

JUL 18 1980

In Reply Refer To: OMS-7-1

Federal Programs Office
Office of Coastal Zone Management
3000 White Haven Street
Washington, D.C. 20435

Gentlemen:

In accordance with 30 CFR 250.34, revised December 13, 1979, enclosed is a copy of a proposed Development/Production Plan submitted by Chevi. U.S.A. Inc. for Leases OCS-G 3258, 3259, and 3960, Blocks 51, 82, and 92, West Cameron Area, Control No. 4-0555.

Sincerely yours,

(Org. Sig.) D. W. Solanas

D. W. Solanas
Deputy Conservation Manager
Offshore Operations Support
Gulf of Mexico OCS Region

Enclosure

cc: Lease OCS-G 3258 (OMS-2-3)
Lease OCS-G 3259 (OMS-2-3)
Lease OCS-G 3960 (OMS-2-3)
(OMS-2-2 w/enclosure)

Alvarado:md:7/15/80



Chevron U.S.A. Inc.
P.O. Box 51743, Lafayette, LA. 70501

May 27, 1980

6 3258
3259
3250
3251

**Proposed Development Plan
West Cameron Blocks 31/82/92
OCS-G-3258/OCS-G-3259/OCS-G-3960**

**United States Department of the Interior
Geological Survey
P. O. Box 7944
Metairie, LA. 70010**

Attention: Mr. D. W. Solanas

Gentlemen:

To comply with the requirements of 30 CFR 250.34 to drill and produce the captioned blocks, please find attached:

1. Nine (9) copies of the following:

- a. **Proposed Development Plan of West Cameron Blocks 81/82/92, Leases OCS-G-3258/OCS-G-3259/OCS-G-3960.**
- b. **Cross Section Map**
- c. **Structure Map**
- d. **Location Plat for the wells proposed in these blocks**
- e. **Shallow Drilling Hazards Report**
- f. **Drawing of Production Structures**
- g. **Information on tentative pipelines**
- h. **Vicinity Map**
- i. **Schematic of drilling rig**

It is requested that the items listed under Section 1 above be kept confidential.

Yours very truly,

J. D. Zimmermann
Administrative Assistant

:mb

Attachments

cc: U.S.G.S. District Office - Lake Charles



PROPOSED DEVELOPMENT PLAN
WEST CAMERON BLOCKS 81/82/92
OCS-G-3258/OCS-G-3259/OCS-G-3960

Chevron U.S.A. Inc., as lessee, submits the proposed Development Plan for West Cameron Blocks 81, 82 and 92 in accordance with the regulations of 30 CFR 250.34-2 as follows:

1) PROPOSED SCHEDULE OF DEVELOPMENT

Chevron, as lessee and operator of West Cameron Blocks 81, 82 and 92, plans to develop the oil and gas reserves of these tracts by drilling from a centralized surface location in West Cameron Block 81.

On the basis of current structural mapping and geological evidence it is anticipated that at least three (3) wells will be necessary to evaluate and drain reserves in West Cameron Blocks 81, 82 and 92.

The discovery well, OCS-G-3258 #1, West Cameron Block 81, was suspended on February 27, 1980. We plan to remove this well and spud the first of the three wells, OCS-G-3259 #2, West Cameron Block 82, from this centralized location during August of 1980 with a permit previously issued under an Exploration Plan. This well should be suspended approximately November 1980 with possible completion in January 1982. The second well drilled will probably be OCS-G-3960 #1, West Cameron Block 92 and will be spudded approximately August 1981 and suspended in November 1981 for approximate completion during February 1982. The third well, OCS-G-3258 #2, West Cameron Block 81 is scheduled for spudding in November 1981 with completion in December 1981.

We plan to install the "CA" Satellite Structure in approximately June 1981. The design and fabrication of a production structure (to be labelled "A") is scheduled to begin in June 1981 and will be installed adjacent to "CA" Structure. A drawing of these two structures is attached.

Assuming no unforeseen delays in the drilling program or structure designs and installations, it is estimated that production should commence during the third quarter of 1982.

Total estimated initial production from the three potential wells is 20,000 MCFD. Total estimated cumulative formation water (produced over an estimated 6-year life) is 50,000 barrels.

2) DESCRIPTION OF DRILLING VESSELS

A mat-supported submersible barge rig is planned for drilling the subject wells (schematic of rig attached).

~~CONFIDENTIAL~~
PUBLIC INFORMATION

NOTED-ALVARADO

Safety features will include well control and blowout prevention equipment at least as good as described in OCS Order No. 2. Appropriate life rafts, life jackets, ring buoys, etc., as prescribed by the U.S. Coast Guard will be provided. Pollution prevention and control features will include all necessary coaming drains and holding tanks to prevent contamination of the sea, in accordance with OCS Order No. 7 - Pollution and Waste Disposal.

3) The surface location of the Satellite Structure ("CA") on West Cameron Block 81 is expected to be as follows:

100' from West line and 1420 from South line of West Cameron Block 81

with a production structure known as "A" Structure located due South and connected to "CA" Structure by a bridge.

The approximate bottom hole locations of the proposed wells to be drilled are as follows:

<u>Well</u>	<u>Bottom Hole Location</u>	<u>Distance from Platform</u>	<u>Depth</u>
OCS-G-3259 #2 (previously permitted under Expl. Plan)	200' FEL & 800' FSL West Cameron Blk. 82	700'	10,600'
OCS-G-3258 #2	5350' FWL & 4600' FSL West Cameron Blk. 81	6150'	9,800'
OCS-G-3960 #1	400' FNL & 750' FWL West Cameron Blk. 92	1950'	10,600'

4) The submitted structure map of West Cameron Blocks 81/82/92 shows the 9750' Sand Structural Horizon of Lower Miocene Age which is approximately 150' above top supernormal pressure. The proposed well will encounter normal and high pressured sands. The schematic structural cross-section is oriented in a northeast-southwest direction and diagrammatically shows the anticipated path of the OCS-G-3259 #2 well in West Cameron Block 82.

5) ENVIRONMENTAL SAFEGUARDS

A. (1) All development drilling will be in conformance with OCS Order No. 2 including all pertinent API Standards.

B. (1) Liquid Disposal

(a) Drilling muds containing free oil will not be discharged into the Gulf of Mexico.

(b) Curbs, gutters and drains will be installed on platforms and/or structures.

- (c) Sewage, produced water and deck drainage discharges will be treated and monitored to assure compliance with Federal Water Pollution Control Act guidelines when same are implemented.
- (d) Solid Waste Disposal
 - (a) No solids containing free oil will be disposed of into the Gulf of Mexico.
 - (b) All other non-sewage solid wastes will be incinerated or transported to shore for disposal.
- C. (1) All personnel (Company and Contract) will be instructed in the techniques of equipment maintenance and operation for the prevention of pollution.
- (2) All unmanned facilities will be inspected as required.
- (3) All spills of any pollutant will be recorded and reported as required by the appropriate regulation, including notification to other operators of malfunctions/pollution from their facilities.
- D. (1) Pollution-control equipment (containment booms, skimmers, clean-up materials, etc.) is available at an onshore location prior to commencement of operations. This equipment is inspected and maintained in accordance with the applicable OCS requirements.

An oil spill contingency plan has been submitted to the appropriate supervisor and has been approved. This plan is reviewed and revised to reflect changes/improvements as required.
- E. (1) All production structures and associated production equipment will be designed and installed to facilitate pollution-free operations.
- (2) Production facilities will be designed, tested and maintained in accordance with the provisions of API RP 14C, "Analysis, Design, Installation, and Testing of Basic Surface Safety Systems on Offshore Production Platforms."
- (3) In addition to the requirements of API RP 14C, design and installation of the following items will be in accordance with the requirements of OCS Order No. 8:
 - (a) Pressure vessels
 - (b) Flowlines
 - (c) Remote shut-in systems
 - (d) Engine exhausts
 - (e) Glycol dehydration units
 - (f) Compressors
 - (g) Curbs, gutters and drains

- (h) Fire-fighting system
- (i) Gas detection system
- (j) Electrical equipment
- (k) Drilling

F. (1) All wells completed as production wells to minimum well and surface safety standards. (a) Well control, (b) minimum surface safety standards shall be maintained to prevent uncontrolled flow and minimize potential pollution.

(2) All sub-surface safety equipment to minimum, reasonable, standard and maximum to prevent uncontrolled flow.

G. (1) All compression wells to minimum well and surface safety standards, (a) Well control, (b) minimum surface safety standards to prevent uncontrolled flow.

(2) All injection wells to minimum well and surface safety standards, (a) Well control, (b) minimum surface safety standards to prevent uncontrolled flow.

H. Employee Orientation and Training:

(1) All employees shall receive orientation and training as a minimum to the following:

- fire safety
- drill safety
- well control
- surface safety

I. Oil and Gas Pipelines:

(1) All oil and gas pipelines shall be designed and developed to minimum standards to ensure safe and pollution-free transportation of oil and gas.

- (a) High-low pressure systems shall be used on all pipelines on the platform.
- (b) Automatic shut-off valves.
- (c) Check valves at the appropriate locations.
- (d) High-low pressure shut-off devices on all pipeline pumps.
- (e) Protection against corrosion either by protective coating or cathodic protection or a combination of both.
- (f) Installed so as to be compatible with trawling and other uses.
- (g) Properly tested prior to placing in service.
- (h) Inspected monthly for leakage.
- (i) Designed so as to be protected against water currents, storm scouring and other environmental factors.

6) SAFETY STANDARDS

All rules and regulations in effect for the OCS will be observed.

7) ONSHORE FACILITIES

The service base for this area will be Cameron, Louisiana. Numerous service facilities, including mud companies, pipe companies, dock space, warehouse, helipads and the like are found here. Existing facilities at the time of development will be utilized to handle the various jobs without any expansion or significant changes in activity levels.

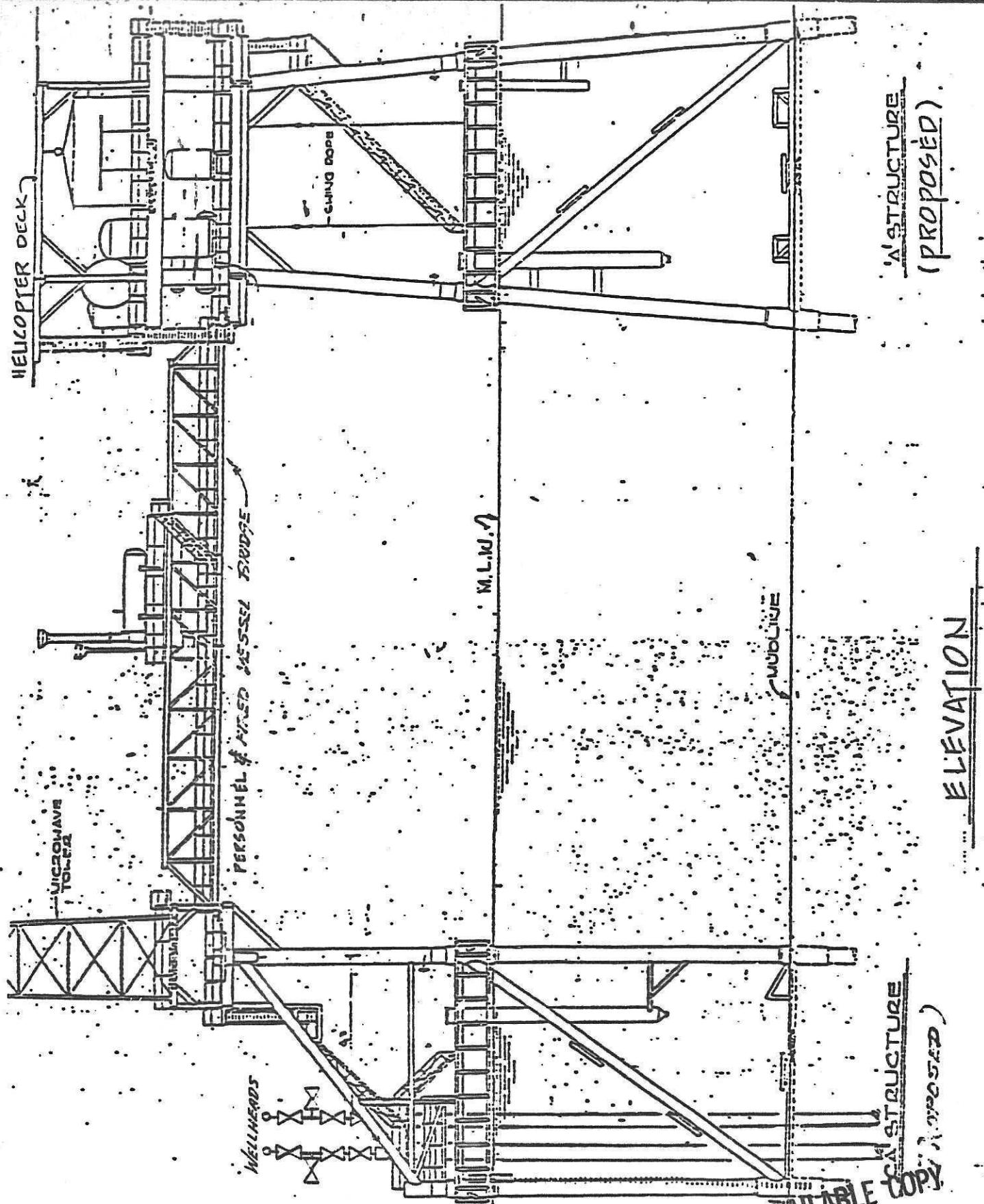
8) OFFSHORE STRUCTURES

See attached drawing labelled LA-395-3.

9) PIPELINES

It is anticipated that the purchaser will install the pipeline facilities to transport both the natural gas and condensate from the proposed West Cameron Block 81 "A" Production Structure. The correct schedule of activities for the development of these leases indicates that this pipeline is expected to be installed during the period from 5/1/82 to 6/1/82. Depending upon which company is awarded the purchase contract for this gas and condensate, we would expect this pipeline to be an 8" lateral line connected to Stingray, UT Offshore, Tidal or Transco System for transportation to shore. (See Drawing No. LA-395-2)

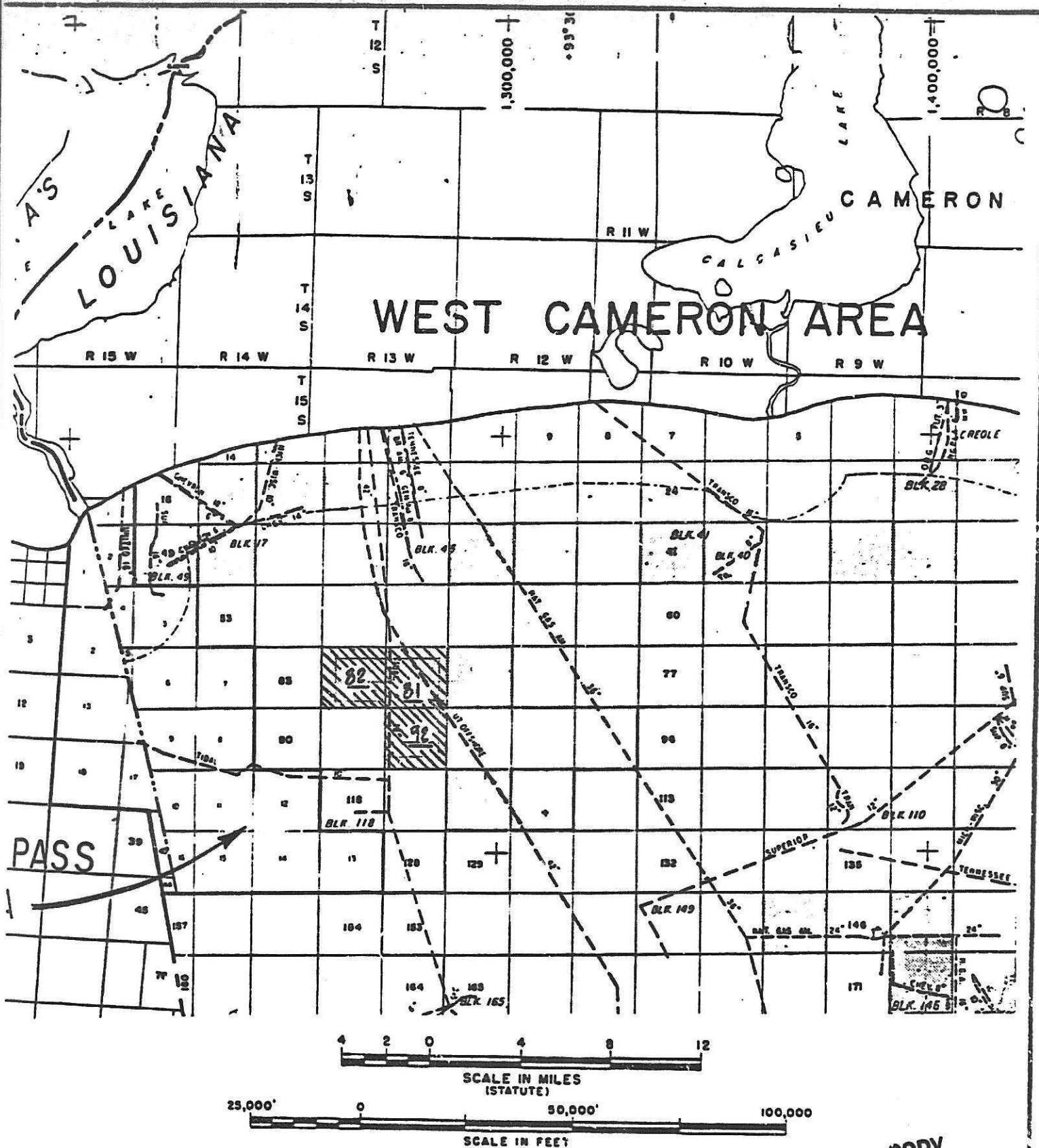
Chevron U.S.A. Inc. as lessee of West Cameron Blocks 81/82/92 believes that the structure map and structural cross-sections submitted with this proposed Development Plan are exempt from disclosure under the Freedom of Information Act and should, therefore, not be made available to the public or provided to any affected state or to the executive of any local government.



WEST CAMERON AREA
BLOCK E1 OCS-G-3258 1/SE.
PROPOSED "A & CA" STRUCTURES

Best Available Copy
Chevron U.S.A. Inc.
P.O. Box 51743, Lafayette, LA 70505

SCALE	NONE	Dwg. No. 1A-785-5
15 MAY 1980		AA-395



BEST AVAILABLE COPY

Chevron U.S.A. Inc.

P.O. Box 51743, Lafayette, LA 70505

VICINITY MAP
WEST CAMERON AREA
BLOCKS 81, 82 & 92

SCALE NOTED

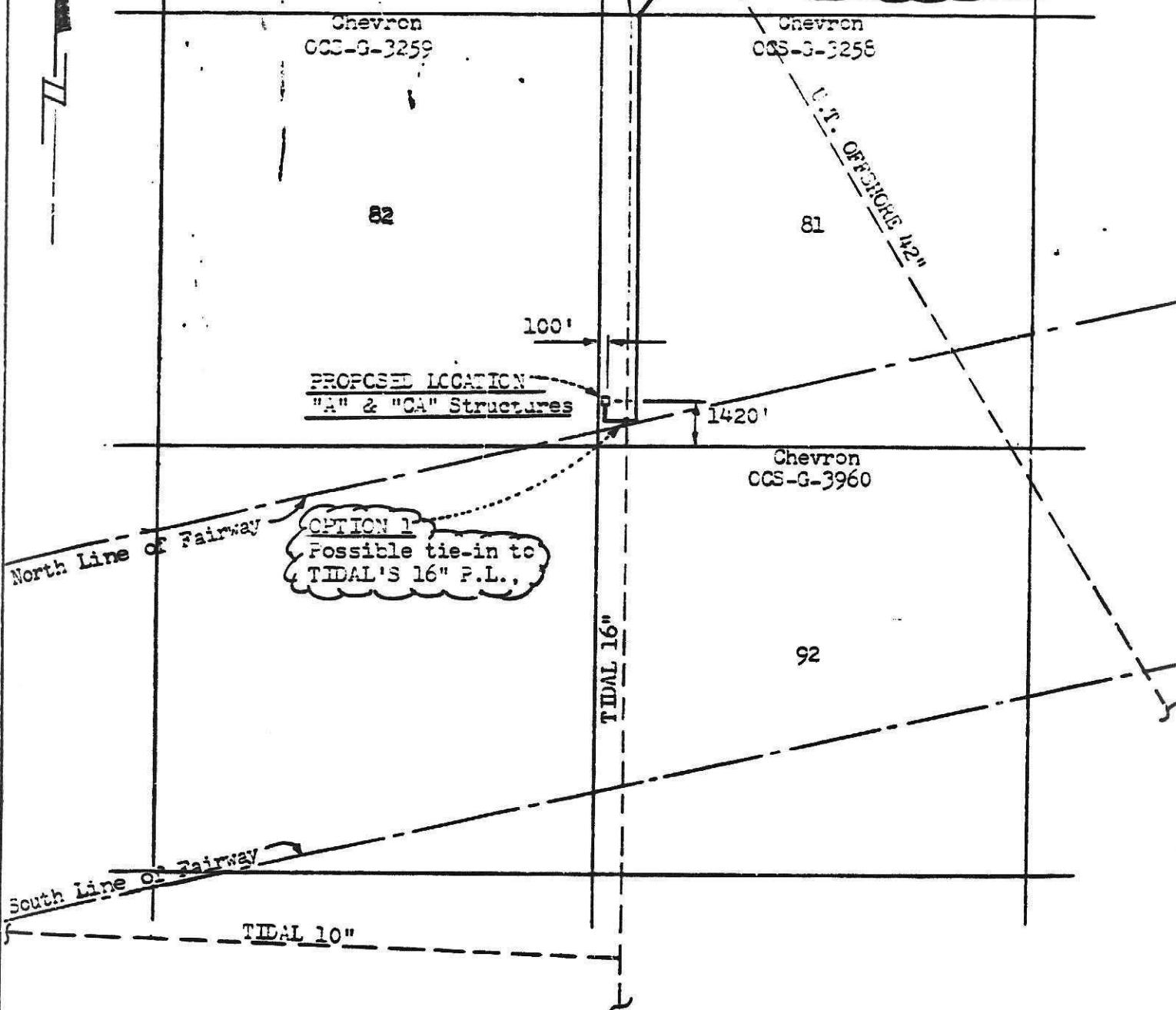
Dwg. No. 1A 70-1

15 MAY 1980

AA 395

OPTION 2
Possible tie-in to U.T. OFFSHORE'S
42" P.L..

OPTIONS 3 & 4
Possible tie-in to TRANSCO'S
P.L. in West Cameron Block 45
OR Stingray's P.L. in West
Cameron Block 44.



PROPOSED LOCATION OF STRUCTURES AND THE
FOUR TENETIVE OPTIONS FOR A GAS SALES
PIPELINE LATERAL FROM WEST CAMERON "A"
STRUCTURE.

CHEVRON U.S.A., INC.

WEST CAMERON AREA

BLOCKS 81, 82, & 92

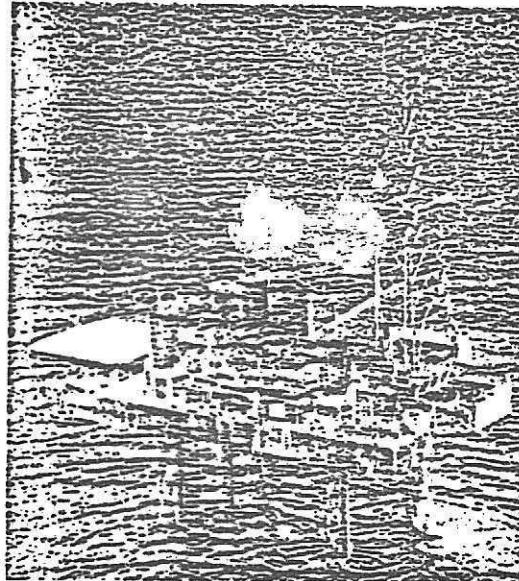
SCALE: 1" = 5000'

MAY 15, 1980

DWG. # Ls. 395-2 AA-395

BEST AVAILABLE COPY

OCEAN 66
MAT SUPPORTED JACK-UP



BARGE DATA

MAT ----- 134' Long x 117' Wide x 8' Deep with 3' scouring skirt. Slot in Mat is 37'8" Long x 37'8" Wide.

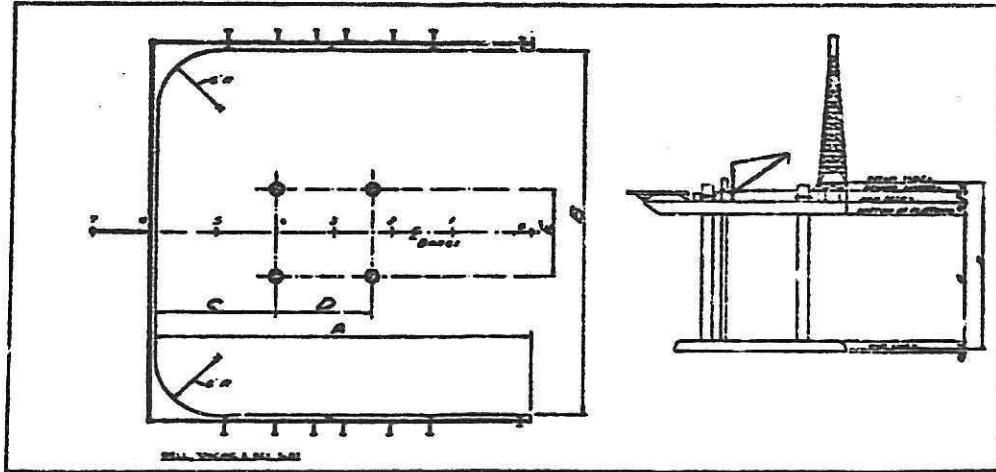
PLATFORM ----- Contains all living and working areas 217'6" Long x 117' Wide x 14' Deep. Slot in Platform is 37'8" Long x 37'8" Wide.

COLUMNS ----- 4 Cylindrical Columns - 12' Diameter. Height above bottom of Mat is 180'6".

HORIZONTAL SKIDGING ----- Allows 4 wells in a 10' x 9' Grid.

QUARTERS ----- For 62 men.

HELIPORT ----- 70' x 70'.



CLEARANCES & DIMENSIONS

	DIMENSIONS												OPERATING DEPTH		
	A	B	C	D	E	H	J	K	L	M	N	P	Maximum Normal	Hurricane Season	Minimum
Ocean 66	37'8"	37'8"	11'8"	10'	9'	168'	9'11"	141'5"	8'	3'	14'	12'3"	120	100	25'

1430' NO. 24

800' NO. 24

065-6-3259 WELL NO. 2

1100' E. S. T.

065-6-3259 WELL NO. 1

5600' N. S. E.

5600' N. S. E.

500' U. N.

500' E. N. W.

065-6-3259 WELL NO. 1

065-6-3259 WELL NO. 1

Block 81

065-6-3258 WELL

CHEVRON U.S.A. INC.

CHEVRON U.S.A. INC.

065-6-3259 WELL

Block 81

LOCATION PLAT
065-6-3259 WELL NO. 2
WEST CAMERON BLOCKS 81 & 82

BEST AVAILABLE COPY

Chevron U.S.A. Inc.
P.O. Box 51743, Lafayette, LA 70505

Scale 1" = 3000'

29 APR 1980

Draw. No.
JE

EQUIPMENT

1 ----- Lee C. Moore 30' x 40' x 147' deck. 1,000,000 pound API static hook load capacity.

1 ----- Continental Emsco C-3 Type 2 drawworks grooved for 1-1/2" line, V-200 Parvac hydrostatic brake, Emsco cat heads, Sandzel assembly mounted on drawworks, driven by 3 - 1,000 hp DC motors.

1 ----- Oilwell 37-1/2" rotary driven by 1,000 hp DC motor.

1 ----- 650 ton swivel Continental Emsco L-650.

1 ----- Continental Emsco RA-16-1-1/2" travelling block - 650 ton.

1 ----- Byron-Jackson hydrocheck - 500 ton.

1 ----- Continental Emsco RA F-0-7 crown block - 650 ton.

1 ----- Cameron-Payne 160 gallon 3,000 psi W.P. combination air and electric motor driven pump accumulator unit, 1-6 station control on drill floor and 1-4 station remote control.

1 ----- 13-5/8 10,000 psi W.P. Cameron Type U double blow out preventer ram units, with 1 shear blind ram, w/5,000 psi valves.

1 ----- 13-5/8 10,000 psi W.P. Cameron Type U single blow out preventer, equipped w/5,000 psi valves.

1 ----- 13-5/8 5,000 psi W.P. Type GL Hydril.

2 ----- Fairbanks-Morse model 38D8-1/8 8 cylinder opposed piston diesel engines, each ABS rated 1,800 hp at 720 rpm driving 2-1,600 KW traction type generators and 1-1,000 KVA AC generator.

1 ----- Fairbanks-Morse model 38D8-1/8 cylinder opposed piston diesel engine, each ABS rated 1,800 hp at 720 rpm driving 2-1,600 KW traction type generators.

2 ----- Emsco F-1300 7" x 12" Triplex pumps each driven by 2-1,000 hp DC motor and supercharged with 6" x 8" Mission centrifugal pump.

2 ----- Mission 6 x 8R, ce. centrifugal mud mixer pumps with 75 hp AC motors.

1 ----- Centrifuge Model - ' dual high speed shale shaker.

10,000' ----- 5" OD 19.50# Grade E, R-3 drill pipe with 5" X-Hole tool joints.

5,000' ----- 5" OD 19.50# X-105, R-3 drill pipe with 5" X-Hole tool joints.

21 ----- 7-3/4" OD x 2-3/4" ID drill collars with 6-5/8" API reg. conn.

1 ----- Taper tap end overshot for rig drill pipe and drill collars.

1 ----- Link belt Speeder model ABS 218 pedestal mounted crane with 100' boom rated at 6 Tons at 100' radius, 10.5 Tons at 70' radius, and 38 Tons at 25' radius driven by a GM 6-71 diesel.

1 ----- 10 Ton - 65' stiff leg crane.

1 ----- Halliburton HT-400 cement unit, Schlumberger.

1 ----- Pioneer T-16-4 Desilter

1 ----- Pioneer T-10-4 Desilter

1 ----- SWACO Degasser

1 ----- Barrel-O-Graph

1 ----- Flo-Slo

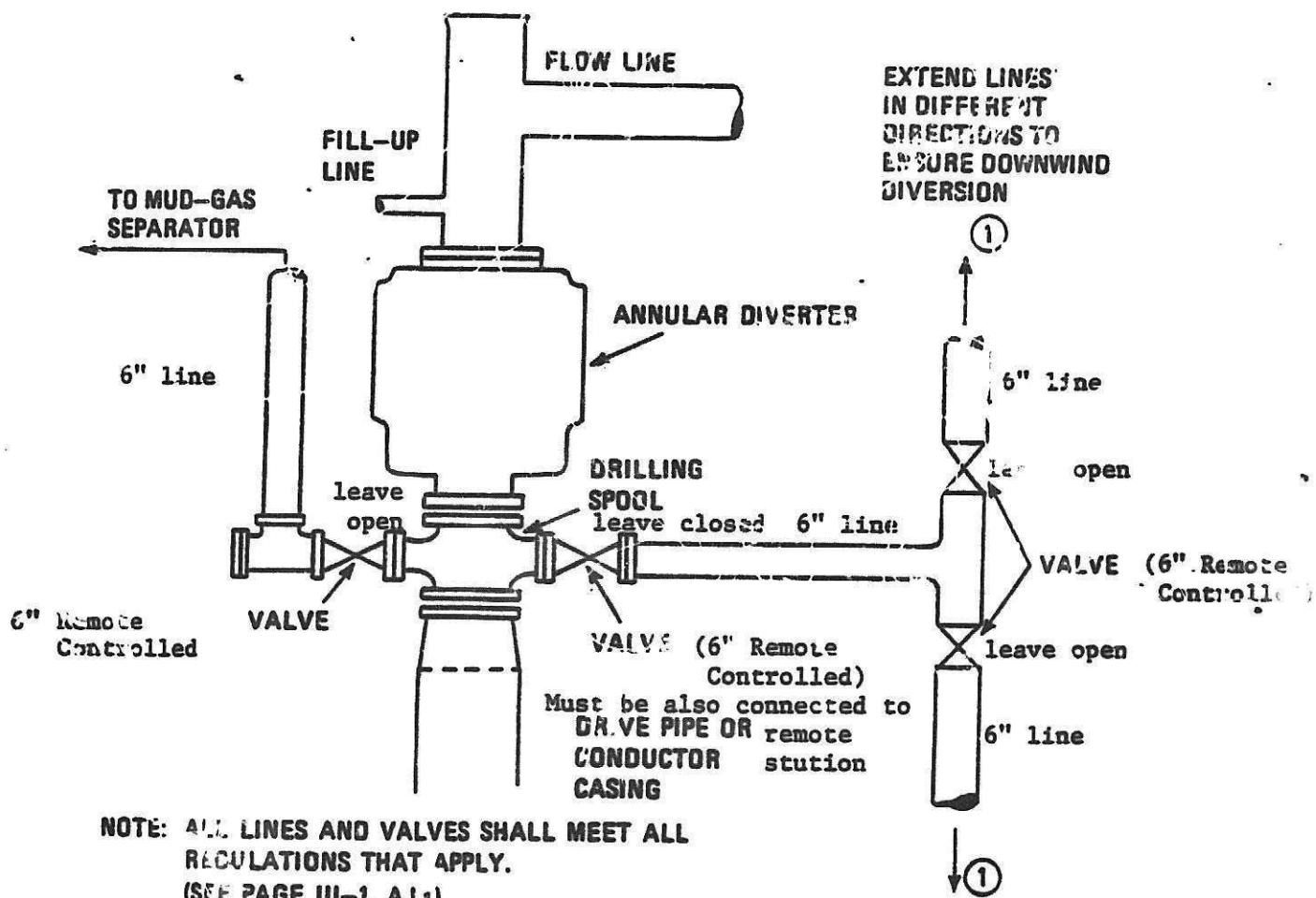
STORAGE CAPACITY

Fuel	1,145 bbls.	Dry Mud	120 S. Tons
Drill Water	5,820 bbls.	Bulk Mud	3,400 cu. ft. (4500sx.)
Potable Water	880 bbls.	Bulk Cement	3,400 cu. ft.
	Liquid Mud	1,200 bbls.	

BEST AVAILABLE COPY

breakdown, a blowout around the shallow conductor pipe, and cratering. A BOP should always be installed while drilling adjacent to another well on a platform or at a multicell location that is capable of producing.

FIGURE - III-1
DIVERTER-PRVENTER HOOKUP



Note: This meets minimum USCG requirements.
All valves are now remotely controlled.

LE 76-2762

DRILLING FLUID COMPOSITION

Gel, Fresh Water - Bentonite
Gel, Salt Water - Attapulgite Clay
Bentonite - Barium Sulfate
Fresh Water and/or Sea Water

CHEMICALS & ADDITIVES

Aluminum Sterate
A-Z-32 - Biodegradable surfactant
Barafloc, Flocculent - Polymer
Ben-Di, Flocculant - Polymer
Caustic Soda - Sodium Hydroxide
Chrome Lignosulfonate
C.I.S. - Chrome Lignosulfonate
Q-Broxin - Ferrochrome Lignosulfonate
Spersene - Chrome Lignosulfonate
Uni-Cal - Sodium Lignosulfonate
Lignite
Lenox - Lignite
Tannathin - Lignite
Ligee - Lignite
Lime - Calcium Hydroxide
NPL-40 - Biodegradable-Surfactant
Soda Ash - Sodium Carbonate
Sodium Bicarbonate
Sodium Bichromate
Sodium Acid Pyro Phosphate (SAPP)
Carboxyl Methylcellulose (CMC)

LOST CIRCULATION MATERIAL

Mica
Walnut Shells
Cellophane Flakes
Fiber

STUCK PIPE

Diesel Oil
Pipe Tax - Surfactant Aromatic Processed Oil (Organic)
Oil Faze - Fatty acid - Resins Emulsifiers clays
Black Magic - Air Blown Asphalt
Chemical "W" - Rosin Acids
Chemical "Y" - Naphthenic Acid
Oil Gel - Organo - Bentonitic Clays

All liquid mud will be returned to the base for disposal.

EGT AVAILABLE COPY

CHEVRON U.S.A. INC.
EASTERN REGION

Critical Operations and Curtailment Plan

Personnel safety and environmental protection have highest priority when conducting any operations. Preplanning and work scheduling are made with these factors in mind.

Chevron recognizes the offshore operating hazards and the possibility of marine environment contamination. Every effort will be made to minimize the pollution possibility and to provide maximum safe working conditions for all personnel.

Listed below are operations which are considered to be critical.

1. Shallow Drilling Hazards - A shallow drilling hazards report will be submitted as required in Sec. 2.3 of OCS Order 2. Upon encountering shallow hazards, well will be controlled in accordance with Chevron's USGS approved "Well Control and Blowout Prevention Guide".
2. Drilling in Close Proximity to Producing Wells - Operations will be conducted as outlined in Chevron's Multiple Operations Guidelines.
3. Moving Drilling Rigs On and Off Locations in Emergencies - Floater rigs and bottom setting drilling units will be secured by use of either hurricane plugs, cement, or BOP closure, if possible, when necessary to move rig off in emergency conditions.
4. Testing of Blowout Preventors - Drilling operations will not proceed until such time as the blowout preventor stack has been completely and successfully tested in accordance with Sec. 5.7 of OCS Order #2.
5. Well Kicks - After experiencing a well kick, drilling operations shall not be continued until such time as the wellbore is stable, safely overbalanced, and properly conditioned, in accordance with Chevron's USGS approved "Well Control and Blowout Prevention Guide".
6. Running and Cementing Casing -
 - a) The well is to be carefully monitored during the last trip in the hole with drill pipe prior to running casing.
 - b) The mud weight shall be determined to be adequate to control formation pressures in hole which is to be cased off.
 - c) The well will be checked for normal hole fillup and mud displacement on trip out of hole with conditioning assembly, and while going in hole with casing.
 - d) Flow line returns will be monitored while circulating or cementing.
 - e) If a casing string sticks before reaching the desired depth and cannot be freed, plans are to cement it in place, and notify proper USGS authority.
7. Nippling Up and Nippling Down Blowout Preventors - BOPs will not be nipped down unless well is deemed to be in a safe condition. Safety of personnel is of highest priority during nipple up and nipple down operations, and use of life jackets, safety lines or nets, and adequate pick-up lines by contractor personnel will be strongly encouraged.

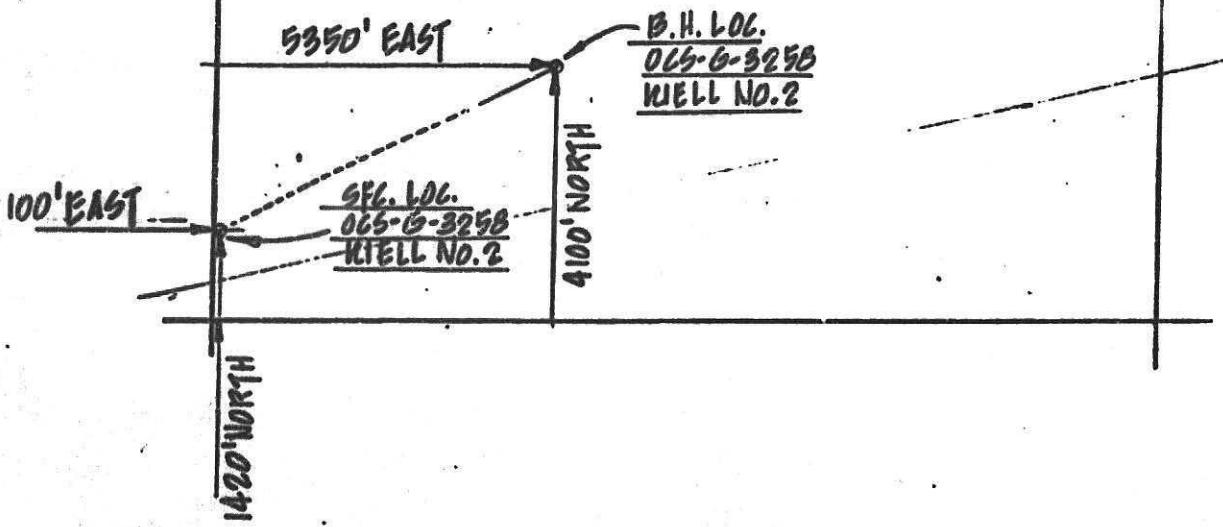
8. Minimum Mud Requirements at Well Site - Drilling will not proceed, when minimum amounts of mud materials or barite fall below minimum requirements of OCS Order #2, as specified on drilling program submitted with permit to drill. Greater than minimum amounts will be kept on location in most cases, and as deemed necessary by operator representative.
9. Logging and Wireline Operations - The mud weight shall be adequate to contain any exposed formations. The well will be monitored for flow during logging operations, and kept full at all times.
10. Hurricane Approach - Emergency procedures are provided for securing the well and evacuation of personnel in storm or hurricane situations.
11. Critical Welding and Burning Operations - Critical welding and burning operations will be conducted as outlined in Chevron's "Multiple Operations Guideline".
12. Drill Stem Testing and Production Testing - Drill stem testing and production testing will be performed in accordance with Chevron's "Multiple Operations Guidelines".
13. Plugging and Abandonment - The well will be plugged and abandoned in accordance with OCS Order #3. Plugging will not commence if the well is not under control. Blowout prevention equipment will not be removed prior to placement of surface plug. The OCS orders will be followed during the cutting and removal of casing and clearing the location.
14. Person In Charge - The person in charge at the site of all drilling operations for which Chevron is operator will be the Chevron operator representative. The immediate supervisor of the operator representative will be the Division Drilling Superintendent, Mr. K. D. Schenck. The Division Drilling Superintendent, or his designated alternate, will be available to advise on matters concerning critical operations or curtailment of drilling operations.

(Grid)

CHEVRON U.S.A. INC.

OCS-G-325B LEASE

BLOCK 81



LOCATION PLAT

OCS-G-325B WELL NO. 2
WEST CAMERON BLOCK 81

Chevron U.S.A. Inc.
P.O. Box 51743, Lafayette, LA 70505

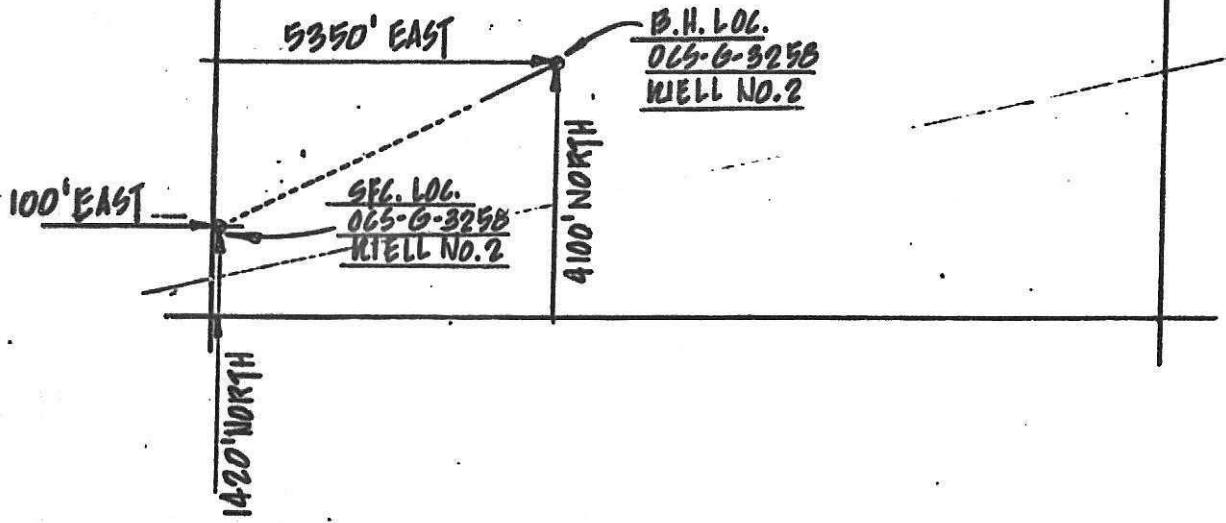
SCALE 1" = 3000'	Dwg. No.
6 MAY 1980	JSE

(GRID)

CHEVRON U.S.A. INC.

OCS-G-325B LEASE

BLOCK B1



LOCATION PLAT

OCS-G-325B WELL NO.2
WEST CAMERON BLOCK B1

Chevron U.S.A. Inc.
P.O. Box 51743, Lafayette, LA 70805

SCALE 1" = 3700' Dwg. No.
6 MAY 1 JSE

SHALLOW DRILLING HAZARDS REPORT

Date: April 18, 1980
Area: West Cameron Block 82
Well: OCS-G-3259 #2
Location: Surface Location; 100' FWL and 1,420' FSL of West Cameron Block 81, TGT; S 28° W, 700' out and vertical @ 9,600' TVD; PBHL; 200' FEL and 800' FSL @ 10,600' TVD in West Cameron Block 82.

Geophysical Data Reviewed

The subbottom profiles suggest numerous fluvial channels from just below the mudline to 200' + below sea level and deeper. There is no evidence for faulting, but in some cases, seismic events are attenuated below the channels suggesting the presence of organic detritus and possibly gaseous muds in the channel.

Results

The specific location for the subject well is not in the vicinity of these fluvial channels. Data examined indicate no problems should be encountered at proposed location.

Geological Data Reviewed

Chevron has drilled one well, OCS-G-3258 #1 in West Cameron Block 81, located 4,500' northeast of the subject well.

Results

The Chevron well drilled in West Cameron Block 81 encountered no hazardous drilling conditions.

Conclusions

Our review of geophysical and drilling experience in the vicinity of the proposed well indicates that current drilling practices should be adequate to drill the well safely.

GEOPHYSICIST: D. E. Zott / mrv

GEOLOGIST: Michael K. Vickers