In Reply Refer To: MS 5231

March 23, 1995

Shell Offshore Inc.
Attention: Mr. R. W. Robison, Jr.
Post Office Box 61933
New Orleans, Louisiana 70161

Gentlemen:

Reference is made to the following plan received March 9, 1995:

Type Plan - Supplemental Plan of Exploration
Lease - OCS-G 6884
Block - 780
Area - Viosca Knoll
Activities Proposed - Wells B and C

In accordance with 30 CFR 250.33, this plan is hereby deemed submitted and is now being considered for approval.

Your control number is S-3595 and should be referenced in your communication and correspondence concerning this plan.

Sincerely,

(Orig. Sgd.) J. R. Hennessey

Donald C. Howard
Regional Supervisor
Field Operations

bcc: Lease OCS-G 6884 POD File (MS 5032)
MS 5034 w/public info. copy of the plan
and accomp. info.

DTrocquet:cic:03/21/95:POECOM

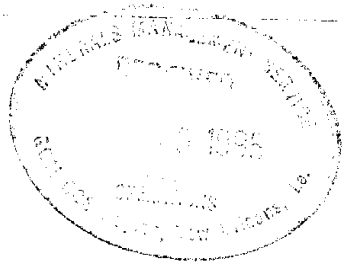
NOTED-SCHEXNAILDRE

Shell Offshore Inc.
An affiliate of Shell Oil Company

One Shell Square
PO Box 61933
New Orleans LA 70161-1933
(504) 588-6161

Exploration and Production
Deepwater Division

March 9, 1995



Regional Supervisor
Office of Field Operations
Minerals Management Service
1201 Elmwood Park Boulevard
New Orleans, LA 70123-2394

PUBLIC INFORMATION

Dear Sir:

SUBJECT: SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884
VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

Shell Offshore Inc. (SOI) herewith submits for your approval a Supplemental Plan of Exploration (POE) for Locations B and C in the captioned lease. Drilling may commence as early as April 20, 1995 if the semi-submersible drilling rig we plan to use, the ARETHUSA CONCORD, is available.

LEASE STIPULATIONS

Viosca Knoll Block 780 is not part of any Biological Sensitive Area or Shipping Fairway. The lease is however, within the Eglin Water Test Area No. 1 (EWTA).

SHALLOW HAZARDS

A Shallow Hazards Report for Viosca Knoll Block 780 was submitted to your office on July 12, 1985, as part of our Initial POE. SOI drilled OCS-G 6884 No. 1 and No. 1 ST (Location A) in 1986.

This Plan is submitted in accordance with 30 CFR 250.30, effective May 31, 1988, and consists of a series of attachments describing details of our intended operations. The attachments we desire to be exempted from disclosure under the Freedom of Information Act are marked "Confidential".

jr506503.arp

Should you require additional information, please contact Al Pickett in our New Orleans office at (504) 588-0198.

Yours very truly,

For: R. W. Robison, Jr.
Contracts Manager

ARP:JRR

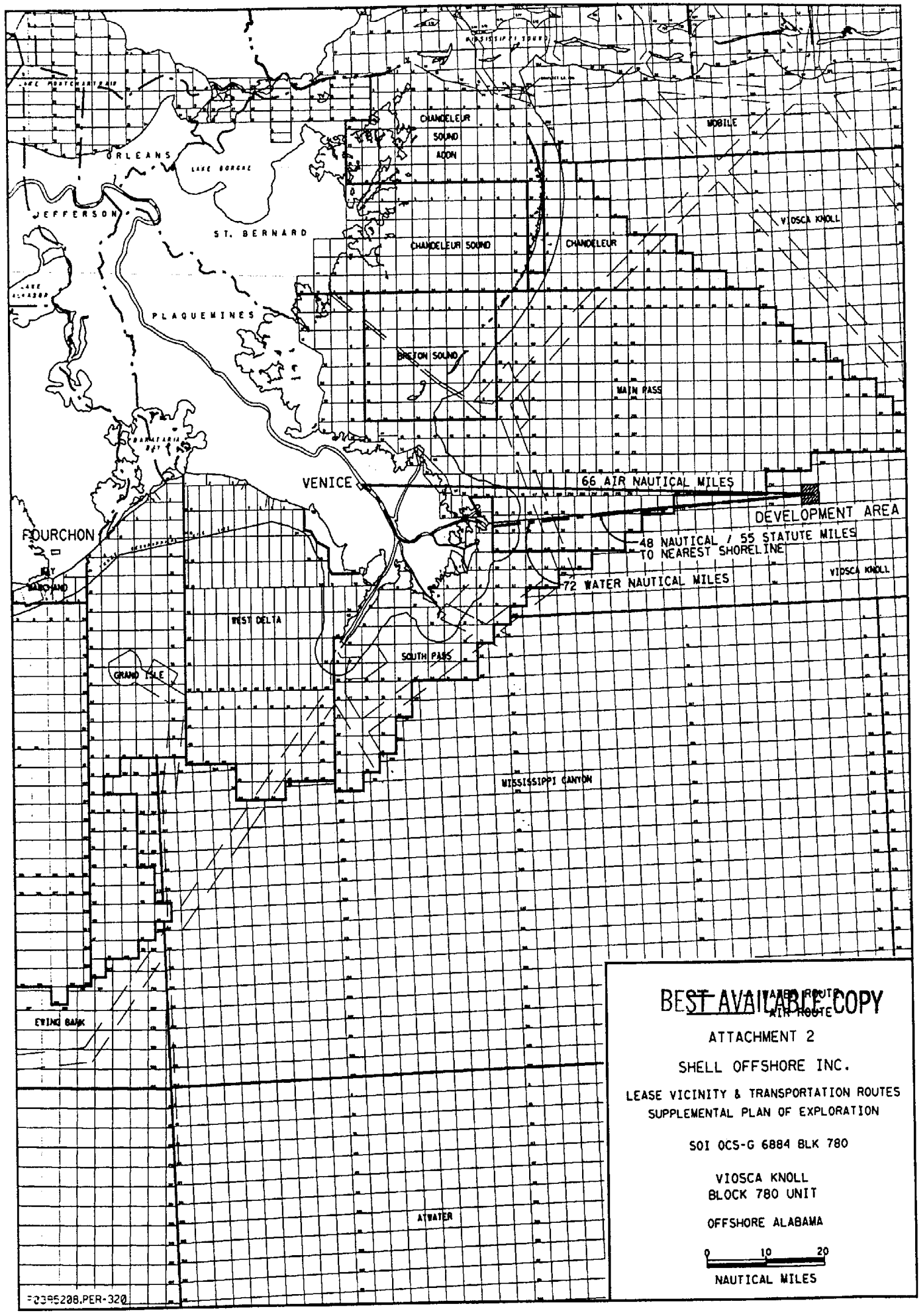
Attachments

cc: (w/attachments)
New Orleans District
Minerals Management Service
1201 Elmwood Park Blvd.
New Orleans, LA 70123-2394

INDEX OF ATTACHMENTS
SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884, VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

ATTACHMENT NO.	DESCRIPTION	NO. OF COPIES
1	Index of Attachments	10
2	Plat, Lease Vicinity, and Transportation Routes	10
3	Description of Activities and Hydrogen Sulfide Determination	5*
4	Plat, Surface Location of Wells	10
5	Plat, Proposed Bottom-Hole Locations and Depths	5*
6-A	Geologic Structure Map - Uvigeriva 3	5*
6-B	Geologic Structure Map - Textularia W	5*
7	Cross Section NW-SE	5*
8	General Information (Schedule of Activities, Safety Features, Hydrogen Sulfide Precautions, Pollution-Prevention Features, Drilling Operations, Well Abandonment, Area Wide Bond Requirement)	10
9	Comments, Oil Spill Contingency Plan	10
10	Comments, Air Emissions Data	10
11-A	List, Drilling Mud Components and Additives	10
11-B	Table, Mud and Cuttings Discharge Volumes	10
12	Description of Onshore Support Facility and Support Vessels' Description and Travel Frequency	10
13	Certificate of Consistency, Alabama	10
14	Site-Specific - Shallow Hazards Data	5*
15	Environmental Report	10

* Confidential



ATTACHMENT 2

SHELL OFFSHORE INC.

LEASE VICINITY & TRANSPORTATION ROUTES
SUPPLEMENTAL PLAN OF EXPLORATION

SOI OCS-G 6884 BLK 780

VIOSCA KNOLL
BLOCK 780 UNIT

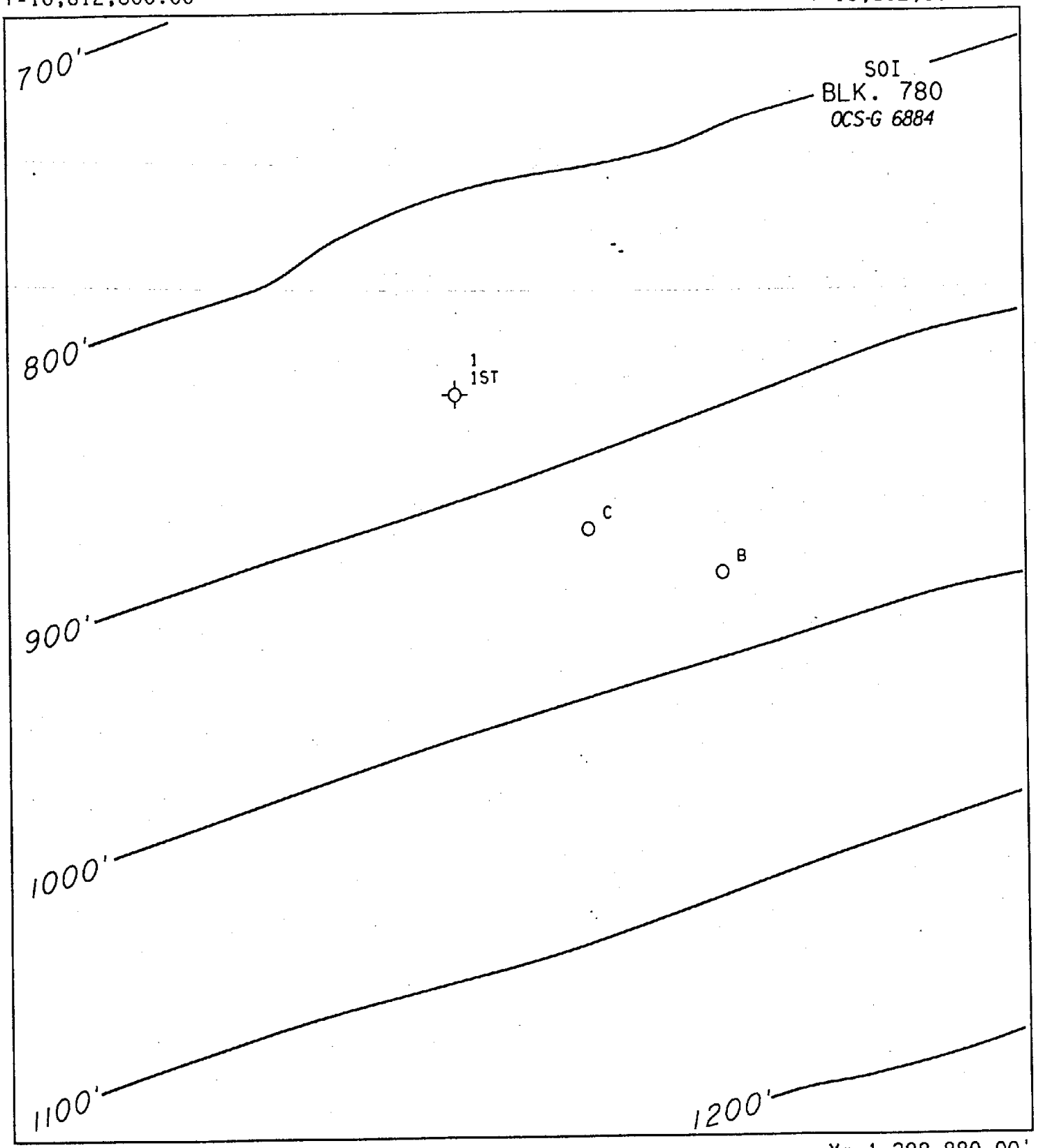
OFFSHORE ALABAMA

0 10 20
NAUTICAL MILES

F2385208.PER-320

X= 1,283,040.00'
Y=10,612,800.00'

X= 1,298,880.00'
Y=10,612,800.00'



X= 1,283,040.00'
Y=10,596,960.00'

X= 1,298,880.00'
Y=10,596,960.00'

BEST AVAILABLE COPY

ATTACHMENT 4

SHELL OFFSHORE INC.

PROPOSED SURFACE LOCATION & BATHYMETRY

SUPPLEMENTAL PLAN OF EXPLORATION

SOI OCS-G 6884 BLK. 780

VIOSCA KNOLL
BLOCK 780 UNIT

OFFSHORE ALABAMA

O PROPOSED SURFACE LOCATIONS

B 4729' FEL & 7905' FNL OF BLK. 780
X=1,294,151.00' Y=10,604,895.00'

C 6811' FEL & 7285' FNL OF BLK. 780
X=1,292,069.00' Y=10,605,515.00'

N

0 2000'

P0395212.PER-320

GENERAL INFORMATION

SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884, VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

SCHEDULE OF ACTIVITIES

Drilling each location is expected to require about 80 days, thus if all wells are drilled, the entire program would require about 160 days.

SAFETY FEATURES

The semisubmersible rig we plan to use will comply with all of the regulations of the American Bureau of Shipping (ABS), International Maritime Organization (IMO) and the United States Coast Guard (USCG).

HYDROGEN SULFIDE PRECAUTIONS

The geological formations that will be encountered in the plan wells are not expected to contain hydrogen sulfide (H_2S). (See Attachment 3.)

POLLUTION-PREVENTION FEATURES

All waste is collected and transported to shore for disposal. Sewage is treated prior to being dumped overboard.

DRILLING OPERATIONS

All drilling operations will be conducted under the provisions of 30 CFR, Part 250, Subpart D, and other applicable regulations and notices, including those regarding the avoidance of potential drilling hazards and safety and pollution prevention control.

WELL ABANDONMENT

The well(s) will be drilled, evaluated, and either temporarily or permanently abandoned in accordance with 30 CFR, Part 250, Subpart G. If further exploration, development, or production activities are to be undertaken thereafter, appropriate plans will be submitted.

AREA WIDE BOND REQUIREMENT

SOI's area wide bond coverage is $3,000,000.

SPILL PREVENTION, CONTROL AND COUNTERMEASURES PLAN

SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884 VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

REFERENCES:

(a) Final EIS for Sales 152 and 155 published December 1994, pages IV-41 through 48;
(b) Final EIS for Sales 142 and 143 published November 1992, pages IV-95 through 157;
(c) MMS LTL dated November 4, 1991 (MS 5231);
(d) Clean Gulf Associates Operations Manual, Volume II, Maps 6 and 7 and the respective Protection Response Mode Tables.

SOI's "Oil Spill Contingency Plan" was approved by the MMS on August 3, 1993. The drilling plans proposed herewith will rely primarily on the spill equipment stored at Clean Gulf Associates base in Venice, Louisiana. Section II of the approved plan lists the preventative measures to be taken to minimize oil spills and the reporting procedures to be followed in the event that one occurs. Section III lists available equipment at this base plus other bases from which additional equipment can be drawn. Section IV provides a listing of the personnel who make up the clean-up organization. The training of these personnel is summarized in Section IX.

OIL SPILL RESPONSE TIME:

Primary FRU Response Activity	Time Required (Hours)
Make calls (e.g., Agencies, CGA, response team, vessel, etc.)	1
FRU Equipped vessel from South Pass Block 62 to spill location at 16-knot speed for 63 nautical miles	3.9
PRIMARY RESPONSE TIME (hours)	4.9

Attachment 9

Back-Up FRU Activity	Time Required (Hours)
Make calls (e.g., Agencies, CGA, response team, vessel, etc.)	1
Muster response team at Venice Terminal	(2) *
Move equipment	(2) *
Move contract boat to Venice Terminal **	1
Load out of equipment (FRU)	2
Channel run to open water (Baptise Collette Pass)	1
Run time to spill location at 15-knot speed for 54 nautical miles	3.6
BACK-UP RESPONSE TIME (hours)	8.6

( ) * denotes not in critical path and not included in Response Time.

** All possible efforts will be made to contract local support vessel at Venice to reduce transit time.

A review of the MMS Spill Trajectory Analysis for the subject lease blocks (launch site C-55) shows a less that 0.5% probability of a major spill striking any land segment within 10 days of a spill.

SOI would utilize the full resources of Clean Gulf Associates, as well as the other resources identified in the SOI "Oil Spill Contingency Plan", to respond should this type of spill occur. This includes seeking approval for Corexit 9527 dispersant application if the resources threatened justify such a request. The dispersant use decision will be guided by the MIRG model.

The strategies and response modes to protect resources in the event of a spill threat are stated in Volume II of the Clean Gulf Associates Operations Manual.

PROJECTED AIR EMISSIONS

SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884 VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

FINDINGS OF AIR QUALITY REVIEW:

As per DOI/Minerals Management Service regulations, this facility is exempt from further air quality review as it has been determined that the operation will not have a significant adverse environmental impact on air quality. Calculated emissions are for a worst case scenario. Actual emissions from this project will probably be lower than projected.

REFERENCES:

a) Final EIS for Sales 152 and 155 published December 1994, pages IV-35 through 36;
b) 30 CFR Parts 250.33 through 250.45;
c) MMS LTL dated May 5, 1994;
d) Atmospheric Emissions from Offshore Oil Development and Production, EPA-450/3-77-026 (June, 1977);
e) Compilation of Air Pollutant Emissions Factors, EPA Report AP-42, 4th Edition (September, 1985).

TITLE INFORMATION:

COMPANY	Shell Offshore Inc.
AREA	Western GOM
BLOCK	Viosca Knoll Block 780
LEASE	OCS-G 6884
PLATFORM	MODU Arethusa Concord

DISTANCE TO LAND IN STAT. MILES:	55
1995 DRILLING DAYS	160

COMPANY CONTACT	R. Meyer
TELEPHONE NO.	(504) 588-6391
REMARKS	

The proposed exploratory drilling activity is planned to consist of two 80 day wells.

Attachment 10

AIR EMISSION CALCULATION SPREADSHEET - 1995:

OPERATIONS	EQUIPMENT		MAX. FUE	ACT. FUEL	RUN TIME		POUNDS PER HOUR					TONS PER YEAR				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/H	SCF/HR	SCF/D	HR/D	DAYS	TSP	SOx	NOx	VOC	CO	TSP	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	1900	91.77	2202.48	12	160	1.00	6.24	46.04	1.38	10.04	0.96	5.99	44.19	1.33	9.64
	PRIME MOVER>600hp diesel	1900	91.77	2202.48	12	160	1.00	6.24	46.04	1.38	10.04	0.96	5.99	44.19	1.33	9.64
	PRIME MOVER>600hp diesel	1900	91.77	2202.48	12	160	1.00	6.24	46.04	1.38	10.04	0.96	5.99	44.19	1.33	9.64
	AUXILIARY EQUIP<600hp diesel	1297	62.6451	1503.48	1	160	2.86	2.66	40.00	3.20	8.66	0.23	0.21	3.20	0.26	0.69
	VESSELS>600hp diesel	3120	150.696	3616.70	1	160	1.65	10.24	75.59	2.27	16.49	0.13	0.82	6.05	0.18	1.32
	STANDBY VESSEL>600hp diesel	3120	150.696	3616.70	1	160	1.65	10.24	75.59	2.27	16.49	0.13	0.82	6.05	0.18	1.32
	STANDBY VESSEL @ idle	1040	50.232	1205.57	23	160	0.55	3.41	25.20	0.76	5.50	1.01	6.28	46.36	1.39	10.12
1995 YEAR TOTAL							9.72	45.26	354.49	12.63	77.27	4.40	26.09	194.24	5.99	42.37
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											1831.50	1831.50	1831.50	1831.50	49833.56
	55.0															

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EXEMPTION CRITERIA: *(30 CFR 250.45)*

Suspended Particulates (TSP), Sulfur Dioxide (SO2), Nitrogen Oxides (NOX), VOC =
E = 33.3D where D = to nearest shoreline

Carbon Monoxide (CO) =
$E = 3400D^{2/3}$ where D = to nearest shoreline

SUMMARY SHEET- PROJECTED PROJECT EMISSIONS:

Year	Emitted Substance				
	TSP	SOx	NOx	HC	CO
1995	4.40	26.09	194.24	5.99	42.37
1996	0.00	0.00	0.00	0.00	0.00
Allowable	1832	1832	1832	1832	49834

EMISSION FACTOR SHEET:

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF.	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	TSP	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-2	4/93
NG 2-cycle lean	gms/hp-hr		0.00185	11	0.43	1.5	AP42 3.2-2	4/93
NG 4-cycle lean	gms/hp-hr		0.00185	12	0.72	1.6	AP42 3.2-2	4/93
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-2	4/93
Diesel Recip. < 600 hp.	gms/hp-hr	1	0.931	14	1.12	3.03	AP42 3.3-1	4/93
Diesel Recip. > 600 hp.	gms/hp-hr	0.24	1.49	11	0.33	2.4	AP42 3.4-1	4/93
NG Heaters/Boilers/Burners	lbs/mmscf	5	0.6	140	2.8	35	AP42 1.4-1/2/3	4/93
NG Flares	lbs/mmscf		0.57	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.6	2.3	0.01	0.21	AP42 1.3-1	4/93
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.000025		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Attachment 10 (Cont.)

BASIS OF CALCULATIONS:

The emission factors were compiled from the latest AP-42 references or from industry studies if no AP-42 reference was available. The basis for the factors is as follows:

1. NG Turbines — Fuel usage scf/hr = HP X 9.524 (10,000 btu/HP-hr / 1050 btu/scf)
2. NG Engines — Fuel usage scf/hr = HP X 7.143 (7,500 btu/HP-hr / 1050 btu/scf)
3. Diesel — Fuel usage gals/hr = HP X 0.0483 (7,000 btu/HP-hr / 145,000 btu/gal)

Natural Gas Prime Movers

1. TNMOC refers to total non-methane organic carbon emissions and these can be assumed equivalent to VOC emissions.
2. The sulfur content assumed is 2000 grains /mmscf (3.33 ppm).

Diesel-Fired Prime Movers

1. Diesel sulfur level 0.4% by wt.
2. For boats use > 600 HP factors based on AP-42 Vol. II, Table II-3-3. Those figures closely match the above values. Include only the emissions from the boats within 25 mile radius of the well/platform.
3. For diesel engines <600 HP VOC emissions equal total HC emissions; for diesel engines>600 HP VOC emissions equal non-methane HC emissions.

Heaters/Boilers/Firetubes/NG-Fired

1. NG Sulfur content is 2000 grains per million cu ft.
2. VOCs emissions based on total non-methane HCs.

Gas Flares

1. Flare is non-smoking.
2. 1050 btu/cu. ft. for NG heating value.
3. The sulfur content assumed is 2000 grains /mmscf (3.33 ppm).

H2S flared (lbs/hr) = Gas flared (cu ft/hr) X ppm H2S X 10E-06 X 34/379

SOx emis (lbs/hr) = H2S flared (lbs/hr) X 64/34

Attachment 10 (Cont.)

Liquid Flares

1. Assume 1% by wt Sulfur maximum in the crude oil.

2. VOC equals non-methane HCs

3. Particulate emissions assumes Grade 5 oil.

Tanks

1. Tank emissions assumes uncontrolled fixed roof tank.

Fugitives

1. Fugitives are based on the 1993 Star Environmental Report. It requires that you count or estimate your components.

Glycol Dehydrator Vent

1. The dehydrated gas rate in SCF/HR must be entered in the spreadsheet. The emission factor is from the compilation of the Louisiana Survey and an average emissions per gas rate.

Gas Venting

1. The emission factor is based on venting unburned natural gas of average weight.

DRILLING MUD COMPONENTS AND ADDITIVES
SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884, VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

I. ITEMS USED ON A ROUTINE BASIS

BARIOD	M-I	MILPARK	DESCRIPTION
BARITE/BARIOD	M-I BAR	BARITE/MILBAR	BARITE (BARIUM SULFATE)
AQUAGEL	M-I GEL	MILGEL	BENTONITE
CARBONOX	TANNATHIN	LIGCO	LIGNITE
Q-BROXIN	SPERSENE & RVC-10	UNI CAL	BLENDED LIGNOSULFONATE
CAUSTIC SODA	CAUSTIC SODA	CAUSTIC SODA	SODIUM HYDROXIDE
ALUMINUM STEARATE	ALUMINUM STEARATE	ALUMINUM STEARATE	ALUMINUM STEARATE
LIME	LIME	LIME	CALCIUM HYDROXIDE
CC-16	CAUSTILIG	LIGCON	BLENDED LIGNITE/CAUSTIC
SODA ASH	SODA ASH	SODA ASH	SODIUM CARBONATE
BICARB	BICARB	BICARB	BICARBONATE OF SODA
BARANEX	RESINEX II	CHEMTROL-X/FILTREX	SELECTED POLYMER BLEND
CON DET.	DD	M.D.	DETERGENT
BARA-DEFOAM 1	DEFOAM-X	W.O. DEFOAM LD-8	DEFOAMER (USUALLY ALCHOHOL BASED)
AKTAFLOS	DMS	-	NONIONIC MUD SURFACTANT
CMC OR CELLEX	CMC	CMC	SODIUM CARBOXY METHYL CELLULOSE
SALT	SALT	SALT	SODIUM CHLORIDE
IMPERMEX	MY-LO-JEL	MILSTARCH	PREGELATINIZED STARCH
CYPAN, WL-100, POLYPAC	SP-101	CYPAN OR WL-100	SODIUM POLYACRYLATE
DEXTRID	POLY SAL	PERM-LOSE	ORGANIC POLYMER
DRISPAC OR PAC	POLY-PAC	DRISPAC	POLYANIONIC CELLULOSE
GYP	GYP	GYP	GYPSUM (PLASTER OF PARIS)
HME/SUPERDRILL	HME/SUPERDRIL	HME/SUPERDRIL	GILSONITE (TREATED) - NATURAL
BLACK MAGIC SUPERMIX (SFT)	PIPE-LAX W	BLACK MAGIC SUPERMIX (SFT)	MUD CONCENTRATE FOR SPOTTING FLUID
ENVIRO-TORQ	LUBE-167	LUBRISAL	ORGANIC LUBRICANT
MICA TEX	MICA (C OR F)	MIL-MICA	MICA-FLAKES
WALL-NUT	NUT PLUG (C, M, OR F)	MIL PLUG	GROUND WALNUT OR OTHER NUT SHELLS

BARIOD	M-I	MILPARK	DESCRIPTION
SODIUM CHROMATE	SODIUM CHROMATE	SODIUM CHROMATE	SODIUM CHROMATE
IRONITE	IRONITE	IRONITE	SYNTHETIC IRON OXIDE, H_2S SCAVENGER
NO-SULF	SULF-X	MIL GARD	H_2S SCAVENGER (ZINC CARBONATE)
E-Z MUD	POLY-PLUS	SEPARAN	POLYACRYLAMIDE POLYMER
SAPP	SAPP	SAPP	SODIUM ACID PYROPHOSPHATE
KOH	KOH	KOH	POTASSIUM HYDROXIDE
KCL	KCL	KCL	POTASSIUM CHLORIDE (POTASSIUM)
MF-1, BORUFLOC	MF-1	MF-1	SELECTIVE FLOCULANT
BEN-EX	GELEX	BEN-EX	CLAY EXTENDER
SOLTEX	SOLTEX	SOLTEX	WATER SOLUBLE SULFONATED ASPHALT
EZ MUD	POLYPLUS	NEWDRILL-HP	POLYACRRRYLAMIDE (PHPA)
-	MY-LO-GEL	MILSTARCH	POTATO STARCH FLUID LOSS AGENT
THERMATHIN	TACKLE	NEWTHIN	POLYMERIC DISPERSANT
-	TACKLE-S	MILTEMP	SULFONATED VINYLIC POLYMER
BHC	MMH	MMH	MIXED METAL HYDROXIDE VISCOSIFIER
THERMACHEK	-	-	STARCH-DERIVED FLUID LOSS AGENT

II. OIL BASE MUD ADDITIVES

BARIOD	M-I	MILPARK	DESCRIPTION
INVERMUL	VERSAMUL	CARBO-TEC L	PRIMARY EMULSIFIER
E-Z MUL	-	CARBO-MUL	SECONDARY EMULSIFIER
DRILTREAT	VERSATHIN	-	DISPERSANT
DURATONE	VERSATROL	-	HIGH TEMP. STABILIZER, FILTRATE CONTROL
GEL TONE	VERSAGEL	CARBO-GEL	VERCOSIFIER WEIGHT SUSPENDING AGENT
LIME	LIME/QUICKLIME	LIME	CALCIUM HYDROXIDE
VISTA ODC	VISTA ODC	VISTA ODC	LOW TOXICITY MINERAL OIL (DIESEL SUBSTITUTE)

III. NONROUTINE ADDITIVES

TRADE NAME	SUPPLIER	DESCRIPTION
HF-100	HYDRA FLUIDS	POLYALCHOL/WATER BLEND - LUBRICANT
A-25	CESCO CHEMICAL	SURFACTANT/WATER BLEND FOR STUCK PIPE
BIOSPOT	MILPARK	SURFACTANT/WATER BLEND FOR STUCK PIPE
XC POLYMER	KELCO	XANTHAM GUM (POLYSACCHARIDE)
ACETIC ACID	MILPARK	GLACIAL ACETIC ACID SOLUTION
IDCIDE-P	IDF	BIOCIDE
KD-40	PETROLITE	CORROSION INHIBITOR
EMI-1267	M-I	SURFACTANT/WATER BLEND FOR STUCK PIPE
HP-007	AQUALON	SUGAR BEET PULP

IV. ADDITIVES FOR "NOVADRIL" SYNTHETIC MUD SYSTEM

PRODUCT	DESCRIPTION	SUPPLIER
NOVASOL	SYNTHETIC OLIGOMER	M-I
NOVAMUL	PROPRIETARY	M-I
NOVAWET	PROPRIETARY	M-I
NOVAMOD	PROPRIETARY	M-I
VG-69	ORGANOBENTONITE CLAY	M-I
LIME	CA (OH) 2	M-I
CAC12	95% CAC12 POWDER	M-I
VERSA-HRP	HYDROXLAMINE-ESTER	M-I
VERSA-SWA	ACTIVE PHOSPHATED AMPHOTERIC IN WATER	M-I

V. ADDITIVES FOR "PETROFREE" MUD SYSTEM

PRODUCT	DESCRIPTION	SUPPLIER
PETROFREE ESTER	ESTER	BARIOD
EZ MUL NTF	EMULSIFIER	BARIOD
OMC 42	DISPERSANT	BARIOD
RM63	VISCOSIFIER	BARIOD
GELTONE	VISCOSIFIER	BARIOD
DURATONE	STABILIZER, FILTRATE CONTROL	BARIOD

VI. METHOD OF DISPOSAL:

All water base mud and mud additives will be disposed of overboard into the Gulf of Mexico provided the material to be discharged meets the toxicity limit specified in the USEPA NPDES General Permit No. GMG290103. Any fluid containing free oil will be transported to a 29 B site for disposal. Diesel will not be used in muds to be discharged, except for spotting to free stuck pipe in accord with Part I.A.1(c) of the permit. All drill cuttings, sand, and other well solids from drilling with water-based muds will be discharged overboard. Cuttings from drilling with oil-based mud and diesel pills and buffers will be hauled to a 29 B site for disposal.

Revised 05/18/92 TCA
06/14/93 ARP
07/26/93 RG

MUD AND CUTTINGS DISCHARGE VOLUMES

SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884, VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

All mud and cuttings will be discharged in compliance with the NPDES General Permit GMG 290103 for Discharge of Effluents. No fluids containing free oil will be discharged. Daily discharge rates will vary over the life of the well. Assume that the discharge rate is uniform over the life of the well.

Cuttings volume is calculated using hole volume times 4.

Mud volume discharged is calculated hole volume times 11. Values taken from Walk, Haydel and Associates Inc. study (1988).

RKB to MSL 70'
Water Depth 950'
1020'

MEAS. DEPTH (FT.)	DEPTH BML (FT.)	CASING SIZE (IN.)	HOLE SIZE (FT.)	INTERVAL LENGTH (FT.)	HOLE VOLUME (BBL)	CUTTINGS VOLUME (BBL.)	MUD VOLUME (BBL.)
1220	200	30.000	30.00	200	175	699	1923
2300	1280	20.000	26.00	1080	709	2837	7802
5500	4480	13.375	17.50	3200	952	3808	10472
9400	8380	9.625	12.25	3900	569	2274	6254
15000	13980	0.000	8.50	5600	393	1572	4323
TOTALS				13980	2798	11191	30774

SUPPLEMENTAL PLAN OF EXPLORATION
SOI OCS-G 6884, VIOSCA KNOLL BLOCK 780
OFFSHORE ALABAMA

ONSHORE SUPPORT FACILITY

The onshore support base for this activity will be SOI's existing VeniceTerminal. This facility is located on the Mississippi River near Venice, Louisiana, approximately 35 miles upriver from the Gulf of Mexico. The physical plant covers 14 acres and includes 1,000 linear feet of waterfront, 3,000 square feet of office space, 3,200 square feet of personnel quartering space and 7,200 square feet of covered warehouse area. One 45-ton crane and two fork trucks are used for material handling operations. No expansion of the Venice terminal will be required for this activity. Also, while personnel transported by helicopter will be picked up and returned to SOI's Venice Terminal, both Air Logistics and PHI operate bases at Venice for refueling and maintenance.

SUPPORT VESSELS

ITEM	SIZE OR MODEL	USE	TRIPS PER WEEK
Boat	190 ±	Cargo	3 or 4
Boat	190 ±	Standby	N. A.
Helicopter	Bell 212, 214 or 412 Boelkow 105 Aerospatiale 330-J Sikorsky S-76	Crew Change and Misc.	18 to 22

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION

PLAN OF EXPLORATION
Type of Plan

VIOSCA KNOLL BLOCK 780
Area and Block

SOI OCS-G 6884
Lease Number

The proposed activities described in detail in this Plan comply with Alabama's approved Coastal Resources Program and will be conducted in a manner consistent with such programs.

Such findings are summarized on the final page of the attached Environmental Report (ER).

SHELL OFFSHORE INC. (SOI)
Operator

Al Pickett
Certifying Official

March 9, 1995
Date

ENVIRONMENTAL REPORT (SUPPLEMENTAL PLAN OF EXPLORATION) GULF OF MEXICO: OFFSHORE ALABAMA, MISSISSIPPI, AND LOUISIANA VIOSCA KNOLL AREA BLOCK 780 (OCS-G 6884)

8 March 1995

Prepared for:

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Prepared by:

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1. TITLE PAGE
ENVIRONMENTAL REPORT (SUPPLEMENTAL PLAN OF EXPLORATION) GULF OF MEXICO: OFFSHORE ALABAMA, MISSISSIPPI, AND LOUISIANA VIOSCA KNOLL AREA BLOCK 780 (OCS-G 6884)

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2. DESCRIPTION OF THE PROPOSED ACTION

2.a DESCRIPTION OF PROPOSED TRAVEL MODES AND ROUTES AND FREQUENCY FOR MOVING SUPPLIES AND PERSONNEL TO AND FROM THE OFFSHORE ACTIVITY SITE AND THE ONSHORE BASES

Shell Offshore Inc. plans to conduct exploratory activities in Viosca Knoll Area Block 780. Helicopters and boats will move supplies and personnel to and from the offshore and onshore locations. Helicopters will make approximately 18 to 22 round trips per week and boats will make approximately 14 round trips per month. If servicing only the proposed lease area, helicopters and boats will normally take the most direct route, weather and traffic conditions permitting (see **Figure 1**).

2.b IDENTIFICATION OF SUPPORT BASES AND NUMBER AND TYPES OF NEW WORKERS ASSOCIATED WITH THE PROPOSED ACTIVITIES

The support base will be located in Venice, Louisiana. The base is capable of providing the services necessary for the proposed activities. No new facilities or workers will be needed for the proposed activities. The initial Outer Continental Shelf (OCS) Socioeconomic Data Base Report will be developed after the Minerals Management Service (MMS) and the States of Alabama, Louisiana, and Mississippi have identified the specific parameters to be addressed in these semiannual reports.

2.c IDENTIFICATION OF THE NUMBER, LOCATION, AND SIZE OF ANY NEW SUPPORT FACILITIES THAT WILL NEED TO BE PROVIDED FOR THE PROPOSED ACTIVITIES

No new support facilities will be needed for the proposed activities.

2.d DESCRIPTION OF ANY NEW TECHNIQUES OR UNUSUAL TECHNOLOGY THAT MAY AFFECT COASTAL WATERS

No new techniques or unusual technology will be used during the proposed activities.

2.e MAPS SHOWING LOCATION OF THE PROPOSED ACTIVITIES IN RELATION TO EACH OF THE AFFECTED STATES' COASTAL ZONES

Figure 1 shows the location of the proposed activities in relation to each of the affected States' coastal zones. The proposed activities will take place in waters adjacent to the States of Alabama, Mississippi, and Louisiana.

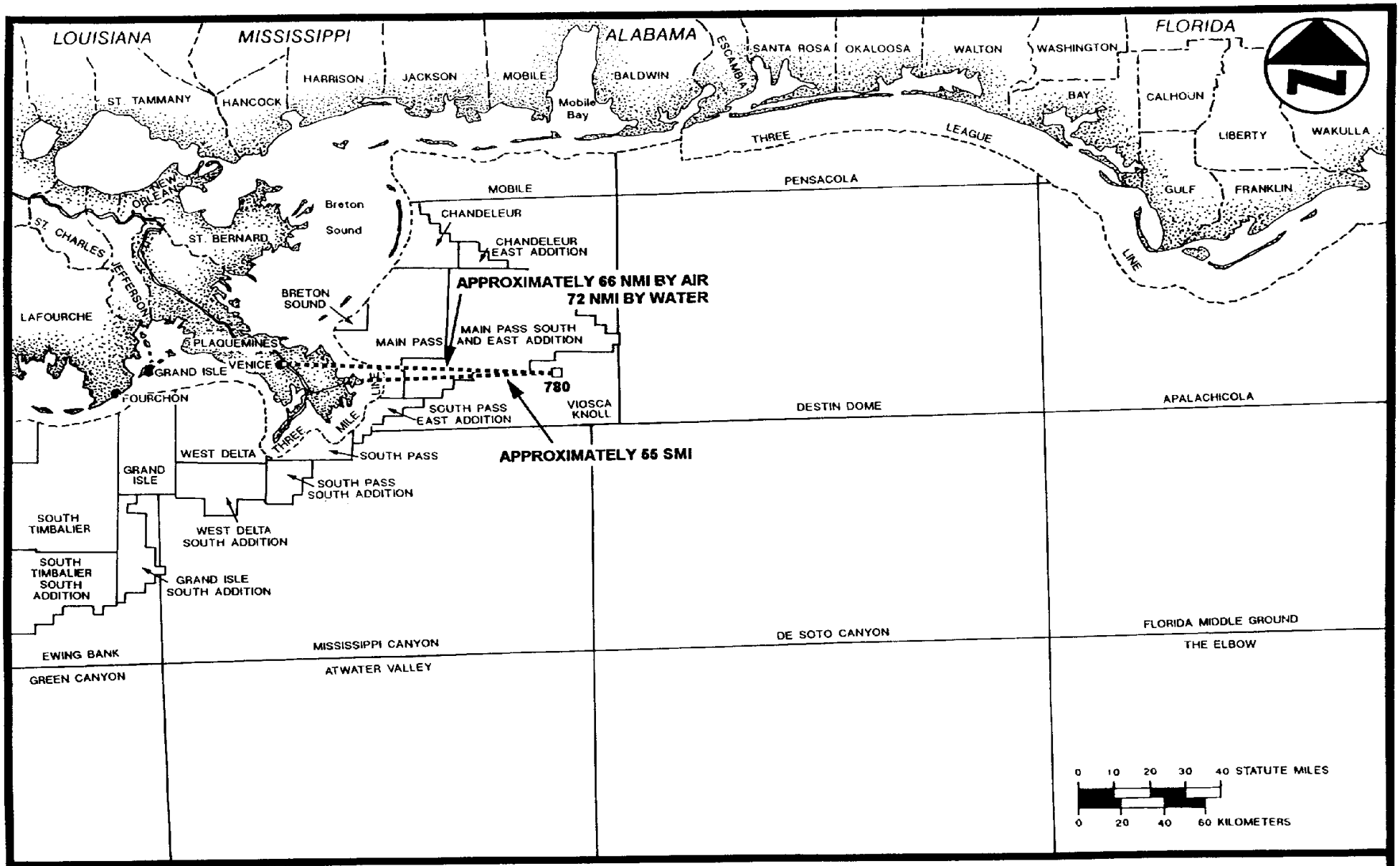

Figure 1. Location of Viosca Knoll Area Block 780 relative to the Alabama, Mississippi, and Louisiana coastal zones (Adapted from: USDOI, MMS, 1984).

2.f **FOR DEVELOPMENT OPERATIONS COORDINATION DOCUMENTS, THE MEANS PROPOSED TO TRANSPORT OIL AND GAS TO SHORE FROM THE LEASE AREA, THE ROUTES TO BE FOLLOWED AND THE ESTIMATED QUANTITIES OF OIL AND GAS TO BE MOVED ALONG SUCH ROUTES**

This Plan is exploratory. No oil or gas will be produced for sale from these proposed activities at this time.

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT AND IMPACTS

3.a PHYSICAL AND ENVIRONMENTAL

3.a(1) Commercial Fishing

The proposed activities are located east of some of the most productive fishing grounds in the Gulf of Mexico. National Marine Fisheries Service Zone 11, which is located approximately 3 km (2 nmi) west of the lease area, accounted for approximately 10% of the commercial fisheries harvest from the western and central Gulf of Mexico (U.S. Department of the Interior [USDOI], MMS, 1986a, Visual Nos. 2 and 2-E; U.S. Department of Commerce [USDOC], National Marine Fisheries Service [NMFS], 1991). Gulf waters account for 40% of the total annual U.S. fisheries harvest (USDOC, NMFS, 1989a).

The Gulf fishery is dominated by estuary-dependent species (USDOI, MMS, 1991a). Menhaden are the most important Gulf species in quantity landed, whereas shrimp represent the most important species in value (USDOC, NMFS, 1989a). Other significant Gulf commercial fisheries include oysters, blue crabs, and an assortment of finfish. Life history and fishery information for economically important species in the Gulf has been provided by the USDOI, MMS (1987a, 1990a).

A total of nine species of penaeid shrimp contribute to the Gulf of Mexico commercial shrimp fishery (USDOI, MMS, 1991a). Brown (*Penaeus aztecus*), white (*P. setiferus*), and pink (*P. duorarum*) shrimp constitute the bulk of the harvest (USDOI, MMS, 1991a) and are taken almost exclusively by trawls in depths ranging from approximately 2 to 73 m (6 to 240 ft). These shrimp are estuarine-dependent species which spawn in the open ocean, go through a series of larval phases in the plankton, migrate during the post-larval phase to the estuarine nursery areas, and then return to the open Gulf as adults. Royal red (*Pleoticus robustus*) and rock (*Sicyonia brevirostris*) shrimp are also commercially important species. The USDOI, MMS (1986a, Visual Nos. 2 and 2E) indicates the fishing grounds for each of these species. The lease area is located within the major shrimp spawning grounds and migratory routes in the northern Gulf (USDOI, MMS, 1986a, Visual No. 2). Planktonic eggs and larval stages of all commercially important shrimp species may occur periodically in the lease area (USDOI, MMS, 1991a).

The blue crab (*Callinectes sapidus*) makes up 98% of the crab harvest in the Gulf of Mexico (Riley, 1970) and 40% of the national total, valued at $31 million (USDOC, NMFS, 1989a). Its life cycle is similar to the shrimps' in that it has planktonic, estuarine, and open ocean phases. Adults spend most of their lives in the estuaries; thus, the blue crab harvest is taken primarily inshore of the lease area. Gravid females migrate to the open Gulf to release their eggs

during spring and summer. Consequently, gravid females and planktonic larvae may occur seasonally in the lease area.

The proposed activities are located outside commercially important finfish fishing grounds (USDOI, MMS, 1986a, Visual No. 2-E). Three species of menhaden known from the Gulf make up the major finfish tonnage taken. These are *Brevoortia patronus*, *B. gunteri*, and *B. smithii*. *Brevoortia patronus* constitutes most of the Gulf catch. Purse seining is the major capture method used in this fishery (Lindall et al., 1972; Vaughan, 1987). In addition to menhaden, at least 10 species of finfish are commercially significant. In decreasing order of value, they are yellowfin tuna, groupers, mullet, red snapper, swordfish, bluefin tuna, black drum, shark, spotted seatrout, and vermilion snapper (USDOC, NMFS, 1989a).

The yellowfin tuna (*Thunnus albacares*) is a fast-swimming oceanic fish, generally taken with hook-and-line within deep waters south of the central and western Gulf area. Yellowfin tuna exhibits schooling behavior, and seasonally moves into the northern Gulf as water temperatures rise (USDOC, 1985; Taniguchi, 1987; Power and May, 1991).

The red snapper (*Lutjanus campechanus*), vermilion snapper (*Rhomboplites aurorubens*), and various species of grouper are taken over irregular bottom areas or reefs in depths of 2 to 305 m (5 to 1,000 ft) (TerEco Corporation, 1976). Historically, red snapper has been the most valuable species in the Gulf reef fish fishery, but its relative importance has declined. This has been offset by the growth of the grouper fishery (Waters, 1988; South Atlantic Fishery Management Council [SAFMC], 1991).

The striped, or black mullet (*Mugil cephalus*) is generally found in nearshore areas such as harbors, estuaries, bays, and along beaches. It is a schooling fish and is generally taken with seines and gill nets.

The swordfish (*Xiphias gladius*) is a pelagic and widely distributed billfish. It is apparently solitary, except when spawning, and is taken on longline (Palko et al., 1981; SAFMC, 1985).

The bluefin tuna (*Thunnus thynnus*) ranges worldwide in temperate and subtropical seas. It is a schooling species, seeking prey throughout the water column, and undergoes trans-oceanic migrations. It is generally taken on longline (USDOC, 1985).

Black drum (*Pogonias cromis*) occurs within estuaries and nearshore waters. It is generally taken with gill nets (Beckman et al., 1990).

Several species of sharks are harvested commercially as a by-catch of the longline fishery. Catches are marketed for food, hides, and other by-products (USDOC, NMFS, 1989b; Anderson, 1990).

Seatrouts, including the spotted (*Cynoscion nebulosus*), the silver (*C. nothus*), and the sand (*C. arenarius*), are important to the bottom fish fisheries in the northern Gulf (Lindall et al., 1972; Lassuy, 1983; Sutter and McIlwain, 1987). They are usually taken in offshore areas with bottom trawls.

TerEco Corporation (1976) describes some additional fish species of the northern Gulf which are important to commercial and/or sport fishermen. Most of the northern Gulf fishes are temperate, with some incursions from Caribbean fauna. They exhibit seasonal distribution and abundance fluctuations related to oceanographic conditions (USDOI, MMS, 1984). The life history of estuary-dependent species (e.g., the croaker, *Micropogonias undulatus*) involves spawning on the continental shelf; transport of eggs, larvae, or juveniles to the estuarine nursery grounds; growth and maturation in the estuary; and migration of the young adults back to the shelf for spawning. After spawning, the adult individuals generally remain on the continental shelf (Darnell, 1988). Rogers (1977) postulated a net inshore-offshore movement for many demersal shelf fish species. Thus, it is probable that many of these species may occur in the lease area at some phase of their life cycles.

Eggs and larvae (ichthyoplankton) of various commercially important fish species are present in the lease area on occasion (USDOI, MMS, 1991a). Larvae of approximately 200 coastal and oceanic fishes from 61 families were recorded from unpublished plankton surveys and other published studies from throughout the northern Gulf of Mexico (Ditty et al., 1988). The 16 most abundant families of larval fishes (ranked on number of individuals collected) include the Engraulidae (anchovies), Gobiidae (gobies), Bregmacerotidae (codlets), Clupeidae (herrings), Sciaenidae (croakers), Carangidae (jacks), Bothidae (lefteye flounders), Synodontidae (lizardfishes), Myctophidae (lanternfishes), Serranidae (sea basses), Cynoglossidae (tonguefishes), Scombridae (mackerels and tuna), Ophidiidae (cusk-eels), Labridae (wrasses), Gonostomatidae (lightfishes), and Mugilidae (mullets) (Ditty et al., 1988). Because ichthyoplankton are at the mercy of water movements, their distributions vary considerably with space and time. The primary factors influencing ichthyoplankton in the northern Gulf are the Loop Current, the Mississippi River, and local runoff. Ichthyoplankton samples collected about the Mississippi River plume were found to be greater by a factor of 10, and sometimes by several orders of magnitude, at the plume front than they were within or outside of the plume (Govoni et al., 1989; Grimes and Finucane, 1991). Due to patchiness in distributions, presence and abundance of ichthyoplankton at any given instance cannot be predicted.

Environmental impacts of proposed oil and gas activities have been analyzed in detail in various MMS Environmental Impact Statements for the Central and Western Gulf of Mexico Planning Areas (e.g., USDOI, MMS, 1990a, 1991a). The conclusion of the MMS has been that future activities resulting from lease sales would not have a significant impact on the marine or coastal environments.

The National Research Council (1983) conducted a comprehensive study of the fate and effect of drilling discharges in the marine environment. Based upon this authoritative report, the USDOI, MMS (1990a) concluded that drilling fluids used on the OCS are unlikely to cause any significant ecological damage beyond 1,000 m from the discharge point either in the short term or long term. The proposed activities probably will temporarily degrade the water quality in the immediate vicinity of the drillsite due to discharges of drilling muds and cuttings. This may cause certain fish species to avoid the area temporarily. The situation should revert to normal as soon as drilling is completed. Effects on the commercial fishing industry should be at a low level.

Wetlands in the Gulf of Mexico occur as swamps, marshes, and seagrass beds throughout the coastal zone. Because coastal wetlands serve as nursery habitat for many shelf fishery species, damage to these habitats could eventually be reflected in the fisheries biology of the continental shelf (Darnell and Phillips, 1988). Wetland loss has been attributed to several factors, including natural succession, sediment deprivation, erosion, subsidence, sea-level rise, hydrologic changes, residential-commercial development, and construction of pipeline and navigation canals through wetlands (Turner and Cahoon, 1988; USDOI, MMS, 1991a). Impact producing factors resulting from OCS oil and gas activities that could adversely affect wetlands include oil spills, pipeline placements, dredging of new navigation channels, maintenance dredging, and vessel usage of existing navigation channels, and construction of onshore facilities in wetlands areas. The level of impact to coastal wetlands within the potentially affected area is expected to be very low (USDOI, MMS, 1991a).

An oil spill would temporarily degrade water quality and introduce toxins into the water. Ichthyoplankton could be killed or functionally impaired. However, most adult fishes encountering a spill probably would exhibit avoidance behavior (Patten, 1977; Davis et al., 1984). This effect would be temporary and fishes should return to the area after dispersal of the spill. No significant or persistent direct effects from an oil spill on fish populations would be expected. Recruitment from surrounding areas should replenish any affected ichthyoplankton populations once the spill was dispersed.

An oil spill that reaches the seafloor could conceivably kill benthic organisms such as shrimp or cause a variety of sublethal effects. Effects may include smothering, acute toxicity, and chronic and sublethal effects (behavioral,

morphological, cellular, and histopathological abnormalities). No effects on benthos were detected on the South Texas shelf in the aftermath of the Ixtoc-I blowout (Boehm, 1982).

Oil spills rarely occur during exploratory drilling. From 1971 through 1985, over 15,000 new wells were drilled on the U.S. OCS, with only 61 drilling blowouts (USDOI, MMS, 1987b). None of the 33 blowouts during exploratory drilling from 1971 through 1985 resulted in a spill of crude oil or condensate. If a spill did occur in the lease area, it would be handled according to an oil spill contingency plan approved by the MMS.

The MMS Environmental Studies Program has sponsored a series of studies where OCS oil and gas activities have occurred in the past or may occur in the future. These studies have demonstrated that the impacts resulting from the operations are localized and, except in areas where there are extreme concentrations of activity, are unlikely to have regional significance (NRC, 1985; Boesch and Rabalais, 1987). While most research results agree that the acute impacts from operational discharges from OCS oil and gas facilities are minor or resolvable, there is less certainty regarding any chronic, sublethal effects (Boesch et al., 1987; Aurand, 1988). With these concerns the MMS Environmental Studies Program has now shifted its focus to studies of the chronic, sublethal environmental stresses which may be associated with offshore oil and gas activities (Aurand, 1988; Ahlfeld, 1990; Kendall, 1990). The MMS Gulf of Mexico Offshore Operations Monitoring Experiment (GOOMEX) is intended to elucidate and assess the effects of any chronic, sublethal perturbations which may be associated with long-term OCS production sites in the Gulf of Mexico, particularly in highly developed OCS areas (USDOI, MMS, 1991b).

Cumulative impacts refer to the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Cumulative impacts for oil and gas activities in the Central and Western Gulf of Mexico Planning Areas have been discussed in detail by the USDOI, MMS (1991a). The proposed activities are generally short-term in nature and are not expected to contribute significantly to the cumulative impacts from previous, ongoing, or reasonably anticipated future human activities in the area.

Cumulative effects of increasing oil and gas activities off the northern Gulf coast on annual fish catches are unknown. Recent data analyses indicate a major change in characteristics of the finfishery during the interval from 1981 through 1987 (Linton, 1988). The number of commercial species landed increased significantly from 27 in 1981 to 82 in 1987. In addition, the number of

species with a value over $1 million has tripled from 3 in 1981 to 9 in 1987. The vast majority of this catch is harvested from the north-central and northwestern Gulf, where hard substrate added by numerous offshore petroleum platforms which serve as artificial reefs is thought to be a positive contributing factor (Linton, 1988).

3.a(2) Shipping

Growth of offshore oil and gas activities has led to the establishment of a series of safety fairways or vessel traffic separation schemes, and anchorages to provide unobstructed approach for vessels using U.S. ports (USDOI, MMS, 1990b, Visual No. 2). Shipping safety fairways are lanes or corridors in which no fixed structure, whether temporary or permanent, is permitted. Fairway anchorages are areas contiguous to and associated with a fairway, in which fixed structures may be permitted within certain spacing limitations (33 CFR 166). All offshore structures are required to be adequately marked and lighted. After a structure is in place, it often becomes a landmark and an aid to navigation for vessels that operate in the area on a regular basis (USDOI, MMS, 1990a).

The proposed activities are located approximately 23 km (12 nmi) southwest of a fairway (USDOI, MMS, 1990b, Visual No. 2). The offshore structure will be equipped with all safety equipment required by the U.S. Coast Guard and the MMS to alert ships of its presence in all weather conditions.

Most oil and gas resources discovered in the Gulf of Mexico will be transported via pipelines to shore (USDOI, MMS, 1991a). The majority of pipeline spills of domestic oil have occurred due to anchor damage. In contrast, accidental spills from tankers normally result from collisions or groundings. Less than 1% of the oil produced in the Central Gulf of Mexico Planning Area and 11% in the Western Gulf of Mexico Planning Area will be transported by tankers. However, one of the most significant contributions of marine transportation to cumulative impacts in the Gulf of Mexico is from tankering of imported crude oil and refined products into the Gulf. The USDOI, MMS (1991a) reported spill rates (1,000 bbl or greater per billion bbl produced and transported) from OCS operations. The spill rate from tankers (1.30) was approximately twice the spill rate from platforms (0.60) and pipelines (0.67). Reduced spill rates for platforms and pipelines were attributed to improved safety practices in the oil industry (USDOI, MMS, 1991a). Additional information indicates that for every 100,000 bbl of oil produced on the OCS, only 3 bbl are spilled, whereas for every 100,000 bbl of oil transported by foreign tanker, 17 bbl are spilled (Offshore, 1992). Studies have shown that 45% of ocean hydrocarbon pollution comes from tankers, while 1.5% comes from OCS production worldwide (Offshore, 1992).

3.a(3) Small Craft Pleasure Boating, Sport Fishing, and Recreation

The major recreational activity occurring on the OCS is offshore marine recreational fishing and diving. A substantial recreational fishery, including scuba diving, is directly associated with oil and gas production platforms, and stems from the fact that platforms beneficially function as high-profile, artificial reefs that attract fish. Witzig (1986) indicates that a majority of the offshore recreational fishing in the Central Gulf of Mexico Planning Area is directly associated with oil and gas structures. At least 46 different fish species are caught by recreational anglers fishing near oil and gas platforms in the central Gulf of Mexico (Stanley and Wilson, 1990). Interest is high throughout the Gulf of Mexico region to acquire, relocate, and retain selected oil and gas structures in the marine environment to be used as dedicated artificial reefs to enhance marine fisheries when the structures are no longer useful for oil and gas production (Reggio, 1989).

Negative effects of the presence of offshore oil and gas structures are the increased probability of vessel collisions with structures in inclement weather, and the risk of overfishing of some reef fish stocks, particularly red snapper (*Lutjanus campechanus*), as a result of the concentrated fishing effort (Gallaway et al., 1981).

Ditton and Graefe (1978) determined that oil and gas structures are the most popular offshore recreation destination areas, attracting 87% of the boats that fished offshore in their study area. Certain pleasure boats (i.e., sailboats, pleasure yachts, and/or open ocean racing power boats) may be slightly inconvenienced by having to maneuver around the offshore structure and its support vessels. This inconvenience is considered minor as offshore structures can be avoided and ample maneuvering room is available.

Any sport fishing which might occur in the lease area could be temporarily affected by degradation of water quality during drilling. Such a change in water quality could cause some desirable species to avoid the immediate lease area. However, any such effects are expected to be temporary and localized and should not affect any fishery potential in the area as a whole. Populations should return to normal once drilling is completed.

3.a(4) Cultural Resources

Archaeological resources are any objects or features that are man-made or modified by human activity, and classified as historic or prehistoric. Most historic archaeological resources on the OCS are shipwrecks. A resource baseline study for the northern Gulf of Mexico (Coastal Environments, Inc., 1977) indicates that less than 2% of pre-20th century ships reported lost in the Gulf have known locations. Texas A&M University completed a study for the MMS that upgraded and expanded the list of historic

shipwrecks developed by Coastal Environments, Inc. (Garrison et al., 1989). This recent investigation identified nearly 3,500 potential shipwreck locations in the Gulf, nearly 1,500 of which occur on the OCS.

According to the sea level curve proposed for the northern Gulf by Coastal Environments, Inc. (1982), sea level would have been approximately 45 m (148 ft) below the present sea level at 12,000 B.P. Therefore, the continental shelf shoreward of the 45-m (148-ft) bathymetric contour would possess potential for prehistoric sites dating subsequent to 12,000 B.P. Although many specific areas in the Gulf have been identified through lease block surveys as having high potential for prehistoric sites, these areas generally have been avoided by oil and gas development rather than investigated (USDOI, MMS, 1990a).

The proposed activities are located outside the Historic and Prehistoric Cultural Resources High Probability Lines (USDOI, MMS, 1989, Visual No. 1) and therefore are in a large offshore area where historic and prehistoric resources are unlikely to be found. An Archaeological Survey was not required for this lease area.

3.a(5) Ecologically Sensitive Features

Several areas of environmental concern are located onshore of the lease area. Alabama, Mississippi, and Louisiana have developed Coastal Zone Management Programs to regulate the significant land and water activities between the outer limit of each State's coastal waters and land up to the Intracoastal Waterway and/or the 3-m (10-ft) contour. Land uses which are regulated are those that have a direct and significant impact on the coastal areas requiring a State permit, and those which are required by Federal law to be consistent with the management programs (USDOC and ACAB, 1979; USDOC and LDNR, 1980; Mississippi Department of Wildlife Conservation [MDWC] and USDOC, 1980). The programs provide for the protection of beaches, dunes, wetlands, submerged grass beds, barrier islands, oyster reefs, cultural resources, water quality, air quality, biological resources, and wildlife habitat. Unique ecological features include zoological, botanical, and geological formations characteristic of coastal processes (Burk and Associates, Inc., 1975; USDOC and ACAB, 1979; MDWC and USDOC, 1980; USDOC and LDNR, 1980). Biologically sensitive areas of the north-central Gulf area include estuarine and coastal ecosystems consisting of salt marshes, oyster beds, grass beds, barrier beaches, and dunes (Coastal Environments, Inc., 1980). These coastal ecosystems contain nursery areas for many species of economic importance as well as habitat, rookeries, major overwintering sites, and nesting areas for many endangered and threatened species, such as the southern bald eagle, brown pelican, golden eagle, osprey, red cockaded woodpecker, American peregrine falcon, and various marine turtles (USDOC and ACAB,

1979; USDOI, MMS, 1986a, Visual No. 2; Coastal Environments, Inc., 1980; MDWC and USDOC, 1980; USDOC and LDNR, 1980).

Alabama has designated two types of "Special Management Areas": 1) geographic areas of particular concern; and 2) areas for preservation and restoration (USDOC and ACAB, 1979). Current Alabama "Special Management Areas" are listed below:

Geographic Areas of Particular Concern	Areas for Protection and Restoration
Part of Mobile	Point aux Pins Wetland System
Mobile-Tensaw River Delta	National Audubon Society Wildlife Sanctuary (Dauphin Island)

None of the proposed activities in these blocks should have any effect upon these "Special Management Areas."

Conspicuous areas of environmental concern for Alabama are depicted by the USDOI, MMS (1990b, Visual No. 2; 1989, Visual No. 1), and the USDOC and ACAB (1979).

There are two existing "Special Management Areas" designated by the Louisiana Coastal Management Program (USDOC and LDNR, 1980). These areas are the "Louisiana Offshore Oil Port" (LOOP or Superport) and the "Marsh Island Wildlife Refuge and Game Preserve." The lease area is located away from both of these areas (USDOI, MMS, 1990b, Visual No. 2). None of the proposed activities in the lease area should have any effect upon either area.

Mississippi designated three types of areas as current or proposed Special Management Areas: (1) industrial and port areas, (2) shorefront access areas, and (3) urban waterfront (MDWC and USDOC, 1980). Current Mississippi Special Management areas are depicted by the MDWC and USDOC (1980).

Conspicuous areas of environmental concern for Louisiana and Mississippi are noted by the USDOI, MMS (1990b, Visual No. 2; 1989, Visual No. 1), the MDWC and USDOC (1980), and the USDOC and LDNR (1980).

The coastal zone area is also of recreational importance to residents and tourists. Most recreational activities focus on the area's water resources, which include beaches, boating areas, and fishing areas. Offshore terrestrial areas of particular ecological significance to Alabama, Mississippi, and/or Louisiana are Bon Secour National Wildlife Refuge, Dauphin Island Sanctuary, the barrier islands of Breton National Wildlife Refuge, and Gulf Island National Seashore. Submerged areas of critical concern are the extensive oyster

grounds off Plaquemines and St. Bernard Parishes, the artificial fishing reefs located off Mobile Bay (USDOI, MMS, 1986c, Visual No. 3), and the remnant coastal banks, which are located off Mobile, Alabama (USDOI, MMS, 1986b, Visual No. 4; 1986d, Visual No. 5).

Accidental discharge of oil can occur during almost any stage of exploration, development, or production on the OCS. Of the various potential spill sources, the great majority of accidental discharges have resulted from production activities (NRC, 1985; USDOI, MMS, 1986e). Oil fouling in any coastal area could directly or indirectly affect a variety of species, including threatened or endangered species or species important to commercial and sport fisheries. Although effects on benthic organisms of the open shelf may occur, none were detected on the south Texas shelf following the Ixtoc-I well blowout (Boehm, 1982). The main concern is for oiling of beaches and coastal wetlands. Effects may include smothering, acute toxicity, and chronic and sublethal effects (behavioral, morphological, cellular, and histopathological abnormalities). Damage or alterations to coastal habitats could result in effects on continental shelf populations and communities, as estuarine areas function as nursery habitat for many shelf species (Darnell and Phillips, 1988).

Oil fouling of the coastal area could also have adverse socioeconomic effects. Tourism is an important part of Gulf coast economies. Removal of beach or other coastal areas from recreational use by significant oil fouling could decrease tourism in the affected area, causing loss of income and a variety of ripple effects in local economies.

Any spill would be handled according to an oil spill contingency plan approved by the MMS. If a spill did occur during operations, it is unlikely that it would affect any nearshore or onshore areas or resources.

3.a(6) Existing Pipelines and Cables

There are no existing pipelines or cables in the lease area (USDOI, MMS, 1989, Visual No. 1).

3.a(7) Other Mineral Uses

Other than potential oil and gas reserves, there are no known mineral resources in the lease area.

3.a(8) Ocean Dumping Activities

The proposed activities are not located in an area designated for ocean dumping activities (USDOI, MMS, 1990b, Visual No. 2).

3.a(9) Endangered or Threatened Species

The USDOI, MMS (1990a, 1991a) considers possible impacts on endangered and threatened species. It has been determined that the direct and indirect proposed activities are unlikely to jeopardize the continued existence of endangered and threatened species or to result in the destruction or adverse modification of their critical habitats. Onshore facilities are located in a previously developed area and pose no new or additional threat to endangered or threatened species.

Six endangered species of whales have been reported in the Gulf of Mexico. They are the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), right whale (*Eubalaena glacialis*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter catodon*). Generally, most of these larger cetaceans occur in continental slope and deep oceanic waters. The population, distribution, and migratory patterns of these species in the Gulf of Mexico are unknown (J. Lehman, 1992, personal communication, USDOI, MMS, Gulf of Mexico OCS Office, Metairie, LA), although healthy individuals or small pods are occasionally sighted nearshore (Schmidly, 1981; Lohoefener, 1988).

Several endangered or threatened species of sea turtles, including the Kemp's ridley (*Lepidochelys kempi*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and green (*Chelonia mydas*), may occasionally visit the lease area. A number of potential effects on sea turtles are of concern. Oil spills can affect the turtles by coating, toxicity, and reduction of food supplies. Many species prefer shallow, coastal waters, which increase their vulnerability to dredging activities, boat collisions, and pollution -- especially oil spills (Fritts et al., 1983). Explosions during platform removal may result in mortality, injury, or behavioral interference. Solid and semi-solid debris may result in mortality through ingestion and entanglement (Darnell and Phillips, 1988).

3.b SOCIOECONOMIC

The initial OCS Socioeconomic Data Base Report will be developed after the MMS and the States of Alabama, Louisiana, and Mississippi have identified the specific parameters to be addressed in these semiannual reports. No new personnel will be needed for the proposed activities.

4. UNAVOIDABLE ADVERSE IMPACTS

4.a SUMMARY OF THE UNAVOIDABLE ADVERSE IMPACTS

Offshore structures will result in minimal navigational interference to ships using established fairways. However, during times of reduced visibility, vessels have the greatest potential to deviate from established fairways and impact offshore structures. Discharge of drilling muds and cuttings and air emissions during drilling operations will adversely affect marine organisms, water and air quality, and commercial fishing as described by the USDOI, MMS (1991a). These impacts are temporary, however, and will be limited to a small area. During the development/production operations, all discharges will comply with all applicable MMS and Environmental Protection Agency requirements. No significant adverse impacts are expected. The proposed activities covered by this Plan should not result in unavoidable impacts on wetlands, cultural resources, recreational activities, shoreline aesthetics, or other land uses.

4.b STATEMENT CONCERNING THE UNAVOIDABLE ADVERSE IMPACTS

None of the environmental consequences expected during normal operations should produce significant or cumulative adverse environmental effects. The effects of a possible oil spill should have no overall cumulative or long-term effect on the environment, except in the possible event of contamination of endangered marine species. A spill would be handled according to an oil spill contingency plan approved by the MMS. Thus, it is unlikely that a spill would occur during operations and affect any nearshore or onshore areas or resources. The proposed activities should have no significant impact on endangered species or critical habitat. The information presented in this Environmental Report indicates no clear or present reason not to proceed with the proposed activities. Withdrawal of the Plan would result in the loss of potential hydrocarbon production from this area.

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6. FINAL STATEMENT

To the best of our knowledge, the set of findings included in the Environmental Report and Plan indicates that each of the proposed activities, their associated facilities, and effects are all consistent with and comply with the provisions and guidelines of the Alabama, Mississippi, and Louisiana-approved Coastal Zone Management Programs. The proposed activities will be conducted in a manner consistent with the Coastal Zone Management Programs as outlined in USDOC and ACAB (1979), MDWC and USDOC (1980), and USDOC and LDNR (1980).

The proposed activities will be carried out and completed with the guarantee of the following items:

1) The best available and safest technologies will be utilized throughout the project. This includes meeting all applicable requirements for equipment types, general project layout, safety systems, and equipment and monitoring systems.

2) All operations will be covered by an oil spill contingency plan approved by the MMS.

3) All applicable Federal, State, and local requirements regarding air emissions, water quality, and discharge for the proposed activities, as well as any other permit conditions, will be complied with.