In Reply Refer To: MS 5231

September 11, 1991

ARCO Oil and Gas Company
Attention: Mr. Donald G. Moore
Post Office Box 51408
Oil Center Station
Lafayette, Louisiana 70505

Gentlemen:

NOTED — KRAMER

Reference is made to the following plan received August 28, 1991:

Type Plan - Supplemental Development Operations Coordination Document
Leases - OCS-G 1608, 2137, 2938, and 2942
Blocks - 60, 60, 17, and 59
Area - South Pass
Activities Proposed - Wells D-38 through D-46 from Platform D

In accordance with 30 CFR 250.34, this plan is hereby deemed submitted and is now being considered for approval.

Your control number is S-2688 and should be referenced in your communication and correspondence concerning this plan.

Sincerely,

(Orig. Sgd.) A. Donald Giroir

for

D. J. Bourgeois
Regional Supervisor
Field Operations

RECEIVED
SEP 12 2 59 PM '91

bcc: Lease OCS-G 1608 POD File (MS 5032)
Lease OCS-G 2137 POD File (MS 5032)
Lease OCS-G 2938 POD File (MS 5032)
Lease OCS-G 2942 POD File (MS 5032)
MS 5034 w/public info. copy of the plan
and accomp. info.

AGobert:cic:09/09/91:DOCDCOM

ARCO Oil and Gas Company

August 23, 1991

Minerals Management Service
Gulf of Mexico OCS Region
1201 Elmwood Park Blvd.
New Orleans, LA 70123-2394

Attention: Deputy Minerals Manager
Office of Field Operations

Re: Supplemental Development Operations Coordination Document **PUBLIC INFORMATION COPY**
OCS-G 1608 South Pass Block 60
OCS-G 2137 South Pass Block 60
OCS-G 2938 South Pass Block 17
OCS-G 2942 South Pass Block 59

The Development Operations Coordination Document (DOCD) for leases OCS-G 1608, 2137, 2938, and 2942, South Pass Block 61 Field, requires a supplement to increase the number of MMS approved wells to be drilled from "D" platform located on OCS-G 1608.

The last supplement, dated May 24, 1983 and referenced as OS-2-2, approved drilling activity for wells D-29 through D-37. Nine additional wells (D-38 through D-46) are proposed for leases OCS-G 1608, 2137, 2938, and 2942 from the South Pass 60 "D" platform.

Eight copies, five proprietary, of this supplemental DOCD are hereby submitted in compliance with applicable provisions of 30 CRF 250.34. A DOCD checklist is included for reference. Please sign and return one copy of the enclosed "Shipment of Confidential Information Form" to us for our records. The remaining three copies are marked as "Public Information". One additional proprietary copy of this supplemental DOCD has been sent to Mr. John Johnston at the Louisiana Geological Survey for his review.

If you have any questions or need additional information, please contact me at (318) 264-4243 or Donald G. Moore at (318) 264-4476.

Sincerely,

ARCO Oil and Gas Company

Mark M. Ireland

Mark M. Ireland

DEVELOPMENT OPERATIONS COORDINATION DOCUMENT (DOCD)
REQUIREMENTS CHECK LIST

I. Initial

Description

_X_ Description of work to be performed

Schedule

_X_ Commence date

_X_ Time to complete each phase

_X_ Total time to complete proposal

Geological, Geophysical, and Cultural Resource

_N/A_ Site-specific shallow hazard analysis (see NTL No. 83-3 for analysis and survey requirements)

_N/A_ Site-specific cultural resource assessment (if cultural resource report is required see NTL No. 75-3, Revision No. 1)

_X_ Structure map of appropriate sands/depth indicating well locations

_X_ Cross-section map

_X_ Surface location, TVD, and BHL of each well

_X_ Spider map

Locations

_X_ Location map of the lease block(s) relative to the shore line (vicinity map)

_X_ Location of onshore support base facility

_X_ Well and platform surface location map (preferably 1":2000') (no confidential information shown)

Oil Spill Contingency Plan Information

X Contingency plan reference

X Equipment base of operations

X Equipment deployment time

Other

X Water depth

X Description of drilling rig, if applicable, with list of pollution prevention equipment

X Air emission calculations (see letter of May 5, 1980)

N/A Environmental Report (ER) if applicable

N/A CZM Consistency Certification if applicable

N/A Address all operational Lease Stipulations

X Estimated life of reserves

X Description of proposed platform(s) and/or well protector(s) including schematic(s)

II. Supplemental (revisions requiring additional permits)

Same requirements as Initial DOCD

III. Revised (revisions not requiring additional permits)

Check list for Initial DOCD is to be applied only to those items in the Revised DOCD which represents a change to the plan

ATTACHMENTS

Exhibit	
A	Location Table - BHL omitted from Publich Information Copy
B	Spider Map - Omitted from Public Information Copy
C	Vicinity Map
D	60 "D" Platform Location
E	Venice Base
F	Geological Structure Maps and Cross-Section - Omitted from Public Information Copy
G	Drilling Rig Data and BOP System

Description

Nine additional wells (D-38 through D-46) are proposed for Leases OCS-G 1608, 2137, 2938 and 2942 from platform "D", South Pass 60. Each well will be put on production as it is drilled and completed. No new facilities, pipelines, or platforms will be required. Bottom hole locations, target reservoirs, and true vertical depths for these wells are shown in Exhibit A. The bottom hole locations are only an estimate which may be revised in the future based on further evaluation of downhole data and/or subsequent drilling. The approximate bottom hole locations for these wells are plotted on the attached spider map (Exhibit B).

Schedule

Drilling activity on wells D-38 through D-46 is expected to commence in October 1991 and last 9 months. An estimate of the drilling schedule is enclosed (Exhibit A).

The estimated life of the reserves to be developed by these wells is ±10 years.

Location of Lease Block, Platform and Onshore Facilities

South Pass Block 61 Field is located ±8 miles from the nearest shore off the Louisiana coast. A location map of the field relative to the shoreline is given in Exhibit C. The Block 60 "D" platform location is shown in Exhibit D.

ARCO Oil and Gas Company's existing facilities at Venice, Louisiana is the shore base for South Pass Block 61 Field. The base consists of a docking facility, heliport, warehouse, yard, parking lot, office and living quarters. Communications include private radios, microwave channels and regular telephones. A base coordinator and a dispatcher are on duty at all times to coordinate movement of materials and personnel by boat and helicopter. The location for the Venice support base facility is shown in Exhibit E.

Geological and Geophysical Data

The requirements of NTL No. 83-3 concerning shallow hazards and NTL No. 75-3, Revision No. 1 concerning cultural resources are met. All pertinent geological and cultural resource data were previously submitted and approved for platforms "A", "D" and "G". There are no mudslide deposits at the platform site. South Pass Block 61 Field is not a known archaeological or historical area. Water depth at the location of "D" platform is ±187'.

Five of the eight copies of the Supplemental DOCD include geological structure maps of J, Upper M and Lower M Sands (Exhibits F1-F3). Also included is a typical cross-

section of this area (Exhibit F4). We request that this geologic data be held confidential as we believe it to be exempt from disclosure under the Freedom of Information Act (5 U.S.C. 552) and implementing regulations (43 CFR Part 2). The attachments B and F-1 through F-4 are omitted from the Public Information Copy. For the same reason, bottom hole locations on Exhibit "A" are omitted from the Public Information Copy.

Drilling Program - General Drilling Operations

A. Rig Description

A self-contained, modular platform drilling rig, such as H&P 101, will be used to drill wells D-38 through D-46 (Exhibit G1). During drilling operations, a diverter system, blowout preventers, and well control equipment will be provided and maintained (Exhibit G2 and G3). All wells will have surface controlled surface and subsurface safety valves installed.

B. Sewage Treating and Solids Waste Disposal

The Rig will be equipped with a Sewage Treatment System which will meet or exceed all regulatory requirement for effluent discharge. solid waste materials will be transported to shore disposal.

C. Liquid Disposal

Drilling muds and cuttings from the proposed development wells will be discharged in accordance with ARCO's EPA NPDES discharge permit requirements (i.e., toxicity analysis, volumes, inventory, etc.).

D. Pollution Control Equipment or Drilling Vessel

Drip pans, drains and sumps are designed into the rig and platform for pollution control.

Oil Spill Contingency Plan

All operations proposed by ARCO Oil and Gas Company shall be performed in accordance with industry standards to prevent pollution of the environment. ARCO Oil and Gas Company's Oil Spill Contingency Plan has been approved by MMS.

As per 30 CFR 250.42, ARCO references this plan and includes the additional information as required by MMS's letter to Lessees (LTL) dated October 12, 1988 and September 5, 1989.

ARCO's Oil Spill Contingency Plan designates an "Oil Spill Response Team"

consisting of ARCO and contract personnel. This team's duties are to eliminate the source of any spill, remove all sources of possible ignition, deploy the most reliable means of available transportation to monitor the movement of a slick, and contain and remove the slick if possible.

ARCO Oil and Gas Company is a member of Clean Gulf Associates (CGA). The CGA has four permanent bases in Louisiana at Venice, Grand Isle, Intracoastal City and Cameron; with each based equipped with a fast response skimmer. There is a barge mounted high volume open sea skimmer based at Grand Isle, Louisiana. In addition to providing equipment, the CGA also supplies advisors for clean-up operations. Equipment available from CGA and the base location is listed in the CGA Operation Manual Volume I, Section III.

Estimated response time for a spill at South Pass Block 60 "D" platform could vary from 8-12 hours. Based on:

1) Procure a boat and deploy to nearest CGA Base in Venice, Louisiana.	3.0 hrs.
2) Load out fast Response Unit and oil spill containment equipment.	2.0 hrs.
3) Travel time from base to lease site.	
Inland Waters (22 miles @ 8 MPH)	3.0 hrs.
Offshore (8 miles @ 10 MPH)	1.0 hr.
	9.0 hrs.

Equipment located in Venice, Louisiana would be utilized first with additional equipment transported from the nearest equipment base as required.

In the event a spill occurs ARCO Oil and Gas Company has projected the trajectory of a spill utilizing information in the Draft Environmental Impact Statement (EIS) for OCS Lease Sales 131, 135, and 137.

The EIS contains oil spill trajectory simulations using seasonal surface currents coupled with wind data, adjusted every 3 hours for 30 days or until a target is contacted. Hypothetical spill trajectories were simulated for each of the potential launch sites across the entire Gulf. These simulations presume 500 spills occurring in each of the four seasons of the year. The results in the EIS were presented as probabilities that an oil spill beginning from a particular launch site would contact a certain land segment within 3, 10, or 30 days. Utilizing the summary of the trajectory analysis (for 10 days) as presented on pages IV 87 through IV 90, the probable projected land fall of an oil spill is as follows. Also listed is the CGA map number

corresponding to the land segment which will be utilized to determine environmentally sensitive areas that may be affected by a spill.

Area	Land Segment Contact	%	CGA Map Number
19	Plaquemines Parish, LA	65%	No. 7 and 8

Section IV 62 through 128 of the CGA Operation Manual containing maps as listed above, also includes equipment containment/cleanup protection response modes for the sensitive areas.

Section VI, Volume II, of the CGA Operation Manual depicts the protection response modes that are applicable for oil spill clean-up operations. Each response mode is schematically represented to show optimum deployment and operation of the equipment in areas of environmental concern. Implementation of the suggested procedures assures the most effective use of the equipment and will result in reduced adverse impact of oil spills on the environment. Supervisory personnel have the option to modify the deployment and operation of equipment to more effectively respond to site-specific circumstances.

Air Emissions Data

A. Summary of Operations

ARCO Oil and Gas Company's leases in the South Pass Block 61 Field encompass (in part or in whole) Blocks 6, 17, 59, 61, 66, and 67. We currently operate seven (7) platforms in Block 60 and one (1) platform in Block 67.

The development drilling on Platform "D" will be located in Block 60 adjacent to existing "A" and "G" platforms, approximately 13 miles ENE of Port Eads, which will be used as the distance in the exemption formulas. This is 13 miles S 21° 09' 32: E from USC and GS Mon. "Calif. 'D'".

Development drilling and well maintenance work on Block 60 "D" platform will be conducted by the H&P 101 natural gas fueled drilling rig.

H&P 101 is a self-contained platform rig having equipment which consists of:

1 Four V-16 Caterpillar G-399 engines
Natural gas fueled, 870 BHP each. Average of two are used 75% in drilling mode at 75% load, 25% non-drilling mode at 25% load. Assume 80% engine efficiency.

2. Crane - Unit Mariner 650-H
   GM 8V-92N diesel engine, 355 BHP. Used 30% of the time and operates at 50% load.

3. Cementing Unit

   a. Two GM 8V-71N diesel engine driven pumps, 333 rated BHP, average of 5% actual use of continuous rating.

   b. One GM 3-71N diesel cement mixer, 90 rated BHP, 67 continuous BHP, average of 5% actual use at continuous rating.

4. Wireline U

   Cummins 3.9-C-155 diesel engine, 90 BHP GIH - 5% of the time, 85 BHP POOH - 50% of the time, average 4 days/well (each 2 months). Total of 24 days/year.

5. Emergency Rig Generator

   Caterpillar D-379 V-8 Diesel, 715 continuous BHP at 1300 RPM's used for emergency backup. Not figured into total emissions.

Block 60 "D" platform deck would have the following platform engines:

1. Two Solar Saturn 1000 BHP turbines to drive the generators (100% usage).

2. One 12V-71 Detroit Diesel - fire pump rated at 504 BHP, 335 continuous BHP. Used only in an emergency and is not figured in total emissions.

3. One Detroit Diesel 6-71 pump down pump rated at 200 BHP, with 142 continuous BHP and an average of 5% actual use.

4. One solar saturn 3850 continuous BHP turbine compressor with 100% usage.

5. Detroit Diesel 6-71N crane rated at 200 BHP and 142 continuous BHP. Average actual use of 40%.

Calculation of Emission Exemptions - Part 250.57.101

<u>Exemption Formula:</u>

1. 33.3 x D for NOx, SO2, TSP, THC each

2. 3400 x $D^{(2/3)}$ for CO

Where D = distance from shore defined as landward of the mean high water mark.

Maximum Allowables:

1. 33.3 x 13 = 435.5 tons/year each of Nox, SO2, TSP, THC

2. 3400 x $13^{(2/3)}$ = 18,797.8 tons/year for CO

B. EPA AP-42/manufacturers data Emission Factors:

Pollutant	Natural Gas Fueled Internal Combustion Engine (#/HP-HR)	Diesel Fueled Internal Combustion Engine (#/HP-HR)	Manufacturers Data for "Clean Burn" Engines
Nox	0.024	0.030837	0.0029
CO	0.0031	0.006674	0.0011
SO2	0.000004	0.0020507	0.000004
TSP	--	0.0022026	--
THC*	0.0097	0.002467	0.00020

* Note: Total hydrocarbons (THC) as methane and non-methane.

C. Calculations of Expected Air Emissions for South Pass Block 61 Field.

Calculations have been performed assuming one year continuous operation of drilling rigs and platform engines on Block 60 "D" platform. The expected incremental air emissions for the Supplemental Development in the South Pass Block 61 Field are equal to:

Total Expected Air Emissions (tons/year) for Nox, CO2, SO2, TSP, THC =

1. South Pass Block 60 Drilling air emissions plus
2. South Pass Block 60 Platform "D" air emissions

(a) South Pass Block 60 "D" Expected Air Emissions from drilling equipment (3) (4) (5)

Engine	Average Power (HP/HR)	Emission Totals tons/year				
		NOx	CO	SO2 (1)	TSP	THC
Prime Movers (2)	1088	114.4	14.8	---	---	46.2
Rig Emergency Generator	(715)	(96.61)	(20.91)	(6.41)	(6.91)	(7.71)
Cement Unit	16.5	2.22	.48	.15	.16	.18
Cement Mixer	3	.32	.10	.03	.03	.04
Crane (3)	53.3	7.20	1.56	.48	.51	.57
Wireline Unit (5)	42.5	.38	.08	.03	.03	.03
TOTALS		124.52	17.02	0.69	0.73	47.02

(b) South Pass Block 60 Expected Air Emissions from production equipment Platform "D" (4) (6)

Engine	Average Power (HP/HR)	Emission Totals tons/year				
		NOx	CO	SO2 (1)	TSP	THC
Platform Generator (7)	1000	12.70	4.82	--	--	.88
Pump Down Pump	7	.95	.21	.06	.07	.08
Platform Generator (7)	1000	12.70	4.28	--	--	0.88
Compressor (7)	3850	48.9	18.55	--	--	3.37
Crane (3)	57	7.70	1.67	.51	.55	.62
TOTALS		82.95	30.07	.57	.62	5.83

FOOTNOTES:

(1) Analysis of natural gas indicates no sulfur content.

(2) Natural gas fueled engines - use natural gas emission factors in calculations.

(3) Diesel fueled.

(4) The general equation used to calculate the tabulated air emission values is provided as well as an example of the use of the equation.

(5) Assumes total of 24 days/year.

(6) Assumes 365 days/year operations.

(7) Use turbine engine emission factor.

TOTAL EXPECTED AND ALLOWABLE AIR EMISSIONS:

Air Pollutants	(a) + (b) = Expected Air Emissions (tons/year)	Allowable (tons/year)
NOX	207.47	435.5
CO	47.09	18,797.8
SO2	1.26	435.5
THC	52.85	435.5
TSP	1.35	435.5

Note that all expected air emissions are below allowable air emissions.

The general equation used for calculation of the tabulated expected air emissions for a particular piece of equipment is given by:

Expected Air Emissions (tons/year)

= [continuous BHP of equipment] x [% actual use]
x [appropriate air emission factor, lbs/HP-HR]
x [8760 Hours/Year] x [1/2000 lbs/ton]

The above equation reduces to:

(2) Expected Air Emissions (tons/year)

= [Average Power of Equipment] x [Appropriate Air Emission Factor]
x [4.38]

An example of the use of the above equation is given below:

The expected yearly air emissions of NOx in tons/year for the platform generator on proposed "D" platform is:

Expected NOx air Emissions = [1000 (HP/HR)] x [0.0029 (lbs NOx/HP-HR] x 4.38

From Generator on "D" Platform - 12.70 tons/year of NOx air emissions.

H2S Classification

Produced crude oil and associated gas is anticipated to have no H2S. This statement is made after having referenced fluid and gas analyses from similar producing reservoirs.

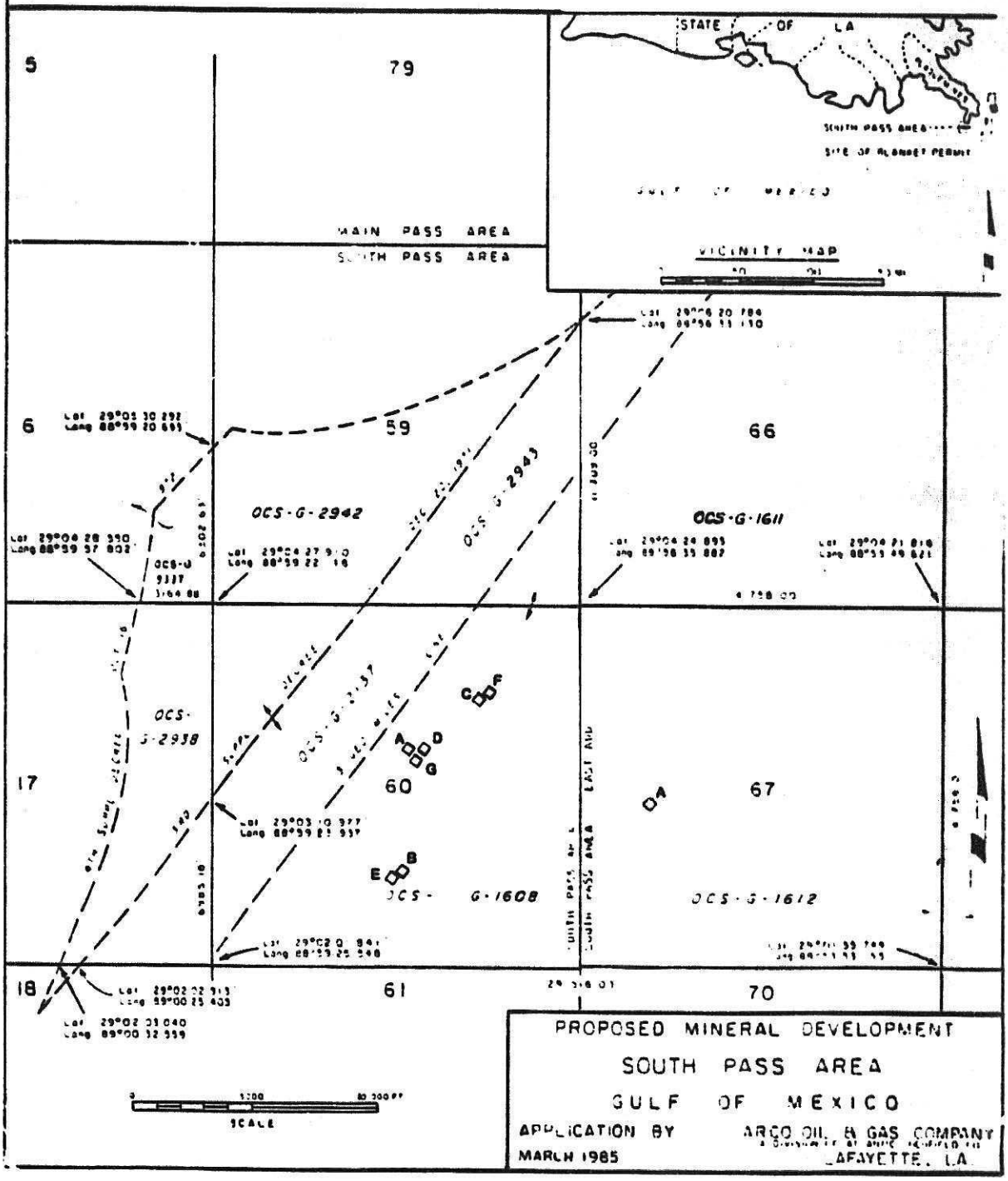
Attachment A through G follow.

Exhibit A

Drilling Schedule
South Pass Block 60 "D"
Supplemental Plan

Well	Lease (OCS-G)	Target Reservoir	BHL	BHL (TVD)	Estimated Spud Date
D-38	2938	UM			10/1/91
D-39	2938	UM			11/1/91
D-40	2137	LM			12/1/91
D-41	2137	UM			1/1/92
D-42	2137	UM			2/1/92
D-43	2942	LM			3/1/92
D-44	2942	LM			4/1/92
D-45	1608	J			5/1/92
D-46	1608	J			6/1/92

Exhibit C



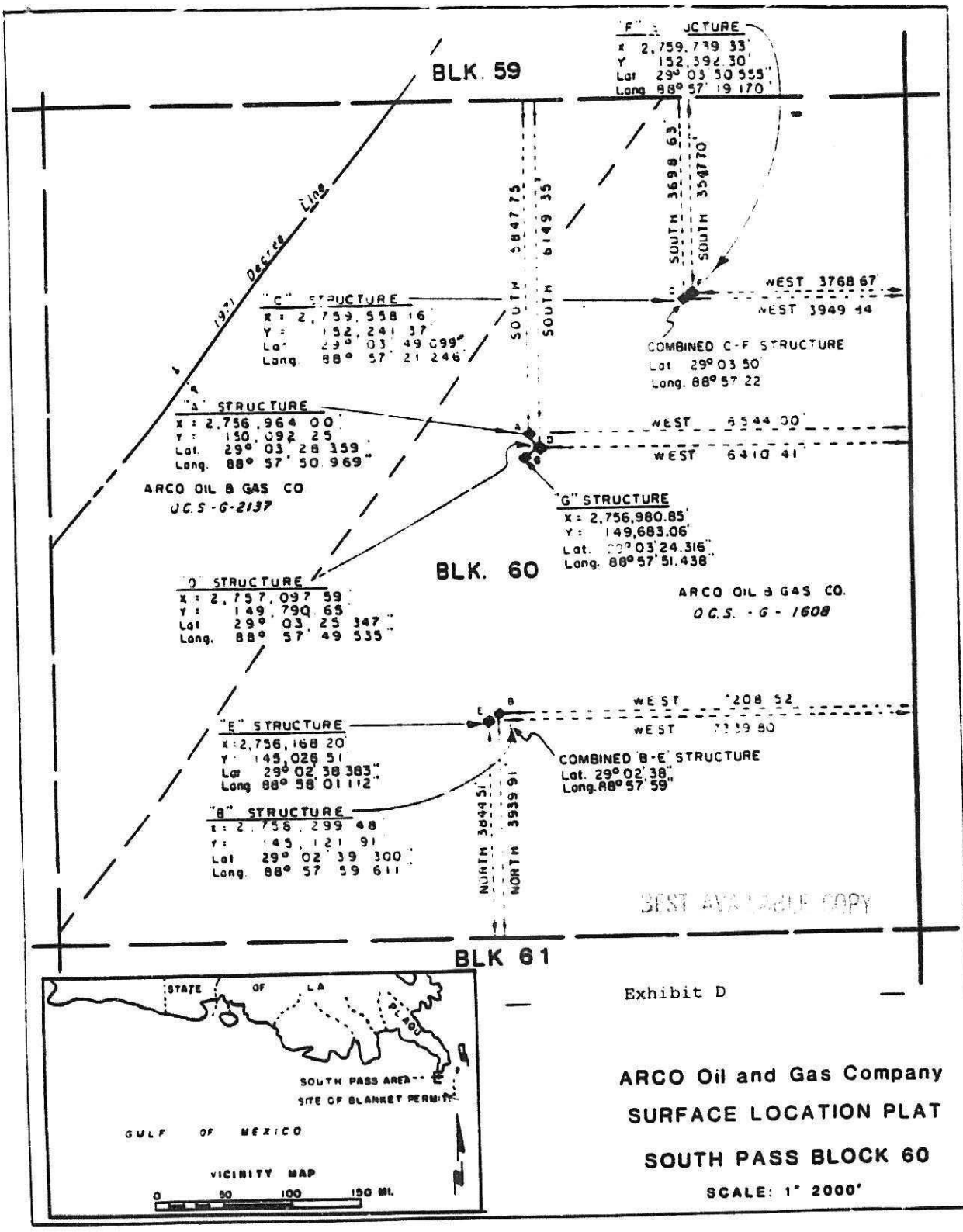


Exhibit D

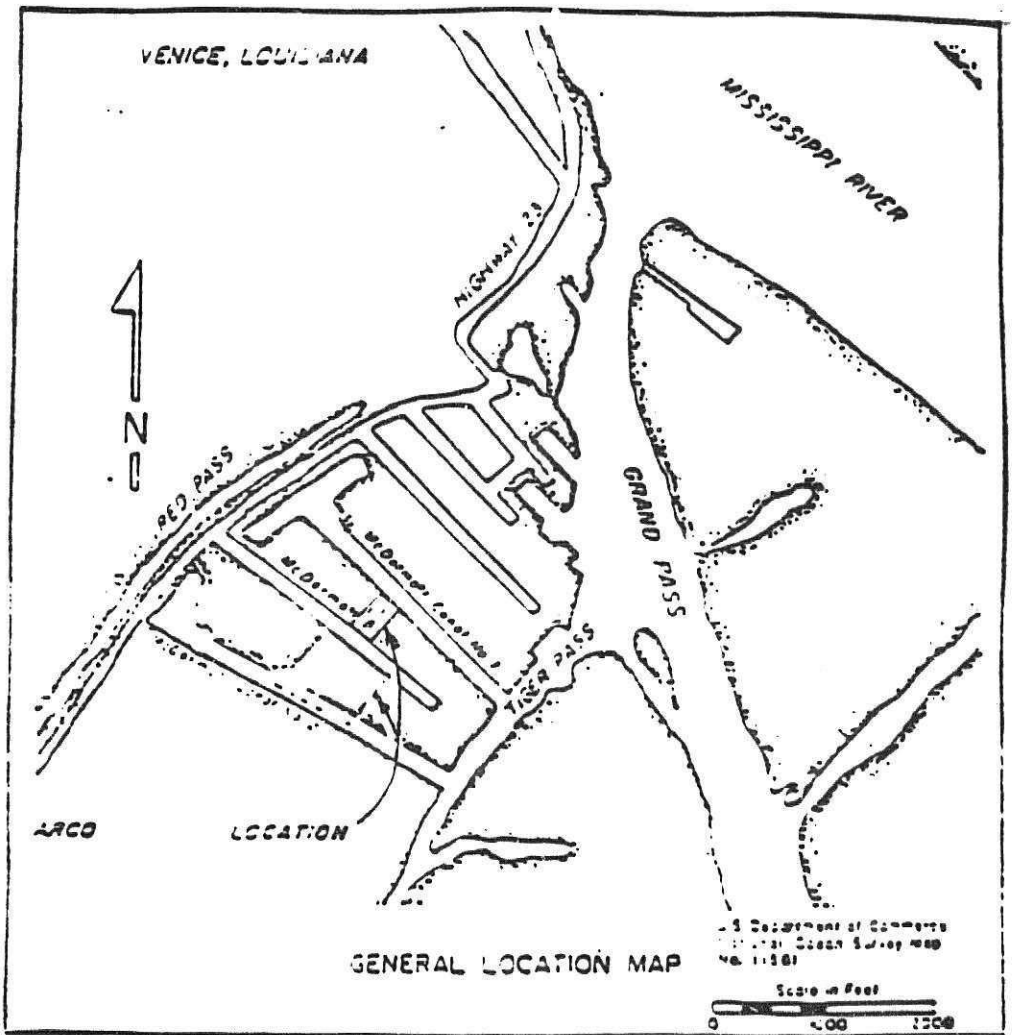
ARCO Oil and Gas Company

SURFACE LOCATION PLAT

SOUTH PASS BLOCK 60

SCALE: 1" 2000'

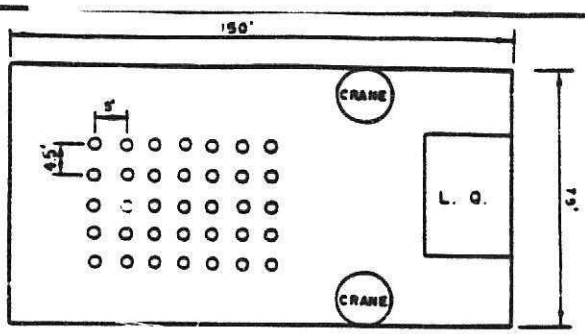
GENERAL LOCATION MAP
FOR VENICE SHORE BASE



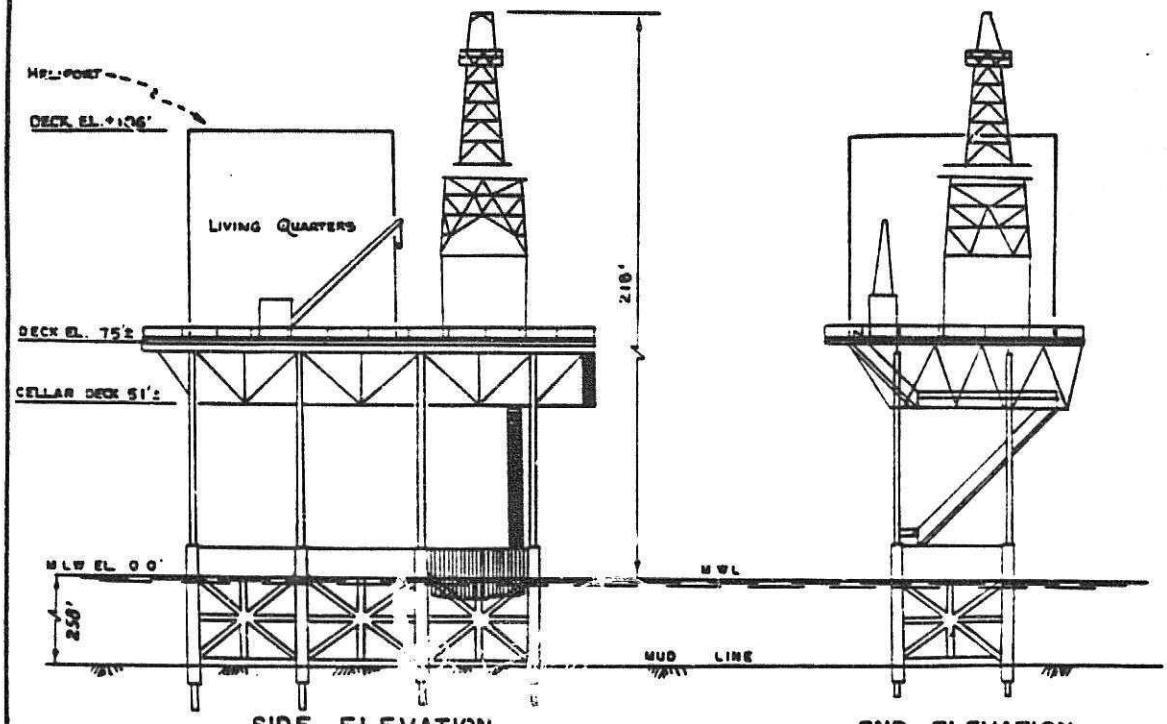
ARCO OIL AND GAS COMPANY	ARCO OIL AND GAS COMPANY
	In McDERMOTT CANAL NO. 2 At PLAQUEMINES PARISH State: LOUISIANA

Exhibit E

Exhibit G1



PLAN



SIDE ELEVATION

END ELEVATION

TYPICAL SELF CONTAINED DRILLING PLATFORM

" " STRUCTURE

0 20 40 60 FT.

SCALE

BLOCK 60'

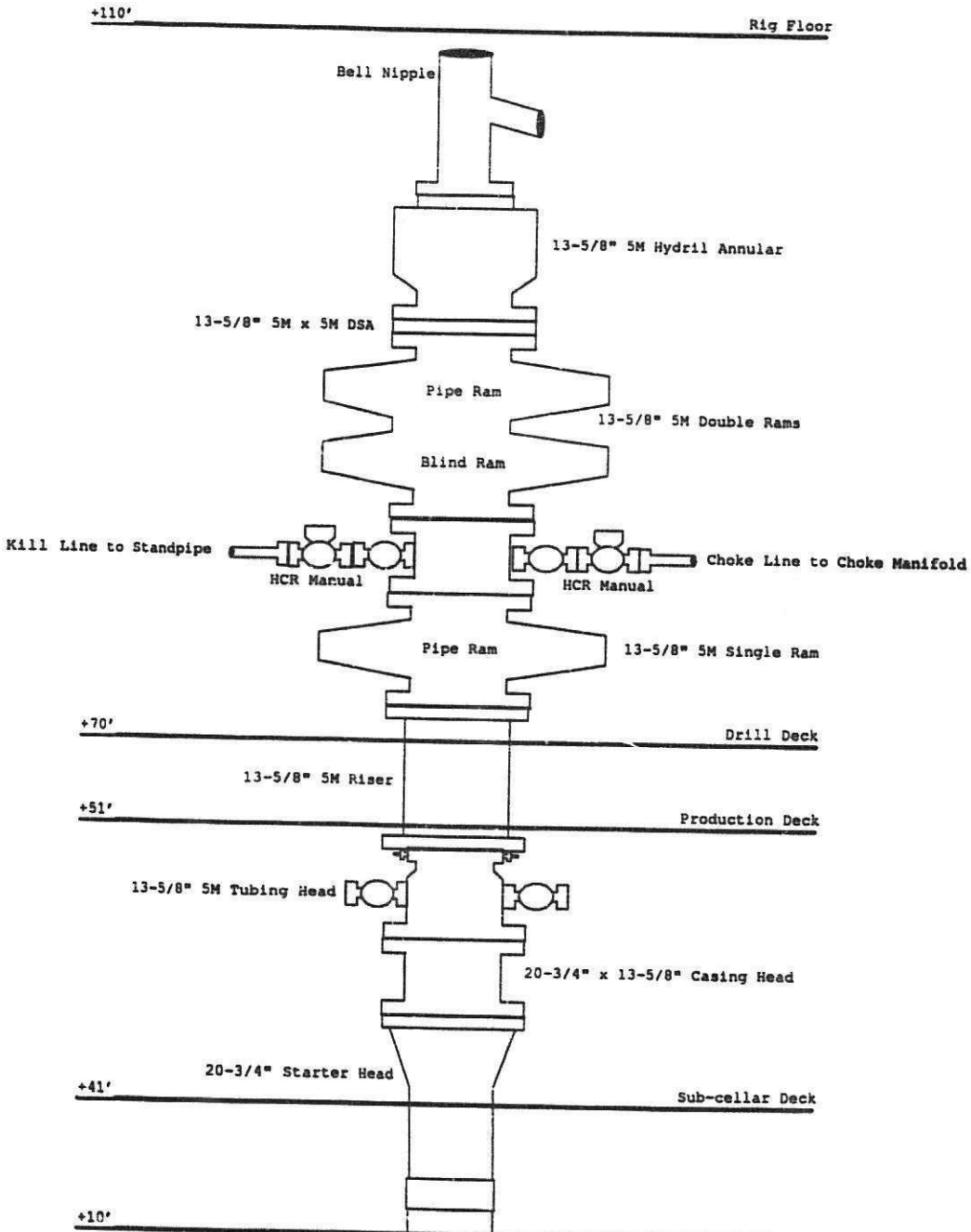
SOUTH PASS AREA

GULF OF MEXICO

ARCO OIL & GAS CO. A DIVISION

South Pass 60 D-Platform 10M BOP Schematic

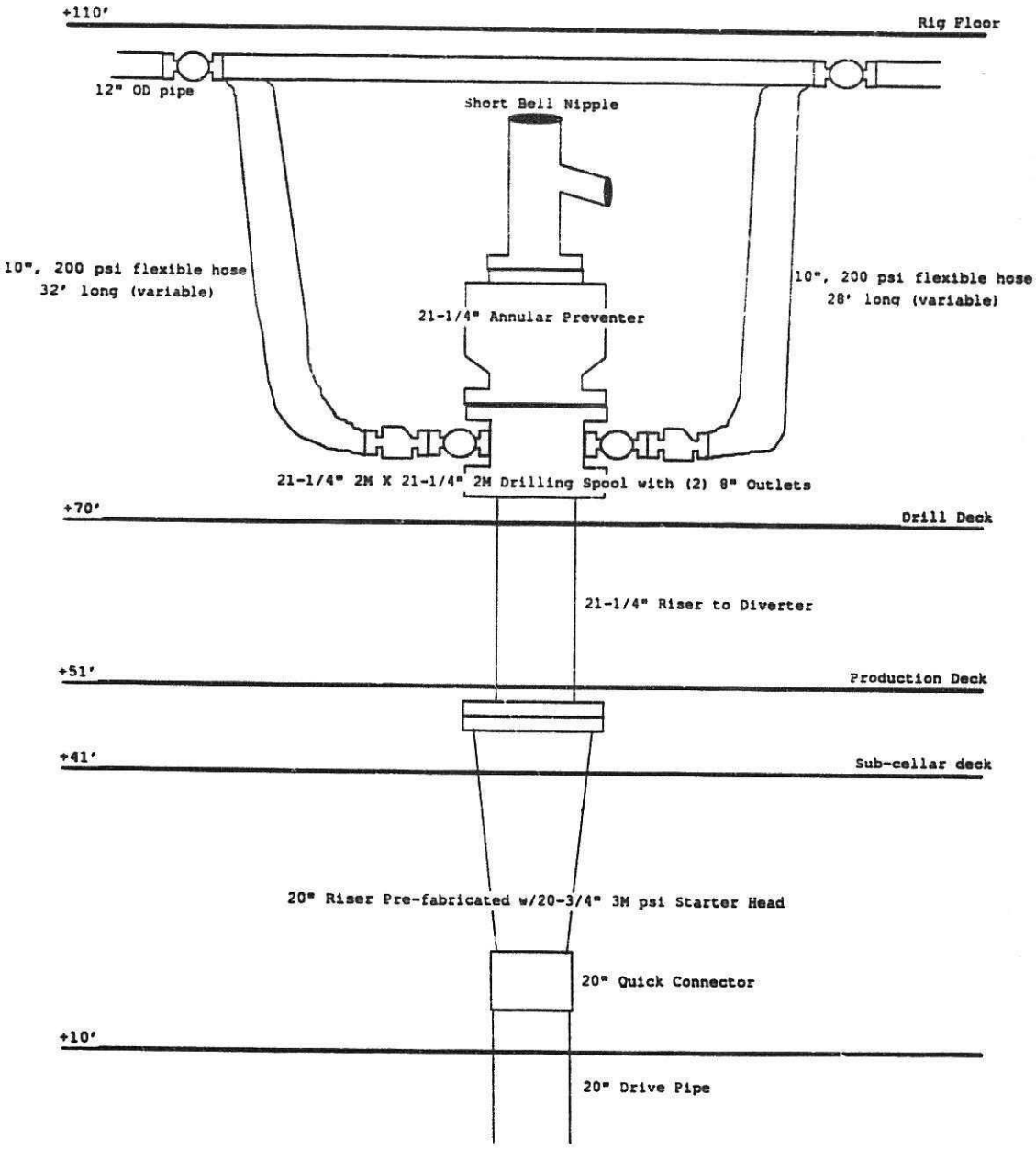
Exhibit G2



South Pass 60 D-Platform Diverter Schematic

Exhibit G3

This diverter system will be installed from spud until the surface casing is landed. All diverter valves will remain open at all times. Lines will be flushed daily. In the event of a kick, driller will close the annular preventer and well fluids will be automatically diverted. Depending on prevailing wind conditions and size of kick, one diverter line may be closed.



Exhibit

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	Primary Applic
WEIGHTING AGENTS · VISCOSIFIERS					
Barite	IMCO BAR™	Baroid	Magcobar	Mil Bar	For increasing mud w to 20 ppg
Barite/hematite Blend	IMCO BAR PLUS	Bar Gain			For increasing mud w 20 to 22 ppg
Hematite	IMCO DENSE				To increase density drilling and kill fluid 25 ppg
Calcium Carbonate	IMCO WATE	Barecarb	Calwate	M-I 35 M-I 50	For increasing density 11 ppg with acid solut material
Bentonite	IMCO GEL	Aquagel	Magcogel	Milgel	Viscosity and filtration in water-base muds
Sub-Bentonite	IMCO KLAY	Baroco	High Yield Blended Clay	Green Sand Clay	For viscosity and filtra control in water base
Attapulgite	IMCO BRINEGEL®	Zeogel	Salt Gel	Salt Water Gel	Viscosifier in saltwater muds
Beneficiated Bentonite	IMCO HYB	Quick-Gel	Kwik-Thik	Super-Col	Quick viscosifier for fr water, upper-hole muds minimum chemical trea
Bacterially Produced Polymer	IMCO XC	XC Polymer	Duovis	XC Polymer	Viscosifier and fluid los control additive for low muds
Sepiolite	IMCO DUROGEL™		Geo-Gel		Viscosifier in all water muds, especially high-temperature drilling flu
Multipurpose Polymer	IMCO POLYSAFE™			Mil Polymer 305	Polymer for fluid loss co and viscosity
DISPERSANTS					
Sodium Tetraphosphate	IMCO PHOS (STP)	Sirolex	Magco-Phos	Oil Fos	Thinner for low pH fresh muds where temperature not exceed 180°F
Sodium Acid Pyrophosphate	IMCO SAPP	SAPP	SAPP	SAPP	For treating cement contamination
Quebracho Compound	IMCO C-B-T®	Tannex	M-C Quebracho	Mil-Quebracho	Thinner for fresh-water a lime muds
Modified Tannin	DESCO	Desco	Desco	Desco	Thinner for fresh-water a salt-water muds alkalize pH control
Processed Lignite	IMCO LIG	Carbonox	Tann-A-Lig	Ligco	Dispersant, emulsifier an supplementary additive fluid loss control
Caustic-ized Lignite	IMCO THIN	CC-16	Causlig	Lignox	Dispersant, emulsifier an supplementary additive fluid loss control
Chrome Lignosulfonate	IMCO [illegible]	Q Broxin	Spersene	Uni-Cal	Dispersant and fluid loss control additive for water muds
Blended Lignosulfonate Compound	IMCO RC				Blended multi-purpose dispersant, fluid loss age and inhibitor for IMCO-RD-111® mud systems
Chrome-Free Lignosulfonate	IMCO RD-2000™		Magco CFL	X-KB Thin	Dispersant and fluid loss control additive for water muds

ATTACHMENT #2

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	Primary Applica
FLUID LOSS REDUCERS					
Organic Polymer	IMCO PERMALOID®	DEXTRID	Magco Poly Sal		Controls fluid loss in water base muds
Pregelatinized Starch	MCO LOID®	Impermex	My-Lo-Gel	Mistarch	Controls fluid loss in saturated saltwater and lime muds
Sodium Carboxymethylcellulose	MCO CMC Regular	Cellex (Regular)	Magco CMC (Regular)	Milchem CMC Med-vis)	For fluid loss control an barite suspension in wa base muds
Sodium Carboxymethylcellulose	IMCO CMC (High Vis)	Cellex (High Vis)	Magco CMC (High Vis)	Milchem CMC (High Vis)	For fluid loss control an viscosity building in low-solids muds
Polyanionic Cellulosic Polymer	ORISPAC	Drispac	Drispac	Drispac	Fluid loss control additiv and viscosifier in salt mu
Polyanionic Cellulosic Polymer	ORISPAC SUPERLO	Drispac Superlo	Drispac Superlo	Drispac Superlo	Primary fluid loss additiv secondary viscosifier in f base muds
Sodium Polyacrylate †	IMCO SP-101®	Cyban WL-100	Cyban WL-100	Cyban WL-100	Fluid loss control in calc free muds.
LUBRICANTS · DETERGENTS · EMULSIFIERS					
Specially prepared blend of organic liquid compounds	IMCO LUBE-105™				A water dispersable, non-foaming, nontoxic additiv designed to impart lubric and reduce torque, drag a friction in all water-base drilling fluids
Blend of Organic Esters	IMCO LUBRIKLEEN®	Torq Trim II	DCS-3	Mil-Plate 2	Supplies the lubricating p perties of oils without environmental pollution
Extreme Pressure Lubricant	IMCO EP LUBE	EP Mudlube	Lube 841 Lube	Lubri-Film	Used in water-base muds t impart extreme pressure lubricity
Oil Soluble Surfactants	IMCO FREEPIPE®	Shot-Free	Pipe Lax	Petrocote	Nonweighted fluid for spotting to free differentia stuck pipe
Blend of Fatty Acids, Sulfonates and Asphaltic Materials	IMCO SPOT™	SF-100		Carbo-Free	Invert emulsion that may b weighted to desired density for placement to free differentially stuck pipe
Water Dispersible Asphalts	IMCO MOLECOAT® II		STABIL-HOLE	ITI-WD	Lubricant and fluid loss reducer for water-base muc that contain no diesel or crude oil
Processed Hydrocarbons	SOLTEX	Soltex	Soltex	Soltex	Used in water-base muds t lower downhole fluid loss a minimize heaving shale
Oil Dispersible Asphalts	IMCO MUD OIL	Baroid Asphalt	Pave-A Hole	Carbo Seal	Lubricant and fluid-loss reducer for water-base muc that contain diesel or crud oil
Detergent	IMCO MD	Con Det	D-D	Milchem MD	Used in water-base muds t aid in dropping sand. Emul sifies oil, reduces torque a minimizes bit-balling
Blend of Anionic Surfactants	IMCO SWS®	Trimulse	Salinex	Atlosol and Atlosol S	Emulsifier for salt-water an fresh-water muds

†Cyban and WL-100 are sold by American Cyanamid and Drilling Services Inc., respectively

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	Primary Appli
DEFOAMERS · FLOCCULANTS · BACTERICIDES					
Aluminum Stearate	Aluminum Stearate	Aluminum Stearate	Aluminum Stearate	Aluminum Stearate	Defoamer for lignosu muds
Liquid Surface Active Agent	IMCO DEFOAM-L™				Defoamer for all wate muds
Surface-Active Dispersible Liquid Defoamer	IMCO FOAMBAN®	Bara-Defoam W300	Magcondi	LD 7 LD 8	All-purpose defoamer
Flocculating Agent	IMCO FLOC™	Baraflos	Flosit	Separan	Used to drop drilled s where clear water is for a drilling fluid
Treated Carbonate Solutions	IMCO CIDE®	Bara-83	Magco Poly Defoamer		Bactericide used to pr fermentation
Paraformaldehyde	Para-formaldehyde	Aldacide	Paraformal-dehyde	Paraformal-dehyde	Bactericide used to pr fermentation
LOST CIRCULATION MATERIALS					
Fibrous Material	IMCO FYBER	Fiberton	Mud Fiber	Mil-Fiber	Filler as well as matrix material to restore lost circulation
Nut Shells: Fine	IMCO PLUG	Wall-Nut	Nut-Plug	Mil-Plug	Most often used to pre lost circulation
Nut Shells: Medium	IMCO PLUG	Wall-Nut	Nut-Plug	Mil-Plug	Used in conjunction w fibers or flakes to rega lost circulation
Nut Shells: Coarse	IMCO PLUG	Wall-Nut	Nut-Plug	Mil-Plug	Used where large crevi or fractures are encoun
Ground Mica: Fine	IMCO MYCA	Micatex	Magco-Mica	Milmica	Used for prevention of circulation
Ground Mica: Coarse	IMCO MYCA	Micatex	Magco-Mica	Milmica	Used for prevention and regaining of lost circula
Cellophane	IMCO FLAKES	Jel Flake	Cell-O-Seal	Milflake	Used to regain lost circ
Combination of granules, flakes and fibrous materials of various sizes in one sack	KWIK SEAL	Kwik Seal	Kwik Seal	Kwik Seal	Used where severe lost circulation is encountere
High-water loss slurry for lost circulation	Diaseal M	Diaseal M	Diaseal M	Diaseal M	Forms a high-solids plug cure severe lost circulati
SPECIALTY PRODUCTS					
Bentonite Extender	IMCO GELEX®	Benex	Benex	Benex	Increases yield of bentor to form low-solids drillin
Inhibiting Agent	IMCO [illegible]	K-Plus			Imparts inhibition fluid and rheology control in potassium muds
Synergistic Polymer Blend	IMCO PCL®	Durenex	Resinex		High-temperature rheolo stabilization and filtratic control
Biodegradable Surfactant	IMCO FOAMA®	Quick Foam	Magco Foamer 76	Gel-Air	Foaming agent in air or drilling

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	Primary Appli
CORROSION INHIBITORS					
Zinc Compound	IMCO SULF-X II			Mil-Gard	For use as a hydrog scavenger in water- oil-base muds
Liquid Corrosion Inhibitor	IMCO CRACK-CHEK®				Prevent stress crack drill strings in an H environment
Catalyzed Ammonium Bisulfite	IMCO XO_2™	Cost 777	OS-1L	Oxygen	For use as an oxyge scavenger
Filming Amine	IMCO X CORR™	Bara Cora	Magco Inhibitor	Aqua-Tec	All-purpose corrosion inhibitor
Filming Amine	IMCO PERMAFILM™	Cost 419	Magco Inhibitor	Ami-Tec	Corrosion inhibitor
Organic Polymer	IMCO SCALECHEK®	Surfio-H38	SL-1000	Scale-Ban	Scale inhibitor
COMMERCIAL CHEMICALS					
Sodium Hydroxide	Caustic Soda	Caustic Soda	Caustic Soda	[illegible]	pH control in wat
Potassium Hydroxide	Caustic Potash	Potassium Hydroxide	Potassium Hydroxide	[illegible]	control pH in ssium system
Sodium Carbonate	Soda Ash	Soda Ash	Soda Ash	Soda Ash	For treating-out calciu low pH muds
Sodium Bicarbonate	Sodium Bicarbonate	Sodium Bicarbonate	Sodium Bicarbonate	Sodium Bicarbonate	For treating-out calciu cement in high pH mu
Barium Carbonate	Barium Carbonate	Anhydrex	Barium Carbonate	Barium Carbonate	For treating-out calciu sulfate (pH should be 10 for best results)
Sodium Chromate	Sodium Chromate	Sodium Chromate	Sodium Chromate	Sodium Chromate	Used in water-base mu prevent high-temperatu gelation
Chrome Alum (chromic chloride)	Chrome Alum	Chrome Alum	Chrome Alum	Chrome Alum	For use in cross-linking Polymer systems
Calcium Sulfate	Gypsum	Gypsum	Gypsum	Gypsum	Source of calcium for formulating gyp muds
Calcium Hydroxide	Lime	Lime	Lime	Lime	Source of calcium for formulating lime muds
Sodium Chloride	Salt	Salt	Salt	Salt	For saturated salt muds resistivity control
Calcium Chloride	Calcium Chloride	Magcobrine C.C.	Calcium Chloride	Calcium Chloride	For weighting solids-fre brines and to control sa in invert oil muds
Potassium Chloride	Potassium Chloride	Potassium Chloride	Magcobrine P.C.	Potassium Chloride	Potassium salt use in K inhibitive systems

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	Primary Applic
OIL-MUD ADDITIVES					
Primary Emulsifier	IMCO KENOL Concentrate	Invermul	VERTILE	Carbo-Fast and Carbo-Tec II	Primary additive to form stable water-in-oil emul
Viscosifier and Gelling Agent	IMCO KEN-Gel®	Gel-Tone II and Petro-Tone	VG-69	Carbo-Gel	Provides viscosity, weig suspension and filtration control in oil muds
Wetting Agent and Dispersant	IMCO KEN CAL-L				Wetting agent and surface for oil muds to reduce or stabilize viscosity
Asphaltic Resin	IMCO VIS™				Used in oil muds to stabi running shale and fluid c under high-temperature conditions
Calcium Oxide	IMCO KENOX™				Calcium source for saponification
Fatty Acid Emulsifier	IMCO KEN SUPREME Concentrate A		Oilfaze		Primary emulsifier and st lizer for oil-base drilling fluids
Emulsion Stabilizer	IMCO KEN SUPREME Concentrate B		OG-55		Imparts gels, contributes viscosity and provides filtration control
Specialty Modified Saponified Fatty Acid Chemicals	IMCO KEN PAK®	SF-100			Gelling agent for formula high-gelation casing pack

COMPARABLE MUD PRODUCTS BY TRADENAMES

Description or Principal Component	IMCO Services	Baroid	Magcobar	Milchem	TBC	Brinadd	Primary Applica
COMPLETION/WORKOVER ADDITIVES							
Blended Synthetic Polymers Fluid-Loss Additives	IMCO SAFE-VIS		Polydrine	WO20	Vistex	Bex	Viscosifier loss agent fresh or sa solutions
Blended Synthetic Polymers	IMCO SAFE [illegible]	Baravis		WO22	Stratex	Kem	Provides h ity and carr capacity
Specially Blended Fluid Loss Control Additive	IMCO SAFE-TROL®		Ceascal		Filotex	Polinesi	Fluid loss re agent for fre saline soluti
Blended, Sized Carbonates	IMCO SAFE-SEAL®		Mixical	WO30F	Circo-Tex	Sluggit	Bridging age control loss to permeable mations
Coarse Sized Carbonates	IMCO SAFE-SEAL C			WO 30C	Circo-Texmax	Sluggitmax	Large sealin seal for sev of returns
Blended Lignosulfonates, Polymers & Sized Carbonates	IMCO SAFE-PERFSEAL®		Ceastop	WO80	Hytex		Single bag c pound for sp across loss z
Thixotropic polymer System	IMCO DRIL-S				Drilex		Complete no damaging dr workover flu system
Blend of polymers, calcium lignosulfonates with specially treated and sized salt	IMCO SAFE-LINK				Bridge-Sal		Provides effe temporary br and sealing c bilities with damage to or formations in IMCO SAFE-L systems with from 10-14 pp
Blend of sized salts, dispersants and anti-caking additives	IMCO SAFE-DENSE				WATE-SEAL		Used to increa density of the SAFE-LINK s salt water sy for drilling, c tion, workove gravel packin perforating
Specially sized and treated salt	IMCO SAFE-BLOCK				Plug-Sal		Used as temp bridging agen IMCO SAFE-L systems with imum of dam producing for
Blend of calcium chloride, calcium bromide and/or zinc bromide	IMCO BROMI-SAFE		Magcobrine				For increasing weights of br to 19.2 ppg