11

July 24, 1992

REC'D DOE/FE

Office of Fuels Program
Fossil Energy FE-50
Forrestal Building, Room 3H087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Attn: Mr. Clifford Tomaszewski

Re: Phillips Petroleum Company
Marathon Oil Company
FE Docket No. 91-103-LNG

Gentlemen:

In compliance with ordering Paragraph B of DOE/ERA Opinion and Order No. 261 issued on July 28, 1988, in the above Docket, Marathon Oil Company hereby submits a schedule of its exported volumes and the prices for LNG at the delivery point in Japan for the months April 1992 through June 1992:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
April	1992	1,353,108	1,340,374	318.3	321.3
May	1992	1,789,356	1,772,516	340.6	343.8
June	1992	1,324,503	1,312,039	323.6	326.7

Subsequent to our letter of April 27, 1992, the applicable volumes and/or prices for the following months were retroactively changed with the terms of the contract as follows:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
February	1992	1,326,509	1,314,026	340.6	343.8
March	1992	1,298,065	1,285,851	323.6	326.7

LT

PHILLIPS ALASKA NATURAL GAS CORPORATION
HOUSTON, TEXAS 77251-1967
BOX 1967

BELLAIRE, TEXAS
6330 WEST LOOP SOUTH
PHILLIPS BUILDING

October 21, 1992

Office of Fuels Programs,
Fossil Energy
Forrestal Bldg., Rm. 3F-056, FE-50
1000 Independence Ave., S.W.
Washington, D.C. 20585

RE: Phillips Alaska Natural Gas Corporation
Marathon Oil Company
Docket No. 91-103-LNG

Gentlemen:

Pursuant to Ordering Paragraph B of Opinion No. 261, issued July 28, 1988, Phillips Alaska Natural Gas Corporation reports the monthly prices and exported volumes of LNG to Japan for the third quarter, 1992, as follows:

	Volumes		Price	
Month/1992	(MCF)	(MMBtu)	(¢/MCF)	(¢/MMBtu)
July	3,071,928	3,101,112	343.5	340.3
August	3,099,689	3,129,136	323.2	320.2
September	3,084,899	3,114,205	330.9	327.8

The reported prices and/or volumes for May and June, 1992, have been revised as follows:

	Volumes		Price	
Month/1992	(MCF)	(MMBtu)	(¢/MCF)	(¢/MMBtu)
May	4,054,356	4,092,873	323.2	320.2
June	3,064,893	3,094,010	330.9	327.8

Respectfully,

Sharon K. Widener

Sharon K. Widener
Agent for Phillips Alaska Natural
Gas Corporation
(713) 669-7518

:sw
91-103

cc: Marathon Oil Company
P. O. Box 3128
Houston, Texas 77253
Attn: R. G. Grammens

LT

Richard G. Grammens
Vice President
Natural Gas Marketing & Transportation

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/296-2226
Telex 166438

October 26, 1992

Office of Fuels Program
Fossil Energy FE-50
Forrestal Building, Room 3H087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Attn: Mr. Clifford Tomaszewski

Re: Phillips Petroleum Company
Marathon Oil Company
FE Docket No. 91-103-LNG

Gentlemen:

In compliance with ordering Paragraph B of DOE/ERA Opinion and Order No. 261 issued on July 28, 1988, in the above Docket, Marathon Oil Company hereby submits a schedule of its exported volumes and the prices for LNG at the delivery point in Japan for the months July 1992 through September 1992:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
July	1992	1,319,536	1,307,118	340.3	343.5
August	1992	1,289,903	1,277,763	320.2	323.2
September	1992	1,335,461	1,322,893	327.8	330.9

Subsequent to our letter of July 24, 1992, the applicable volumes and/or prices for the following months were retroactively changed with the terms of the contract as follows:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
May	1992	1,789,042	1,772,206	320.2	323.2
June	1992	1,325,346	1,312,874	327.8	330.9

It would be appreciated if you would date stamp the duplicate copy of this letter and return same in the self-addressed envelope enclosed.

Very truly yours,

R. G. Grammens

RGG/JRG:hf

Enclosures (2)

cc: Phillips Petroleum Company
Attn: Sharon K. Widener
6330 West Loop South
Bellaire, TX 77251-1967

LT

Richard G. Grammens
Vice President
Natural Gas Marketing & Transportation

Marathon Oil Company

P.O. Box 3128
Houston, Texas 77253
Telephone 713/296-2226
Telex 166438

January 27, 1993

Office of Fuels Program
Fossil Energy FE-50
Forrestal Building, Room 3H087
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Attn: Mr. Clifford Tomaszewski

Re: Phillips Petroleum Company
Marathon Oil Company
FE Docket No. 91-103-LNG

Gentlemen:

In compliance with ordering Paragraph B of DOE/ERA Opinion and Order No. 261 issued on July 28, 1988, in the above Docket, Marathon Oil Company hereby submits a schedule of its exported volumes and the prices for LNG at the delivery point in Japan for the months October 1992 through December 1992:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
October	1992	891,296	882,908	355.8	359.2
November	1992	1,295,308	1,283,117	352.3	355.6
December	1992	1,330,271	1,317,753	357.5	360.9

Subsequent to our letter of October 26, 1992, the applicable volumes and/or prices for the following months were retroactively changed with the terms of the contract as follows:

		VOLUME		PRICE	
		MMBTU	MCF	CENTS/MMBTU	CENTS/MCF
August	1992	1,293,181	1,281,012	352.3	355.6
September	1992	1,335,442	1,322,875	357.5	360.9

It would be appreciated if you would date stamp the duplicate copy of this letter and return same in the self-addressed envelope enclosed.

Very truly yours,

R. G. Grammens

RGG/JRG:hf

Enclosures (2)

cc: Phillips Petroleum Company
Attn: Sharon K. Widener
6330 West Loop South
Bellaire, TX 77251-1967