DATE 7-9-82

TO: OMS-2-2

FROM: OS-7-1

Supplemental Plan of [redacted] Development/Production, Lease OCS-G 1608

Control No. S-905.

SP61

Arco Oil + Gas Co.

WOOD JOSEPH

ARCO Oil and Gas Company
South Louisiana District
Post Office Box 51408, Oil Center
Lafayette, Louisiana 70505
Telephone 318 264 4[illegible]

W. A. DeShazer
District Engineer
Facilities/Production

[illegible]

July 8, 1982

Mr. D. W. Solanas
United States Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region
P. O. Box 7966
Metairie, Louisiana 70010-7966

Re: Modification of Development and Production Plans
South Pass 61 Field

Dear Mr. Solanas:

ARCO Oil and Gas Company, a division of Atlantic Richfield Company has enclosed twelve copies of a modified Development and Production Plan for a portion of Atlantic Richfield Company's properties in the South Pass 61 Field. These copies are hereby submitted in compliance with the applicable provisions of 30 CFR 250.34.

This plan supersedes previous plans except for the plan submitted April 7, 1980 for platform 60 E, the plan approved May 30, 1979 for platform 60 A, and the plan submitted July 2, 1980 for modification of development and production plans.

ARCO Oil and Gas Company is planning to expand their present facilities in 2 areas: an enhanced oil recovery project (EOR), and gas handling facilities (Supplemental Gas Processing, SGP). These expansions involve the laying of additional pipelines and changing some existing pipelines. Refer to Figure 1, a plat of the proposed South Pass Block 60 facilities. Listed below are the pipeline additions or changes for the EOR expansion:

ENHANCED OIL RECOVERY EXPANSION

EOR projects are currently underway in the four largest oil reservoirs in the South Pass Block 61 Field. The process being used is gravity stable enriched gas miscible displacement. Enriched gas is generated by using NGL which is separated from field gas production by a cryogenic gas plant located on platform "B". The NGL is then mixed with plant residue gas to produce an enriched gas, which is injected by high pressure compressors located on "F" platform. When operating at capacity, the cryogenic plant can generate only enough NGL to mix with 4000 MCFPD of residue gas. At capacity operation, another 15,000 MCFPD of residue gas is available but cannot be enriched. This gas is currently being injected into storage reservoirs for future use in displacing the enriched gas slugs in the EOR reservoirs. Much more enriched gas could be injected if additional NGL were available.

We are proposing to lay a 6" NGL supply pipeline approximately 30 miles in length from platform "A" to a facility operated by Warren Petroleum Company (a division of Gulf) near Venice, Louisiana. Warren currently has a large surplus of normal butane which they are storing in underground caverns in salt domes. They are very interested in selling us some of this surplus. Butane in large volumes is barged to their facility at Venice where it is fractionated. The normal butane is not currently being marketed and has to be stored.

1. Lay a 164,740 ft. long 6" NGL pipeline from the Warren Refinery to South Pass Block 60, "A" platform.

   The 6" NGL line will supply a maximum rate of 170 M gallons per day of .58 specific gravity NGL fluids initially at 650 psig and 60°F, to the South Pass Block 61 field to expand the EOR facilities. Pumps located at the Warren Refinery will be the power source for the NGL. The first 23 miles of pipe will be 1" concrete coated with a 6 5/8" O.D., .312" wall thickness at 21.07 #/ft. of API 5L Grade B seamless pipe and have a specific gravity of 1.57 (empty pipe). It will have a maximum design working pressure of 2,183 psig. The remaining 8.2 miles will not be concrete coated to have the flexibility to install the pipeline with a reel barge. To maintain the necessary specific gravity, the wall thickness will increase to .375; 25.04 lb/ft., 1.63 specific gravity (empty pipe). This part of the line will have a maximum design working pressure of 2,663 psig. The pipeline expected installation and commissioning dates are first quarter of 1983.

2. Lay a 4,150 ft. long 6" bidirectional NGL pipeline from platform "A" to "F".

   The 6" bidirectional NGL pipeline will continue transporting the .58 specific gravity liquids from platform "A" to "F" at a maximum rate of 170 M gallons per day. The pipeline will be bidirectional to transport NGL from platform "F" to the "A-D" complex in the case the supply from Warren is disrupted. The 6 5/8" O. D. API 5L Grade B seamless pipe has a wall thickness of .375" and is 25.04 lb/ft. with an empty pipe specific gravity of 1.63. It has a maximum design working pressure of 2,663 psi. To obtain the required specific gravity, the design working pressure, 2,663 psi must be greatly larger than the operating pressure, 550 psig at 60°F. On "F" platform, it will be pressured by using the injection pumps. The 6" pipeline will not make any pipeline crossings. This pipeline is expected to be installed in the first quarter of 1983. The MMS will be notified upon commisioning.

3. Lay a 4,900 ft. long 4" very high pressure gas pipeline from platform "F" to "D".

The 4" very high pressure pipeline from "F" to "D" platform will transport 7.5 MMSCFD of either methane or enriched gas. The specific gravity at 75°F and 5000 psig of the fluid, is .2 or .5, respectively. The pipe has a maximum design working pressure of ANSI 2500 (6000 psi).

This pipeline will cross 3 in-field Atlantic Richfield Company pipelines. The pipeline pressure source will be the injection compressors located on "F" platform. The pipeline will arrive on "D" platform, where 2.5 MMSCFD of gas will be removed to a flowline header with flowline drops to the wellheads of selected injection wells. The pipeline will be installed in August, 1982; commmissioning is expected in September, 1982.

4. Lay a 4840 ft. long 4" very high pressure gas pipeline from platform "D" to "B".

The 4" very high pressure gas pipeline will continue from "D" platform to "B" carrying 5 MMSCFD gas. The pipe and fluid characteristics will be the same as in paragraph 3 above. Expected installation is in September, 1982 with commissioning in October, 1982. The gas on "B" platform will be injected in new EOR reservoirs. Two in-field ARCO Oil and Gas Company owned pipelines will be crossed by this 4" pipeline.

5. Change the 6" NGL pipeline from platform "B" to "F" to a bidirectional line.

A 6" NGL pipeline transports NGL from platform "B" to platform "F". This line will be made bidirectional. Warren Refinery will supply NGL to the B-E complex for injection through the 6" NGL pipeline when the cryogenic plant is down.

SUPPLEMENTAL GAS PROCESSING

The goals of the Supplemental Gas Processing (SGP) are three fold: 1) produce oil at the maximum efficient rate, 2) provide gas processing capability for future field expansion in South Pass Block 67 "A" and South Pass 60 "E", and 3) recover all available NGL from the produced gas for use in enriched injection. In order to produce at maximum oil rates, the field needs compression and handling facilities for about 60 MMCF/D. However, because the current facilities can handle only about 45 MMCF/D, we had to cut back on oil production as gas rates rose.

We are operating three boost compressors at their maximum of 15 MMCF/D each for a total of 45 MMCF/D (33 MMCF/D formation gas plus 12 MMCF/D gas lift gas). We have also fully loaded the two 12" low pressure unprocessed gas lines, the 6" high pressure processed gas line, and the one operational

recompressor. New wells cannot be produced without shutting in present production. In order to raise production and still be able to process all the gas, we have to remove all three constraints.

Because of the facilities constraints, on June 20, 1982 we shut in about 1220 BOPD + 4 MMCF/D formation gas and 3.5 MMCF/D gas lift (G/L) gas. In addition, Southern Natural Gas, the gas purchaser, recently eliminated gas sales, causing us to shut in another 500 BOPD to further reduce gas production. The amount of shut in production will likely increase if more G/L gas is needed and/or more gas flows into the low pressure system. A description of the proposed modifications follow:

1. Lay a 4,862 ft. long 12" high pressure gas pipeline from platform "B" to "D".

   The 12" high pressure gas pipeline will carry 43 MMSCFD of gas from platform "B" to "D". The recompressor discharge gas, at 60°F and approximately 1150 psig, has a .6 specific gravity. The 12" O.D., .688" wall thickness, 88.57 lb/ft. of API 5L Grade B seamless pipe with an empty pipe specific gravity of 1.60 has a maximum design working pressure of ANSI 900 (2160 psig). This pipeline, with an expected installation in September 1982, crosses two in-field ARCO Oil and Gas Company pipelines.

2. Exchange the existing pipeline service in the 6" high pressure gas pipeline and 8" oil sales line between platforms "C" and "A".

   The 6" high pressure gas line from "A" to "C" is at its maximum capacity and has large pressure drops. Since gas lift gas is also tapped from this line, any additional gas throughput would lower gas lift pressure with an attendant decrease in oil production. Increasing the gas throughout, due to a gas production increase, would severely inhibit gas lift and exceed the very high compressor capabilities at "F" platform.

   Presently, a 6" high pressure gas pipeline and an 8" oil pipeline owned by ARCO Pipeline Company, run between "A" and "C" platforms. Oil production on "C" has declined and the capacity of the 8" line is no longer necessary. The service of the oil and gas lines will be switched, minimizing the gas pressure drop at "C".

A new properly sized vent boom and scrubber will be installed on Platform "D" to discharge gas in the event of an upset or emergency. All other platforms have an adequately sized vent boom to handle the vented gas except "E" platform where vent gas crosses the bridge and is vented on "B" platform. The vent boom on "D" will discharge the gas at an elevation of approximately 90 feet above the drill deck (approximately + 160' MSL).

All instrumentation and safety systems will be installed in accordance with OCS Order No. 5. A Simultaneous Operations Plan and a Welding and Burning Safe Practices and Procedures Plan, as required by OCS Order No. 5, will be in force when these operations are started. These plans will be similar to those currently in effect for our operations in South Pass Block 60.

To prevent the pollution of the Gulf of Mexico, all necessary prevention and control features such as drip pans, curbs, drain lines and sumps will be utilized in accordance with OCS Order No. 7. Should there be an occurrence of pollution at the platform site, control and cleanup procedures will be implemented according to the approved "Oil Spill Contingency Plan" on file with the MMS Area Supervisor by Atlantic Richfield Company. Atlantic Richfield Company is a member of Clean Gulf Associates which has response bases at Venice, Grand Isle, Intracoastal City and Cameron in Louisiana. The response time of Clean Gulf Associates is within approximately 12 hours.

The platform production facilities and pipelines will be designed, installed, and maintained according to OCS Order No. 9 and DOT regulations in 49 CFR parts 192 and 195. They will also have all safety systems and devices as specified in API RP 14C and in the body of this test. In accordance with OCS Order No. 5, all individual wells will have surface controlled surface and subsurface safety valves installed. Life jackets, life rafts, ring bouys, escape ropes, fire extinguishers, and other safety features such as warning lights and horns, as required by the U. S. Coast Guard's "Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf" will be installed. Spark arrestors will be required on all engine exhausts and, if exhaust temperatures exceed 400°F, insulated shrouding will be installed.

In addition, training for personnel working offshore for the first time shall include orientation and safety and motivational programs as required in OCS Order No.5 in addition to their job related training.

The existing facility at Venice, Louisiana, will serve as the shore base for this operation. The present docking facility, warehouse, yard, parking lot, and office will be used to supply the needed logistic, communication, and supervisory support. The shore base facility has dispatchers on duty 24 hours per day and a base coordinator on site during daylight hours. The platform will be staffed with 4-6 production personnel.

If further data or clarification is required, please call W. H. Edwards at (318) 264-4000 in Lafayette, Louisiana.

Sincerely,

ARCO OIL AND GAS COMPANY

W. A. DeShazer
District Engineer - Facilities/Production

FIGURE 2
SOUTH PASS BLOCK 60
PLATFORM "A"

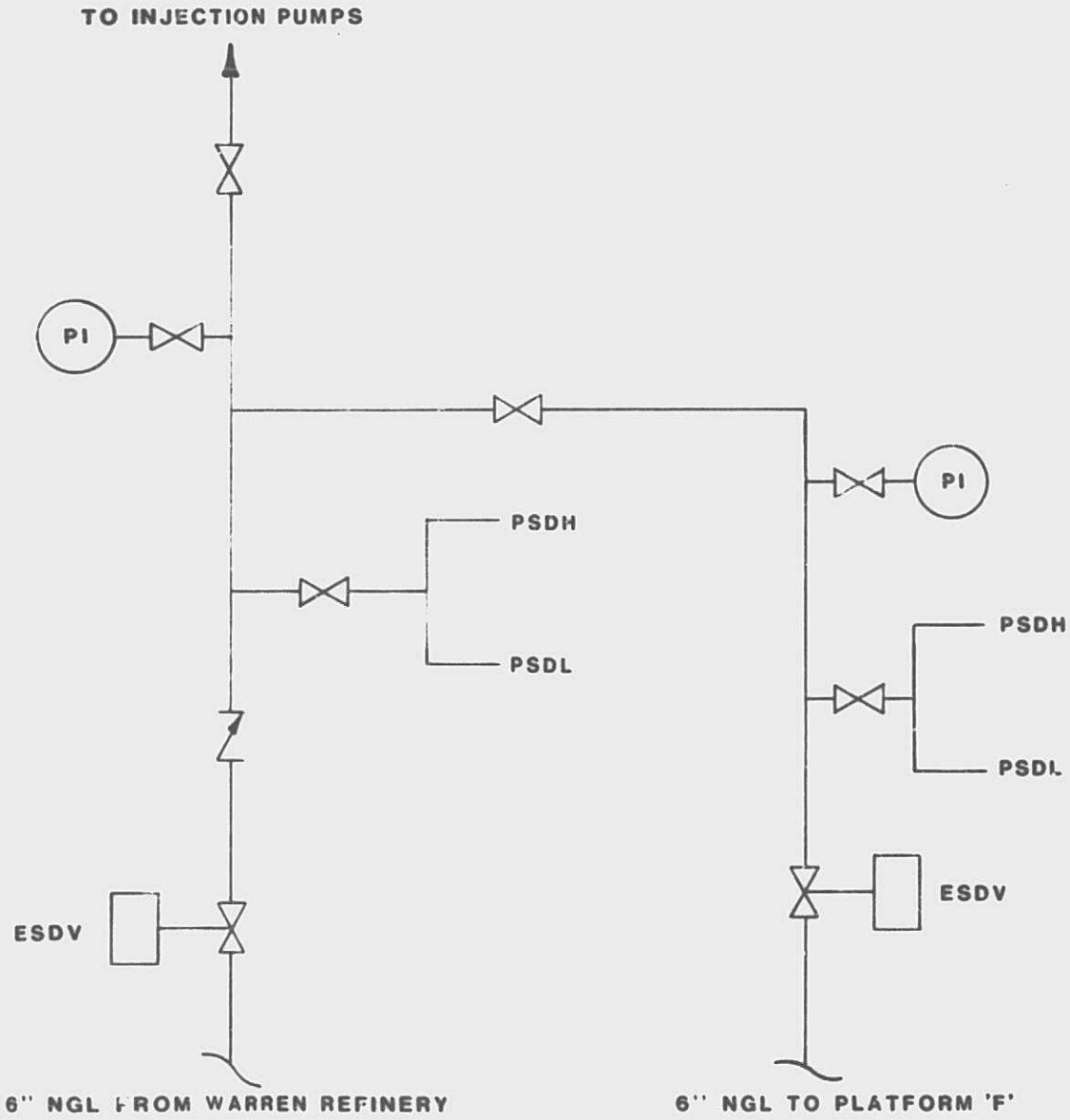

FIGURE 3
SOUTH PASS BLOCK 60
PLATFORM "F"

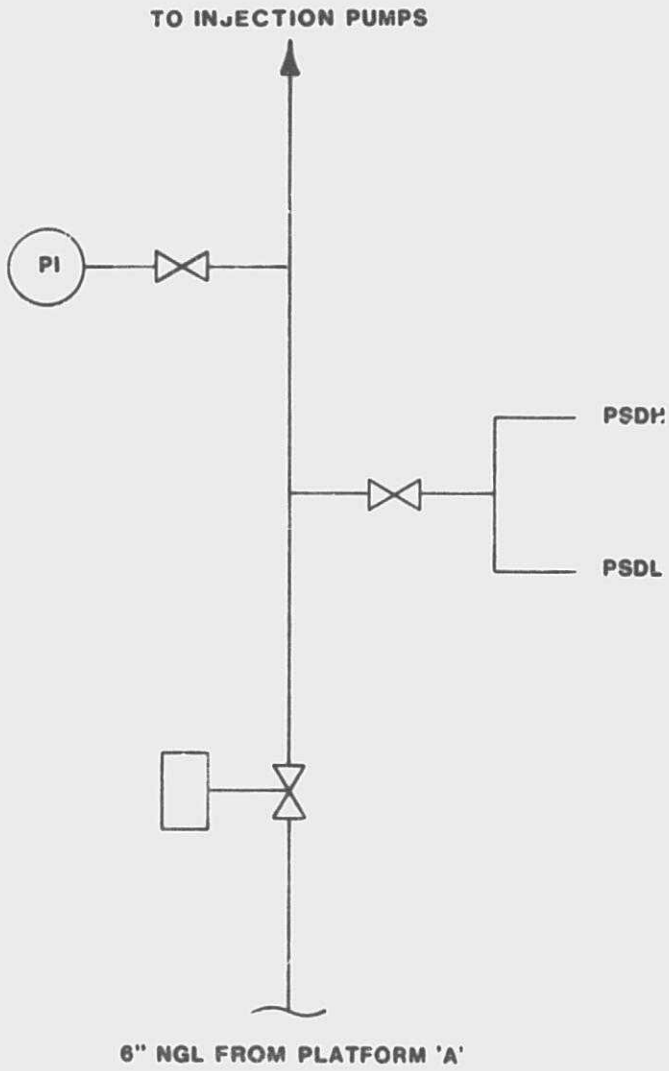

FIGURE 4
SOUTH PASS BLOCK 60
PLATFORM "F"

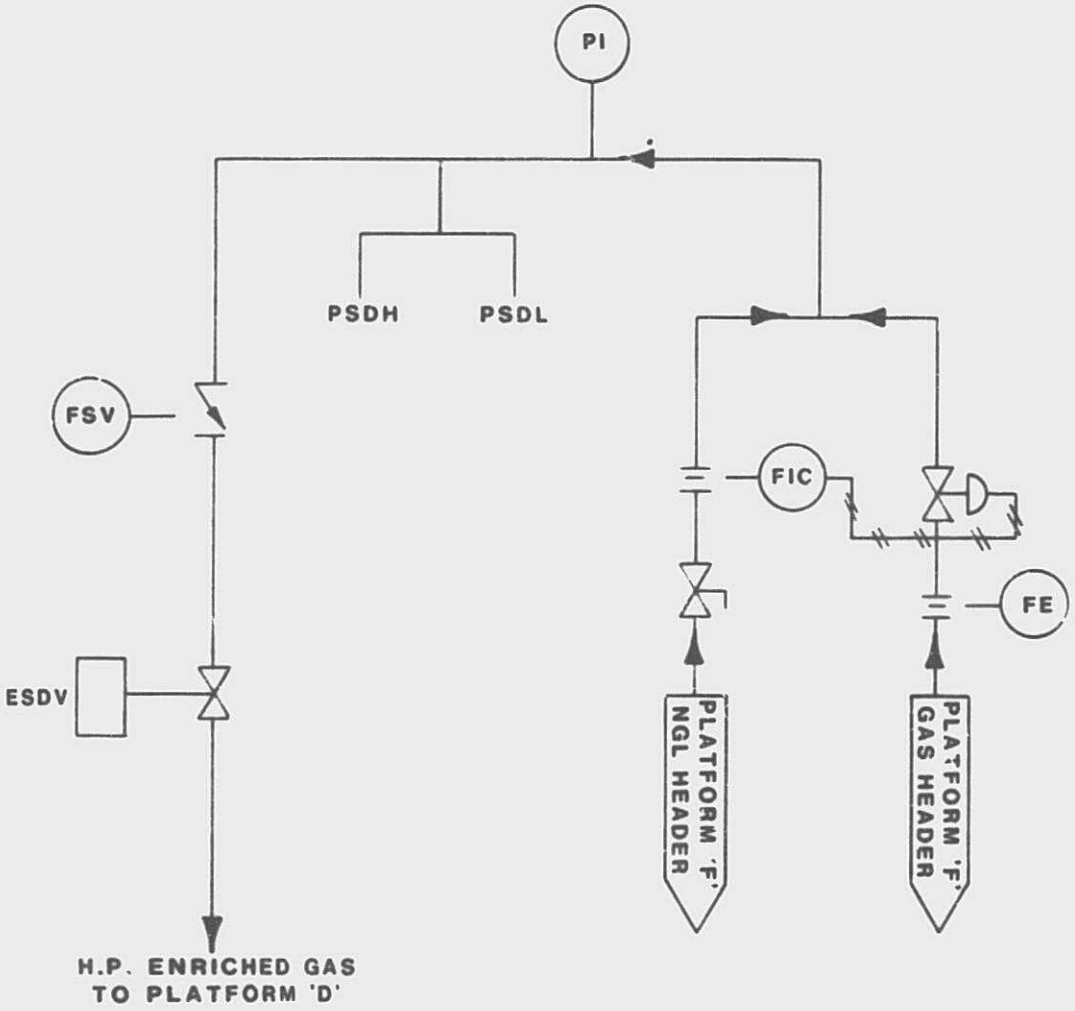

FIGURE
SOUTH PASS BLOCK 60

PLATFORM "D"

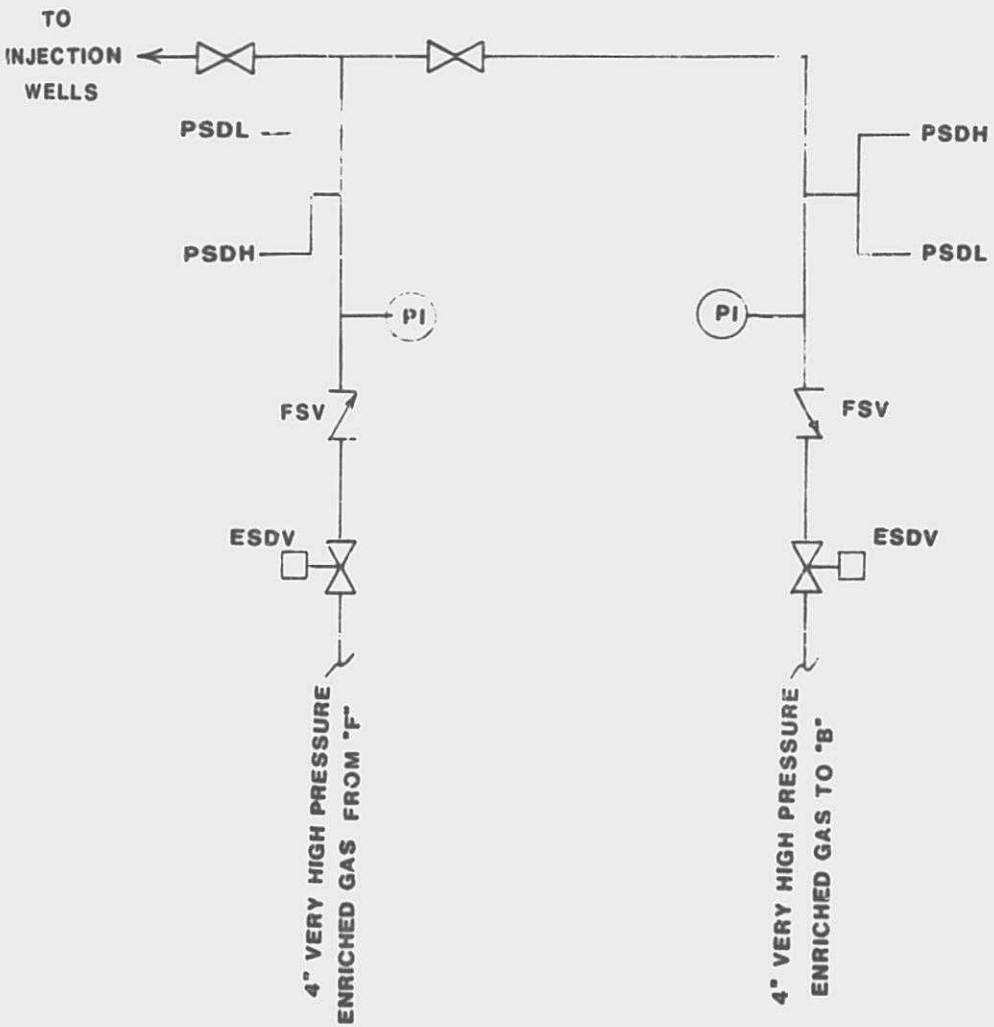

FIGURE 6
SOUTH PASS BLOCK 60
PLATFORM "B"

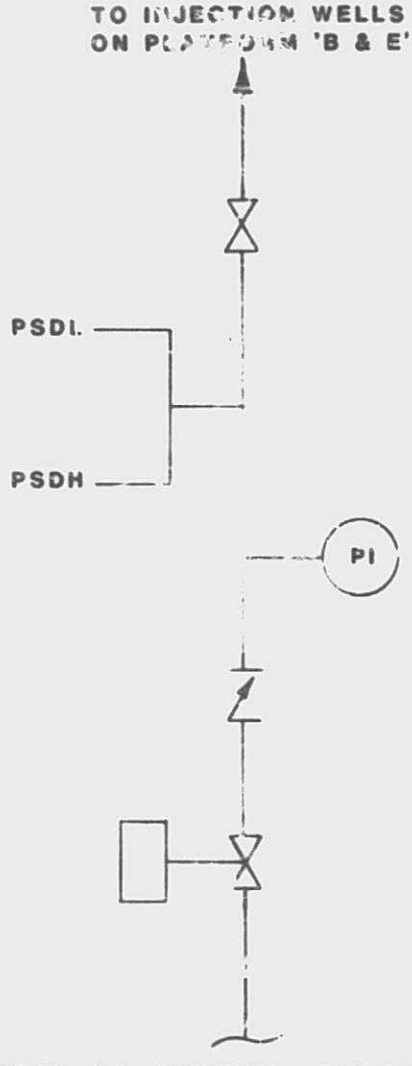

FIGURE
SOUTH PASS BLOCK 60
PLATFORM "F"

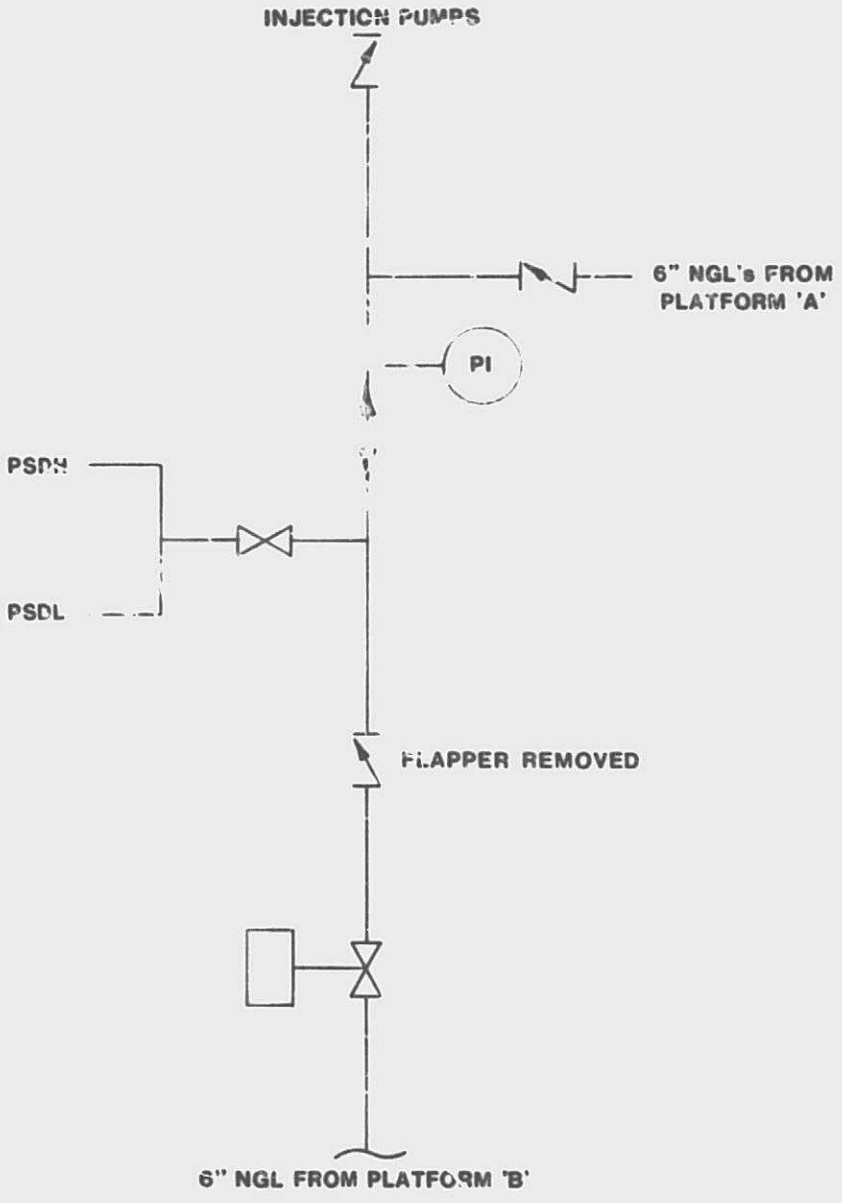

FIGURE 8
SOUTH PASS BLOCK 60
PLATFORM "B"

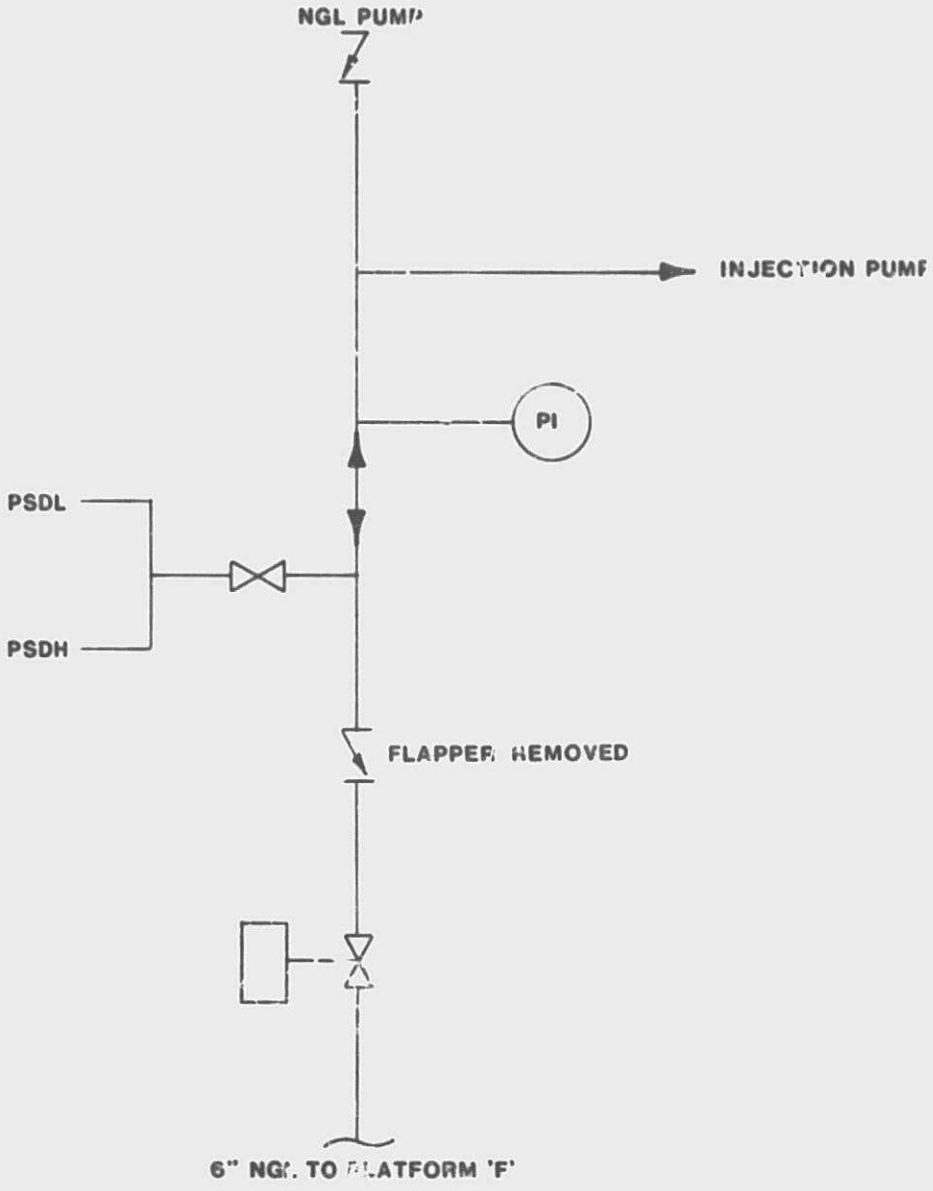

FIGURE 9
SOUTH PASS BLOCK 60
PLATFORM "B"

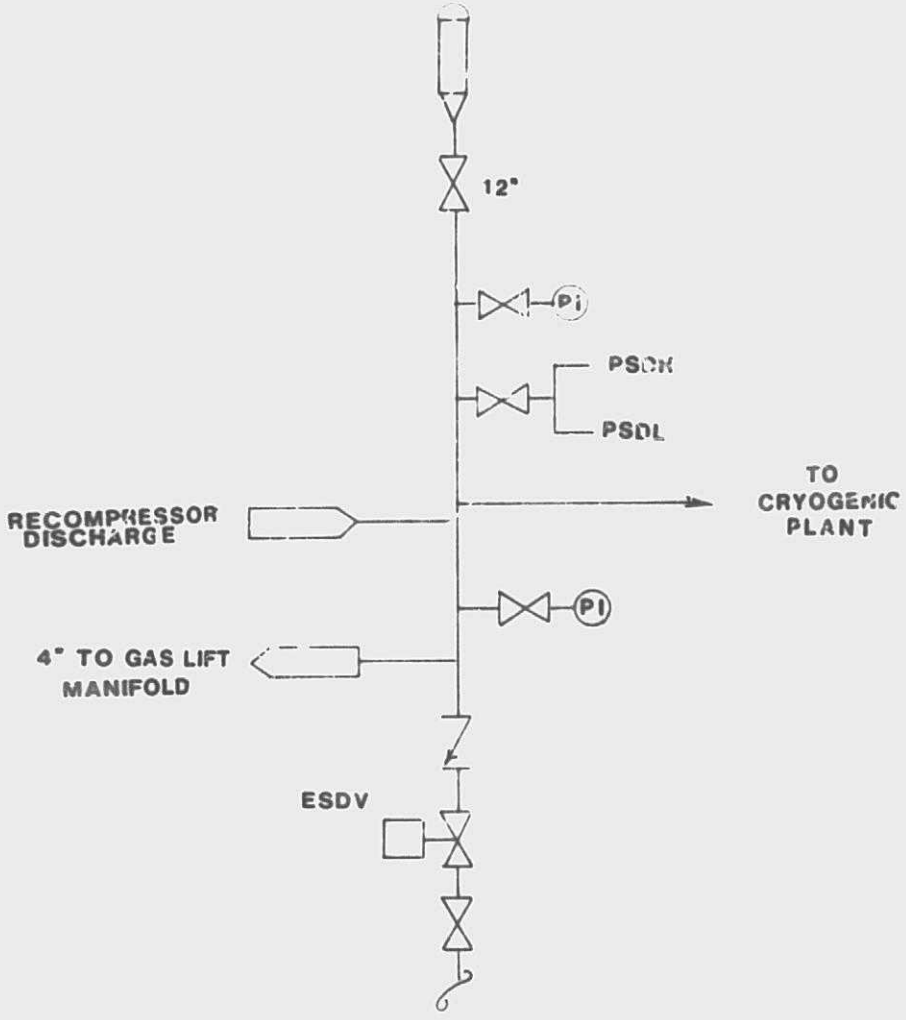

FIGURE 10
SOUTH PASS BLOCK 60
"A"-"D" COMPLEX

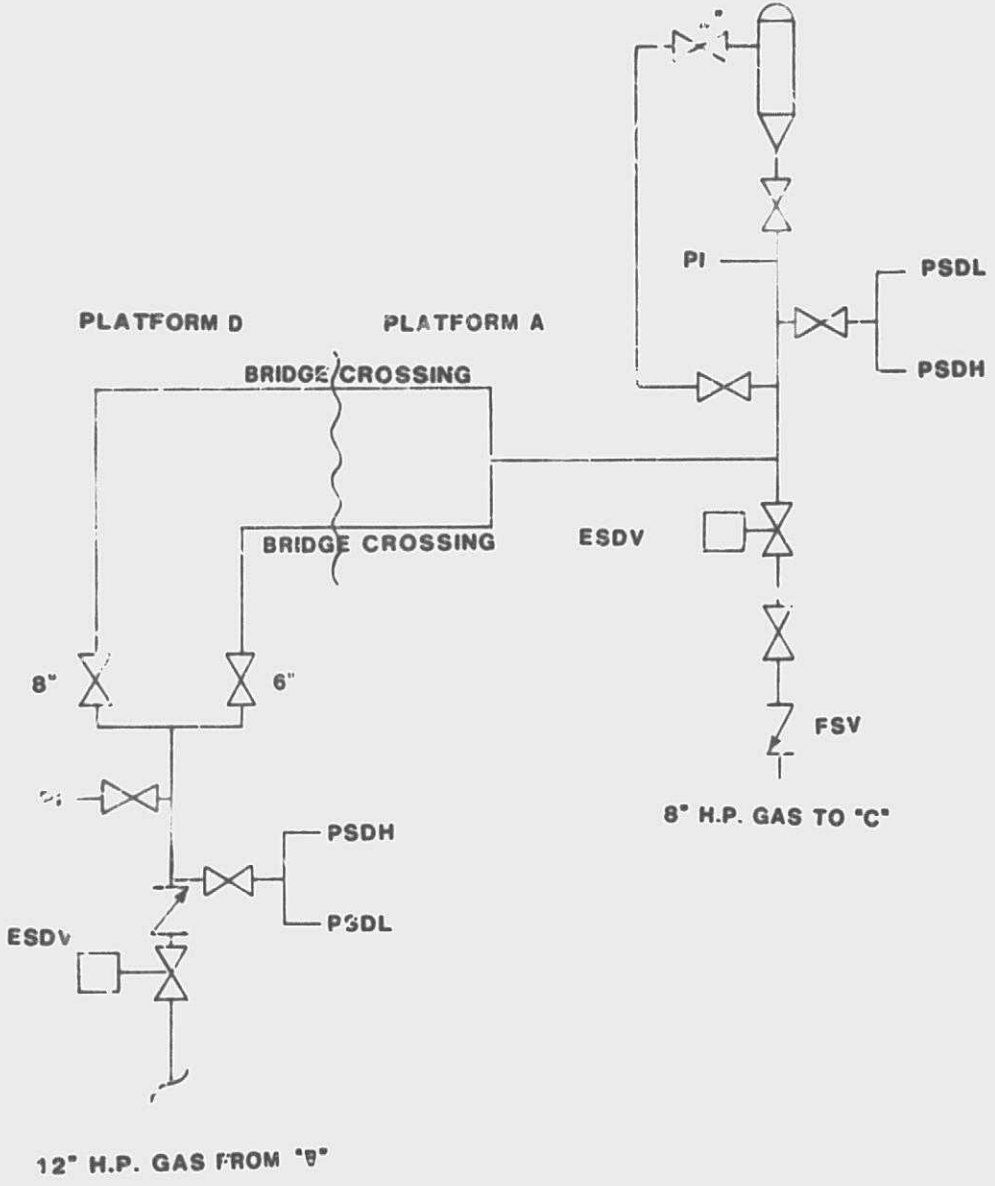

FIGURE 11
SOUTH PASS BLOCK 60
PLATFORM "C"

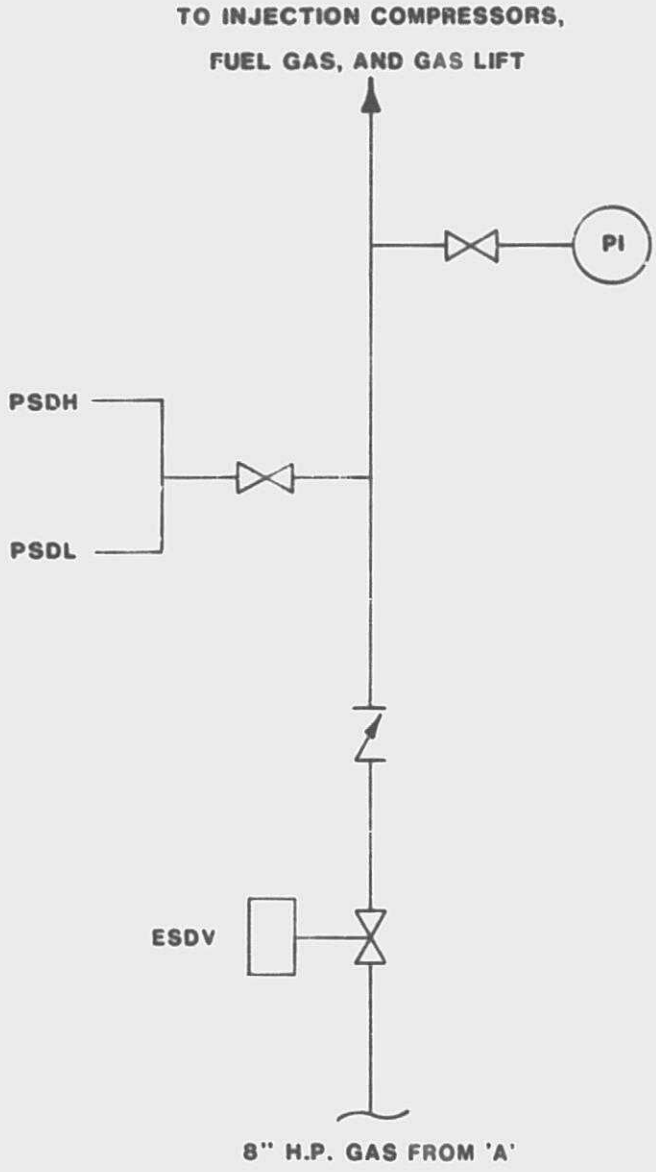

FIGURE 12
SOUTH PASS BLOCK 60
PLATFORM "A"

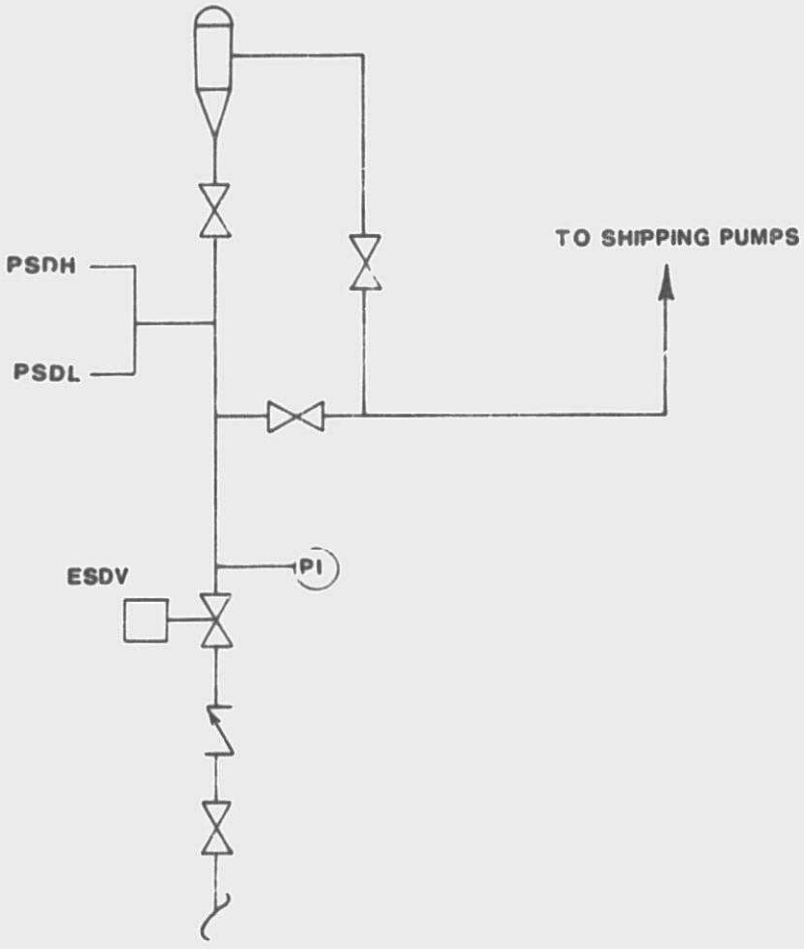

FIGURE 13
SOUTH PASS BLOCK 60
PLATFORM "C"