

Investigation of August 1980
Blowout and Fire, Lease OCS-G 2271
Vermilion Block 348, Gulf of Mexico
Off the Louisiana Coast

by

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I. Investigation and Report

A. Authority

By memorandum dated March 27, 1981, pursuant to Section 208 (subsections 22d, e, and f) of the OCS Lands Act Amendments of 1978, and Department of the Interior Regulation 30 CFR Part 250, the following U.S. Geological Survey (USGS), Conservation Division personnel were named to serve as Investigative Panel:

Robert H. Darrow
Michael J. Hebert
Charles J. Schoennagel, Jr.
Daniel J. Bourgeois

The Panel was given the assignment of investigating by informal conference and preparing a public report of the blowout and fire which occurred on August 24, 1980, on Mesa Petroleum Company's Platform A in Vermilion Block 348, Gulf of Mexico, offshore the State of Louisiana. (See Attachment 1 for attendees.) The incident occurred while completion operations were being conducted on Well A-1, Lease OCS-G 2271, with the SEE Rig 8.

B. Procedures

An informal meeting was held in the Lake Charles District Office on September 25, 1980, in which six Mesa Petroleum Company representatives conferred with five USGS representatives concerning the cause of the incident, as well as remedial operations, such as the drilling of a relief well, pollution control measures, and spraying water on the platform (see Attachment 2). Present at that meeting was the Mesa Petroleum Company Drilling Foreman, who was in charge of the completion operations at the time of the blowout and fire. His recollection and eyewitness account of the activities leading to the blowout and the events that took place shortly thereafter on the afternoon of August 24, 1980, were of primary consideration.

In addition, the Panel utilized numerous documents, including the Mesa Petroleum Company report submitted pursuant to 30 CFR 250.45, as well as various well and lease records and other relevant regulatory, administrative and procedural documents.

II. Introduction

A. Background

Lease OCS-G 2271 covers Block 348 of the Vermilion Area, South Addition, Gulf of Mexico, off the Louisiana coast (see Attachment 3). The 5,000-acre lease was initially issued to Shell Oil Company effective February 1, 1973. Mesa Petroleum Company was designated as operator on January 9, 1978, and was assigned all of Shell's rights, title, and interests of the lease effective August 1, 1978.

A total of seven exploratory wells were drilled and plugged and abandoned by Shell on the lease, with the first commencing May 10, 1973, and the seventh on August 5, 1976. Mesa spudded the eighth exploratory well on January 30, 1978, and temporarily abandoned it for future tieback to a platform. The suspension of production, which was granted to Mesa by Secretary of the Interior Andrus, called for the drilling of eight development wells and the tying back of exploratory Well 8 to the platform. Mesa applied for approval of the platform by letter dated November 28, 1978. Approval of the design, location, and installation of the platform was granted by letter of January 26, 1979, in accordance with OCS Order 8.

Platform A is a four-pile, self-contained drilling and production platform. The platform has two boat landings at diagonal corners: the southwest and the northeast. During drilling operations, two 28-man survival capsules were used to supplement the platform rig's safety equipment. The structure is located at a point 3,015 feet east of the west line and 4,460 feet south of the north line in approximately 240 feet of water (see Attachment 4). The platform has slots for nine wells.

Mesa commenced drilling operations on September 17, 1979, on Well A-2 with the SEE Rig 8 located on the A platform jacket. By August 12, 1980, the eight development wells were drilled, and exploratory Well 8 was tied back to the platform and renamed as Well A-1.

B. Description of Incident

Well A-1, which was initially drilled as exploratory Well 8 to a depth of 9,597 feet, was spudded by Mesa on January 30, 1978. The well record shows that 30-inch drive pipe was set at 467 feet, 20-inch conductor casing was set and cemented at 1,028 feet, 13 3/8-inch surface casing was set and cemented at 3,963 feet, and the 9 5/8-inch intermediate casing was set and cemented at 6,191 feet. A 7 5/8-inch liner was hung from 5,949 feet to 9,087 feet.

On August 12, 1980, Mesa tested the tieback of Well A-1 to 2,500 pounds per square inch (psi). The Blowout Preventers (BOP's) were tested on August 17, 1980, and the weight of the well fluid was being cut from 11.6 pounds per gallon (ppg) to 9.5 ppg calcium chloride (CaCl_2). By August 21, 1980, a Dowell Model 18 packer was set below the lower sand, and that sand was perforated with 12 shots per foot. A Dowell Model 16 packer was set above the lower sand, but below the upper sand, and the upper sand was perforated with 12 shots per foot on August 23, 1980. The perforations were washed; then the completion fluid was cut from 9.5 to 9.1 ppg in an attempt to reduce fluid loss.

On the morning of August 24, 1980, Mesa pulled the plug in the Model 16 packer, allowing the two zones to be in communication with each other. They tripped out of the hole with the 3 1/2-inch work string and proceeded to test the BOP's. The hole, which was taking approximately 15 barrels (bbl) per hour, was kept full during these operations, which lasted from 11:00 a.m. to 4:30 p.m. After completing the BOP tests, Mesa decided to cut the drill line. Following this operation, Mesa started to make up the gravelpack assembly for the upper zone. The assembly, which was hanging in the slips and through the BOP stack into the wellbore, consisted of 40

feet of 4" outside diameter (OD) screen, 120 feet of 4 1/2-inch OD blank pipe, and approximately 160 feet of 1 1/4-inch pipe which was being stabbed inside the gravel-pack assembly.

At approximately 5:10 p.m., while attempting to run a 1 1/4-inch OD pipe crossover tool in the assembly, the well started to flow. Within minutes, the 1 1/4-inch pipe was blown out of the assembly. At this time, Mesa closed the blind rams on the assembly and sounded the alarm to abandon the platform.

There were 37 individuals on the platform when the well blew out. Twenty-three people boarded one of the escape capsules. It would not start, so all of those individuals proceeded down the stairway to one of the boat landings, where they were picked up by a standby boat. The 14 people who boarded the other escape capsule evacuated the platform by means of that capsule. Four individuals were slightly injured in the evacuation.

On the morning of August 25, 1980, at approximately 4:30 a.m., the well caught fire.

III. Findings

A. Preliminary Activities

Well A-1 was perforated, washed, and the formation successfully gravel packed. A second interval was perforated, and fluid loss problems were then experienced. Weight of the completion fluid was then cut from 9.5 ppg to 9.1 ppg. Approximately 15 bbl/hour of CaCl₂ water were needed to keep the well full. The 3 1/2-inch work string and the plug in the packer between the upper and lower zones were then pulled out of the hole.

B. Loss of Well Control

Prior to 5:00 p.m. on August 24, 1980, a series of events commenced which ended in the loss of control of Well A-1, Lease OCS-G 2271, Vermilion Block 348, Gulf of Mexico, off the Louisiana coast. These events were as follows:

1. While experiencing losses of completion fluid, the BOP's were tested, and the drill line was cut. During these operations, 70 bbl of completion fluid were periodically pumped in the hole.

2. Immediately following these operations, a gravel-pack assembly, consisting of 40 feet of 4-inch OD screen and 120 feet of 4 1/2-inch OD blank pipe, was made up in the rotary and extended through the BOP stack and into the wellbore.

3. A string of 1 1/4-inch pipe and crossover tool were being stabbed in the assembly.

4. When the well started to flow, an attempt was made to pull the 1 1/4-inch pipe, but it was blown out of the gravel-pack assembly.

5. The blind rams were closed on the 4 1/2-inch pipe portion of the assembly hanging in the hole.

C. Explosion and Fire

The gas did not ignite until the following morning at approximately 4:30 a.m. on August 25, 1980, (see Attachment 2). The source of ignition has not been determined.

D. Emergency Warning

The general alarm was sounded, and all personnel proceeded to their emergency stations.

E. Abandonment of Platform

All 37 individuals aboard the platform were evacuated safely. Twenty-three people boarded one escape capsule, and 14 boarded the other escape capsule. However, the motor for the first capsule could not be started, so all 23 men, wearing life jackets, proceeded down the stairway to the boat landing, where they were picked up by the standby boat.

F. Injuries and Damage

Four people were slightly injured while abandoning the platform. Injuries were limited to minor abrasions on their feet caused by walking on the platform grating without shoes.

The upper deck of the platform, the drilling rig, SEE Rig 8, and the living quarters were essentially destroyed in the fire (see Attachment 2). All wellheads were damaged and will have to be replaced. Wells on the platform were temporarily abandoned in accordance with OCS Order 3 and were not completed. No pollution resulted, due to the fact that the flow was dry gas.

IV. Conclusions

A. Proximate Cause of Incident

The proximate cause of the loss of well control was:

1. The failure to maintain proper fluid level in the well. The hole was losing fluid to the open perforated intervals. The periodic fillup was not sufficient to avoid gas influx into the well.

2. Inability of pipe or blind rams to seal while the gravel-pack assembly was hanging through the BOP stack. The length of the assembly necessitated hanging it in the well during makeup.

B. Proximate Cause of Explosion and Fire

The proximate cause of the fire was:

1. Release of gas hydrocarbon at a high rate of flow from the wellhead.
2. Ignition from an undetermined source, possibly:
 - a. Spark from debris striking derrick;
 - b. Static electricity;
 - c. Generator.

C. Cause of Injuries

The cause of minor personal injuries was from walking on the platform grating without shoes.

D. Contributing Causes

Contributing causes of the incident:

1. Scheduling of BOP tests and cutting the drill line with open perforated intervals.
2. Not stabilizing the hole before proceeding with these operations.

E. Evidence of Misconduct or Violations

In our opinion there is no evidence of misconduct or violation of any specific laws or regulations; however, there is apparent violation of the general requirement of 30 CFR 250.41(a)(1) that "the lessee shall take all necessary precautions to keep its wells under control at all times"

V. Recommendations

A. Issuance of Proposed OCS Order 6

That the USGS expedite the issuance of proposed OCS Order 6, "Well Completion and Workover Operations," which has specific requirements covering completion operations and may have avoided this incident.

B. Issuance of Safety Alert

That, as soon as possible, the Gulf of Mexico OCS Region issue a Safety Alert warning all operators of the need to:

1. Constantly monitor the fluid level status of the hole while completing, and especially when there are open perforations.
2. Schedule routine repairs, maintenance, and tests of equipment to be completed before the casing is perforated or after the well is secured.

C. Review Maintenance Program

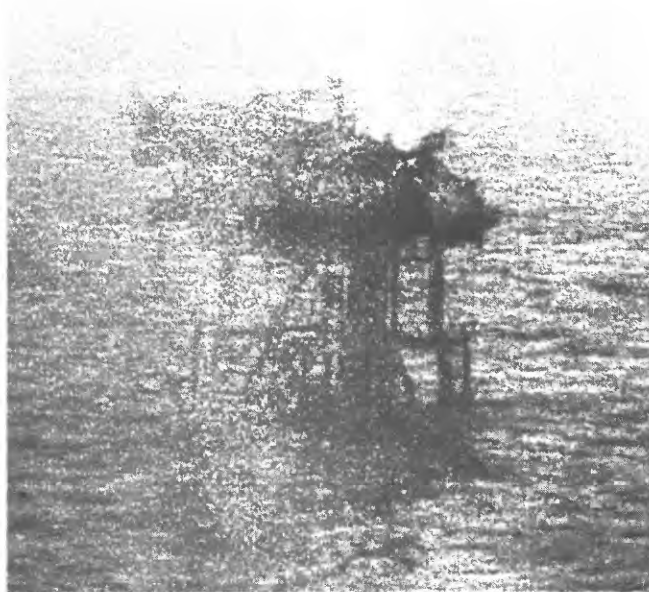
That the company review the maintenance program for escape capsules.

D. Case Closed

That this report be referred to the Director's designee for review pursuant to 30 CFR 250.71.

LIST OF PERSONNEL AT MEETING

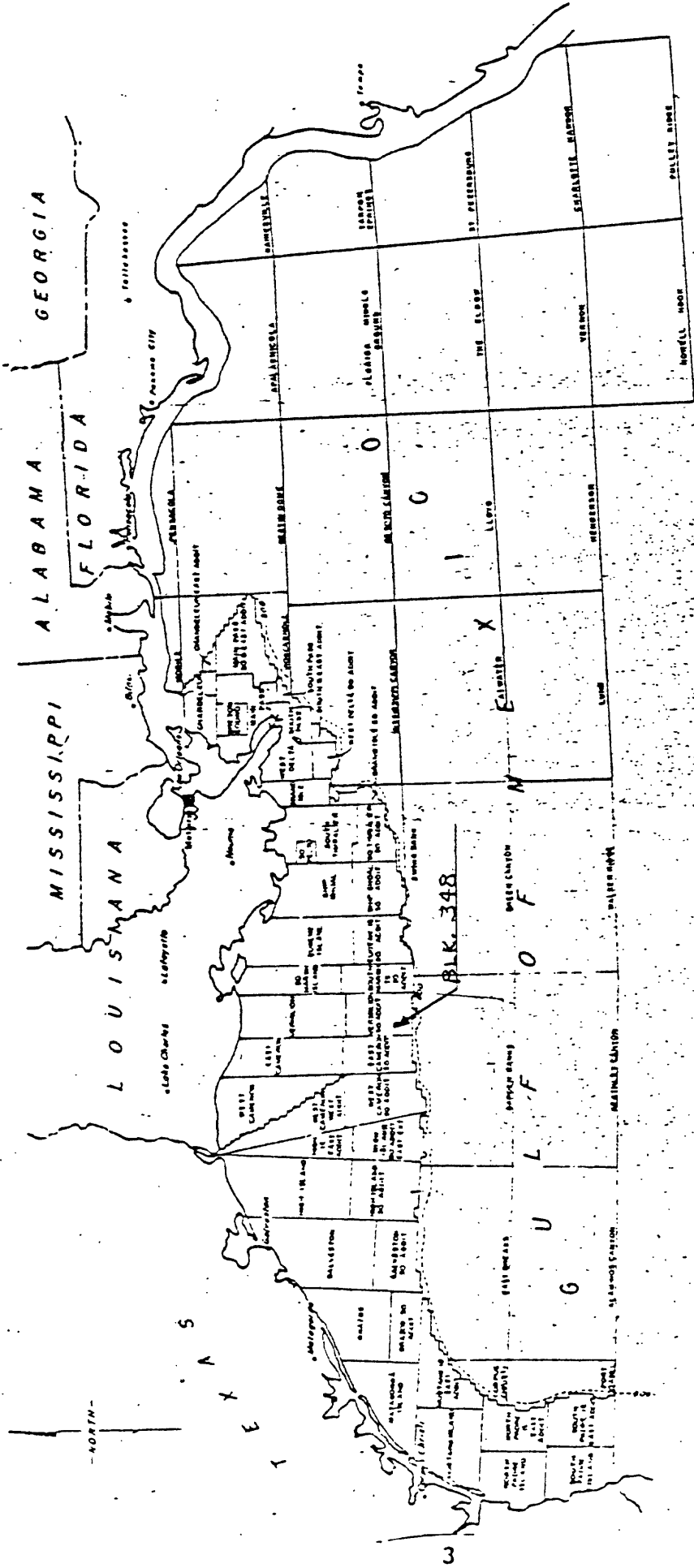
John Kloecker	W/Mesa	Regulatory Coordinator
Jim Stewart	"	VP - Operation
Jim Barrett	"	Operations Manager - Gulf Coast
Pete Phillip	"	Production Supervisor
Bob Thomas	"	Attorney
Bob Rawls	"	Drilling Foreman
Don Lueck	USGS	Chief Drilling Technician
J. B. Hidalgo	"	Drilling Technician
Mike Hebert	"	Drilling Engineer
Robert Mayeux	"	Drilling Technician
Robert Darrow	"	District Supervisor



Date: Prior to Commencement of Spraying By
Jet Barge Jirafa on 8/28/80
Location: Vermilion Block 348, Platform "A"
Photographer: Supplied by Mesa Petroleum Co.

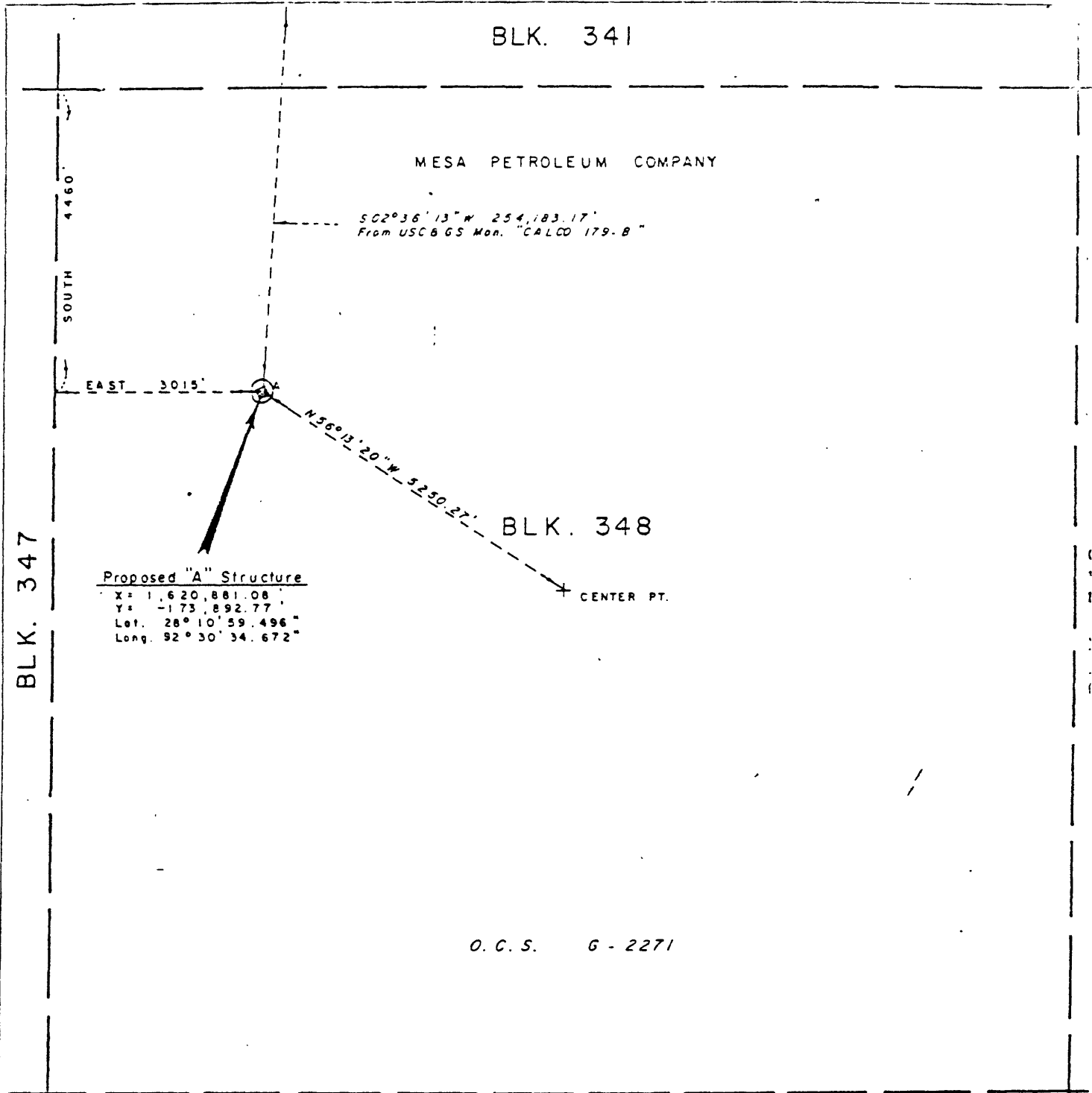


Date: After Commencement of Spraying by Jet
Barge Jirafa on 8/28/80
Location: Vermilion Block 348, Platform "A"
Photographer: Supplied by Mesa Petroleum Co.



UNITED STATES
 GEOLOGICAL SURVEY
 DEPARTMENT OF THE INTERIOR
 CONSERVATION DIVISION - METAIRIE, LA.
 GULF OF MEXICO OCS REGION

Attachment 3 --- Lease Index Map, Gulf of Mexico.



Proposed "A" Structure
 X = 1,620,881.08
 Y = -173,892.77
 Lat. 28° 10' 59.496"
 Long. 92° 30' 34.672"

O. C. S. G - 2271

BLK. 347

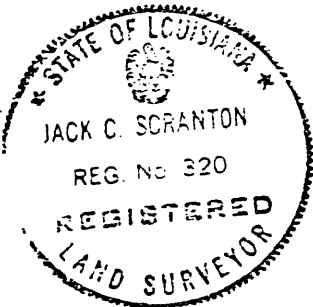
BLK. 341

BLK. 348

BLK. 363

I hereby certify that the above prop. "A" str. location is correct.

Jack C. Scranton
 Registered Land Surveyor No. 320
 State of Louisiana
 John E. Chance & Associates, Inc.



MESA PETROLEUM COMPANY
 O.C.S. G-2271 NO. "A" ST

PERMIT PLAT

VERMILION AREA
 SOUTH ADDITION

SCALE: 1"=2000'

11 /21/7