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Record Group/Collection:	Donated Historical Materials
Collection/Office of Origin:	Bush, George H.W., Collection
Series:	Personal Papers
Subseries:	Zapata Oil File, Business Correspondence File

OA/ID Number:	25850
Folder ID Number:	25850-001

Folder Title:
Correspondence with Le Tourneau, Miscellaneous [1957-1959]

Stack:	Row:	Section:	Shelf:	Position:
G	5	1	3	5

ZAPATA OFF-SHORE COMPANY

BOX 3185

MIDLAND, TEXAS

GEORGE H. W. BUSH, PRESIDENT

August 28, 1959

R. G. LeTourneau, Inc.
Longview, Texas

Attention Mr. C. T. Peterson

Gentlemen:

We are returning herewith your proposal OD-960 dated August 26, 1959. This proposal has been signed by Mr. Wayne H. Dean and dated August 28, 1959.

We would appreciate it very much if you could speed this job up in every way possible. The proposal calls for five week delivery but since we need to receive these leg extensions as soon as possible we would appreciate you doing all you can to speed up this delivery.

Regarding the down payment, in accordance with Mr. LeTourneau and Hoyt Taylor's phone conversation, the \$60,000 down payment will be forthcoming within two weeks.

Very truly yours,

George H. W. Bush

GHWB/vf
Enc.

LETOURNEAU



EQUIPMENT

R. G. LETOURNEAU INC.

MANUFACTURERS OF HEAVY DUTY ELECTRICALLY POWERED AND CONTROLLED EQUIPMENT

GENERAL OFFICES: LONGVIEW, TEXAS

August 26, 1959

Zapata Offshore Drilling Company
2218 First City National Bank Building
Houston, Texas

Attention: Mr. Hoyt Taylor, Secretary

Gentlemen:

This will confirm the phone information from Mr. R. L. LeTourneau on August 24 concerning material and services for twenty-eight feet leg extensions on the "VINEGARROON."

The accompanying proposal, OD-960, is based upon Zapata furnishing all materials-handling equipment, heavy lift, welding equipment and supplies, and any additional personnel. If labor conditions at the facility selected for the installation impose any union requirements, Zapata will make all arrangements.

If you wish to proceed as proposed, please sign and return two copies of the proposal.

With best regards,

Yours very truly,

R. G. LeTOURNEAU, INC.

C. T. Peterson

CTP:jw

Enclosure: Proposal No. OD-960 (3)

P.S. Dick has mentioned that you were also to be advised of the estimated weight of the leg extensions, which is approximately 249,000 pounds.

*cancel any effort to speed up
down payment*

FFSHORE PLATFORM

PROPOSAL FROM

LETOURNEAU



R.G. LETOURNEAU INC

POST OFFICE BOX 2307 • LONGVIEW, TEXAS • TELEPHONE: PLAZA 3-4411

TO: ZAPATA OFFSHORE DRILLING COMPANY
2218 FIRST CITY NATIONAL BANK BUILDING
HOUSTON, TEXAS

ATTENTION: MR. HOYT TAYLOR, SECRETARY

DATE AUGUST 26, 1959

PROPOSAL NO. 00-960

SUBJECT LEG EXTENSIONS AND
BRACING FOR "VINEGARHORN"

We propose to furnish at the price and under the terms and conditions hereinafter set forth and set out on the reverse side hereof, and as described in the accompanying specification No. HEREIN which forms a part hereof, the following:

MATERIAL AND SERVICES FOR THE "VINEGARHORN"

Item

1. Services of two engineers to measure present structures for accommodation of extensions
2. Three sets of leg extensions to add approximately 28 feet, and approximately 41,000 lbs. of reinforcing material for the present top three panels of each leg, principally 3" x 5" x 3/4 angles of LeTOURNEAU N-20 High Tensile Alloyed Steel.
3. Services of two engineers to assist in placement of leg extensions.
4. Services, if desired, of welding personnel for installation of leg extensions.

WE WILL ENDEAVOR TO MAKE SHIPMENT

ALL THE ABOVE FOR THE SUM OF Item Two - \$120,000.00 F.O.B. Vicksburg, Mississippi of Item Two approximately five weeks after receipt of proposal acceptance accompanied by down payment.
Items One, Three and Four - First Engineer at \$100.00 per day, Second Engineer at \$75.00 per day, Welding Personnel at \$7.50 per hour, eight hour day (plus time and a half and double time as applicable), plus cost of travel, meals and lodging. Time runs from departure from Vicksburg until return to Vicksburg.

TERMS: Item Two - \$60,000.00 with proposal acceptance, balance net invoice upon shipment; Items One, Three and Four - Net upon invoice

This quotation is subject to acceptance within Five (5) days from this date.

ACCEPTED:

APPROVED:

Date 8-28-1959

Date _____

Firm Zapata Offshore Co.

R. G. LeTOURNEAU, INC.

By W. Wayne H. Dean

By _____

TERMS AND CONDITIONS

1. Until approved in writing by R. G. LeTOURNEAU, INCORPORATED (a California Corporation hereinafter called "SELLER") at Seller's home office, Longview, Texas, this order shall constitute an offer of purchase. When so approved it shall constitute the entire contract between the parties. Seller shall not be bound by any terms, conditions, representations or warranties, express or implied, not stated herein.

2. Limit and terms of credit specified on the front hereof shall be subject to change or limitation by Seller at any time, either before or after delivery of any part of the order, and Seller may demand payment in cash before delivery.

3. All claims that there is a shortage in delivery must be presented in writing to Seller within thirty (30) days after receipt of merchandise by Buyer. Failure of Buyer so to present any claim shall constitute a waiver thereof, and Buyer shall have no such claim against Seller.

4. The Seller warrants only such new equipment, accessories, parts and other products as are manufactured by the Seller. The Seller warrants each new piece of equipment to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory any part or parts thereof which shall be returned to it with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective, provided that such part or parts shall be so returned to it not later than six (6) months after factory shipment of the equipment to the original purchaser. This warranty is expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and it neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its equipment.

This warranty shall not apply to any equipment which shall have been repaired or altered outside of its factory in any way so as, in its judgment, to affect its stability, reliability, nor which has been subject to misuse, negligence or accident, nor to any equipment made by it which shall have been operated at a speed exceeding the factory rated speed, or loaded beyond the factory rated load capacity.

5. The delivery of any merchandise under this contract to any common or private carrier, for delivery to Buyer or his order, shall constitute delivery hereunder and Buyer will bear all risk of loss or damages in transit.

6. Seller will endeavor to ship promptly and to make delivery on the date requested on the front hereof, but it is understood that Seller cannot guarantee any time for delivery and in no event shall Seller be liable for delay in delivery from any cause whatsoever. Seller shall not be liable for any other default or failure to perform this contract caused by any cause or contingency beyond its control or beyond the control of any of its sources of supply, including but not limited to strikes, lockouts or other labor disputes, shortage of materials or labor, fires, accidents, floods, war, delays in transportation and any federal or state law regulation, action or order. In the event of occurrence of any such cause or contingency Seller may extend delivery schedules for the duration of such cause or contingency.

7. If Buyer is in default in payment or otherwise on this or any other contract, Seller shall have the right, in addition to all other legal remedies and without prejudice to any of its rights hereunder, to defer on further shipments until such default is removed, or, at its option to cancel any undelivered portion of this or any other contracts at any time after such default occurs, or to declare all outstanding bills of the Buyer due and payable forthwith.

8. All federal, state or municipal taxes, excises and duties on the manufacture, sale, use or delivery of the merchandise herein described, whether now or hereafter imposed, shall be paid by the Buyer unless otherwise stated on the front side hereof.

9. This contract shall not be subject to cancellation or modification except as hereinabove provided unless such modification or cancellation is agreed to in writing by Seller. If cancellation or modification is agreed to by Seller, Buyer will promptly pay all reasonable engineering and other expenses incurred by Seller in connection with this contract.

10. This contract shall be construed in accordance with the laws of the State of Texas.

/// 3195

June 12, 1958

Mr. S. H. Fain
Assistant Adv. Manager
R. G. LeTourneau, Inc.
Longview, Texas

Dear Mr. Fain:

I am returning the copy on the ad which you propose to run. I would prefer that we be quoted to only a limited extent. I would suggest that the quote be, "We at Zapata are very proud of the performance of our two LeTourneau platforms. Both the Scorpion and the Vinegarroon have rendered exceptionally fine service to the offshore oil industry, and we feel they will continue to do so for some time to come." We think the last of the text should be merely language which is not a direct quotation of Zapata. The gist of the material is satisfactory, but I personally feel it is more effective not to have too long a quote from Zapata since it would appear to be too much of a solicitation on your part.

If this does not meet with your approval, please give me a call and we can talk about this on the telephone since I do not want to weaken your ad in any way. I am holding the text in the event you want to discuss it some more.

You asked if we would like to have reprints of the ad. We would like to have several of these if convenient to you.

Yours very truly,

ZAPATA OFF-SHORE COMPANY

George H. W. Bush
President

GHWB:JMcB
cc: Wayne H. Dean

THEY

TOOK

TWO . . .

ZAPATA OFFSHORE CO.

twice selected LeTourneau Platforms . . .

praises two-year payoff performances

(pic)

Left to right: Hugh Liedtke, treasurer,
Wayne Dean, vice-president, George Bush,
president, of Zapata Offshore Company,
Houston, Texas

After two years of successful operation with
LeTourneau drilling platforms, President
George Bush reports:

"We at Zapata are very proud of the performance
of our two LeTourneau platforms. The Scorpion
set a record, we believe, in completing a move
from one location to another in less than eight
hours -- including a two hour tow. It has also
demonstrated an unusual ability to operate in
very soft bottom conditions.

(more)

check this

"The seaworthiness and ease of handling of the Scorpion was demonstrated recently when a single tug towed it from Galveston to Cay Sal Bank, Bahama Islands, -- a distance of over 1000 miles.

"The Vinegarroon, too, has proved itself under the most adverse conditions. In June, 1957, it withstood the full force of the destructive hurricane Audrey. Although the anemometer of the platform registered winds in excess of 100 mph before it was broken, the Vinegarroon was the first mobile offshore platform in the area to resume full scale operations.

LeTourneau platforms are custom engineered and built for a wide range of operating conditions. If you have a situation requiring a new platform we'd welcome the opportunity to discuss it with you. Call us for additional information, or write for descriptive literature. No obligation, of course.

(pic) "A"

(pic) "B"

The SCORPION on location

The VINEGARROON under tow

R. G. LeTOURNEAU, INC. (logo)

Marine Products Division

0000 South MacArthur

Longview, Texas

LETOURNEAU



R. G. LETOURNEAU INC

MANUFACTURERS OF HEAVY DUTY ELECTRICALLY POWERED AND CONTROLLED EQUIPMENT

GENERAL OFFICES: LONGVIEW, TEXAS

June 2, 1958

Mr. George H. W. Bush
President
Zapata Offshore Company
P. O. Box 2216
Midland, Texas

Dear Mr. Bush:

We are enclosing a photostat of the layout of the advertisement that we recently discussed with you, plus copy and photographs. Would you please check them and if they meet with your approval, let us know and we will get it into production immediately.

We plan to use this in Petroleum Week and Oil and Gas Journal either in late June or early July. If you like, we will be glad to furnish you reprints of the ad for your own use.

Thank you very much for your cooperation.

Sincerely yours,

R. G. LeTOURNEAU, INC.

S. H. Fain
Assistant Adv. Manager

SHF:aw

Enclosures

cc: Mr. Wayne Dean

May 5, 1958

Mr. R. L. LeTourneau
R. G. LeTourneau, Inc.
Longview, Texas

Dear Dick:

George Bush requested that I pass along to you some dope on our drill tender Nola I.

I am enclosing a brochure which covers both the tender and the drill rig that we use in conjunction with the tender. I believe all the drill rig equipment is listed separately so that you will have no trouble telling what is on the platform and what is on the tender. I am sure that between the description and the print that is attached you will have all the information you need. However, please do not hesitate to call us if more detail information is necessary.

Best personal regards.

Very truly yours,

ZAPATA OFF-SHORE COMPANY


Hoyt S. Taylor
Chief Engineer

HST:bj
Attachment

c.c. Bush

//// 3195

April 18, 1958

Mr. S. H. Fain
Assistant Advertising Manager
R. G. LeTourneau, Inc.
Longview, Texas

Dear Mr. Fain:

I am in receipt of your letter of April 16, 1958, and we certainly will cooperate with you on your planned advertising program.

The quotations which you suggest are satisfactory to me. Perhaps you would like to add a quotation regarding the log tow and the subsequent drilling operation in the Bahamas, since this seems to me to be a feature which might be of increasing interest to your customers. I would like to approve any wording before it is used if it is to be a direct quotation, of course.

Regarding the picture, I would much prefer your using the picture showing Liedtke, Dean and me, rather than one of me alone. If you do not have a glossy print of that picture, I am sure we can find one here, but I am sure it was taken by your people.

Yours very truly,

ZAPATA OFF-SHORE COMPANY

George H. W. Bush
President

GHWB:JMcb



R. G. LETOURNEAU INC.

MANUFACTURERS OF HEAVY DUTY ELECTRICALLY POWERED AND CONTROLLED EQUIPMENT

GENERAL OFFICES: LONGVIEW, TEXAS

April 16, 1958

Mr. George H. W. Bush
President
ZAPATA OFFSHORE COMPANY
P. O. Box 2216
Midland, Texas

Dear Mr. Bush:

We are planning a series of advertisements promoting the companies who have bought offshore platforms from us. These ads, as we have them planned, will feature the platform on location with a second picture of the president of each drilling company aboard his platform if possible. This campaign should be of benefit to all concerned.

To start off the series, we would like to feature Zapata and cover both the "Scorpion" and "Vinegarroon". With your permission, we would like to use the following information which has been taken mainly from your 1957 Annual Reports:

"We at Zapata are very proud of the performance of our two LeTourneau platforms. The Scorpion recently set, we believe, a record in completing a move from one location to another in less than eight hours -- including a two hour tow. It has also demonstrated an unusual ability to operate in very soft bottom conditions.

"In June, 1957, the Vinegarroon withstood the full force of the destructive hurricane Audrey. Although the anemometer on the platform registered winds in excess of 100 mph before it was broken, the Vinegarroon remained perfectly level and suffered inconsequential damage."

We would like to quote you on the above material and also we would like to have a photograph of you taken, if possible, on one of the platforms, preferably the Vinegarroon, but if this is not available, a print of the photo used in your 1956 annual report showing you, Hugh Liedtke and Wayne Dean would work fine.

R. G. LeTOURNEAU INC

Mr. George H. W. Bush

April 16, 1958

Page 2

If there are any other features about the platforms that you think would make good material for such an ad, or any thoughts you might have of interest to the people who lease your platforms, we would appreciate your mentioning them. The ad will be run in the petroleum publications as soon as we complete it.

If you have no objections to our running such an ad, we would appreciate hearing from you at your earliest convenience.

Sincerely yours,

R. G. LeTOURNEAU, INC.



S. H. Fain

Assistant Adv. Manager

SHF:aw

LETOURNEAU



R. G. LETOURNEAU INC

MANUFACTURERS OF HEAVY DUTY ELECTRICALLY POWERED AND CONTROLLED EQUIPMENT

GENERAL OFFICES: LONGVIEW, TEXAS

April 8, 1958

Mrs. Juanita McBride
ZAPATA OFF-SHORE COMPANY
Box 3195
Midland, Texas

Dear Mrs. McBride:

It is not an imposition at all ... we are happy to be able to send you the photographs of the Scorpion on location that you requested.

With the activity in the Bahamas, it is understandable that your supply of photographs has been exhausted. We are taking the liberty of sending a few additional prints.

Please let us know if we may be of further service to you in any way.

Sincerely yours,

R. G. LeTOURNEAU, INC.


Vernon Bingham
Public Relations

VB:ha
Enclosures

/// 3195

March 31, 1958

Mr. Nathaniel E. Jones
Public Relations Supervisor
R. G. LeTourneau, Inc.
Longview, Texas

Dear Mr. Jones:

You have been so good about furnishing us with pictures that I wonder if we can impose upon you once again. We have been having to furnish a number of pictures with reference to our Scorpion drilling at the Cay Sal Bank in the Bahamas and our supply has been depleted. Would it be possible for you to send us about ten more copies of #10850, and perhaps that will hold us for a while.

Thank you very much.

Yours very truly,

(Mrs.) Juanita McBride

LETOURNEAU

R. G. LeTOURNEAU, INC.



Equipment

GENERAL OFFICES: LONGVIEW, TEXAS

October 8, 1957

Anna

ASME PAPER:

This is a copy of an ASME paper presented by Dick LeTourneau on the design of drilling platforms for waters up to 600 feet.

Several magazines are running excerpts from the paper but we thought you might like to read it in its entirety.

If you would like additional copies, please let us know.

S H Fain

S. H. Fain

Marine Division

SHF:aw

October 16, 1957

Mr. S. H. Fain
Marine Division
R. G. LeTourneau, Inc.
Longview, Texas

Dear Mr. Fain:

Thank you very much for forwarding me a copy of the ASME paper presented by Dick on the new design of drilling platforms. I found this article to be very interesting.

Yours very truly,

George H. W. Bush

JMcB

LETOURNEAU



EQUIPMENT

R. G. LETOURNEAU INC

MANUFACTURERS OF HEAVY DUTY ELECTRICALLY POWERED AND CONTROLLED EQUIPMENT

GENERAL OFFICES: LONGVIEW, TEXAS

July 17, 1957

Mr. George H. W. Bush
Zapata Off-Shore Company
P. O. Box 2216
Midland, Texas

Dear George:

In accordance with our telephone conversation today, I am enclosing two copies of our Engineering Illustration No. L-11906 showing the principle of the employment of our drilling tender type platform. The Aramco unit will contain only the sub-structure, derrick and the drawworks associated with it. The power plant and generator for elevating and lowering the barge of course will be on the platform. All the other functions will be taken care of by the drilling tender. In this illustration the depth of hull is 10 ft., length of spuds 100 ft., and overall length approximately 88 ft., and overall width approximately 92 ft. The draft of the hull afloat for location change is calculated to be approximately 5 ft. 6 in. The wind and wave forces are substantially below the hurricane criteria in the Gulf.

I believe there are similar requirements in Venezuela as to wind and wave forces, elevation of the unit above sea level, and bottom conditions, but I think you will find the water depths are somewhat greater.

I am working on some units now with particular regard for the requirements in Venezuela. As soon as all the data is put together, I will be glad to show you the unit.

With best regards.

Yours very truly,

R. G. LeTOURNEAU, INC.

R. L. LeTourneau
Vice President

RLL:bjm
Enclosures

2 copies Eng. Illus. L-11906

cc: Mr. Wayne Dean, Houston

RECEIVED
JUL 19 1957

ZAPATA

July 17, 1957

Mr. George H. W. Bush
Zapata Off-Shore Company
P. O. Box 2216
Midland, Texas

Dear George:

In accordance with our telephone conversation today, I am enclosing two copies of our Engineering Illustration No. L-11906 showing the principle of the employment of our drilling tender type platform. The Aramco unit will contain only the sub-structure, derrick and the drawworks associated with it. The power plant and generator for elevating and lowering the barge of course will be on the platform. All the other functions will be taken care of by the drilling tender. In this illustration the depth of hull is 10 ft., length of spuds 100 ft., and overall length approximately 88 ft., and overall width approximately 92 ft. The draft of the hull afloat for location change is calculated to be approximately 5 ft. 6 in. The wind and wave forces are substantially below the hurricane criteria in the Gulf.

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I am working on some units now with particular regard for the requirements in Venezuela. As soon as all the data is put together, I will be glad to show you the unit.

With best regards.

Yours very truly,

R. G. LeTOURNEAU, INC.

R. L. LeTourneau
Vice President

RL:bjm
Enclosures
2 copies Eng. Illus. L-11906

cc: Mr. Wayne Dean, Houston ✓

Mobile and Fixed Platforms for Waters Up to 600 Feet

R. L. LeTourneau
Vice President

R. G. LeTourneau, Inc.
Longview, Texas



For delivery September 24, 1957 at the
American Society of Mechanical Engineers
Petroleum Mechanical Engineering Conference

ABSTRACT

Covered in this paper are the requirements — basic and technical — for platforms capable of drilling in waters 100 to 600 feet in depth. Answers are submitted for such problems as: Multiple wells from a single mobile platform; conversion of a mobile exploratory platform to a fixed platform for development operations; probable costs of units designed for waters up to 300 feet; spud penetration and footing for various soils; equipment obsolescence; and other platform factors pertinent to opening new offshore areas.

MOBILE AND FIXED PLATFORMS FOR WATER UP TO 600 FEET

INTRODUCTION

At this writing, drilling has been conducted from mobile platforms in waters up to 100 feet in depth, and in waters up to 110 feet in depth from fixed platforms. For purposes of this discussion, I shall call depths in excess of 100 feet, and possibly up to 600 feet, the *deep water* range.

It is the purpose of this paper to develop an economical approach to providing a platform in these deep waters from which drilling operations can be conducted. Depth of wells, exploratory and development drilling, and the combination of mobile barge and fixed platforms are considered. Although the total economics of offshore drilling also includes such factors as distance from land, lease cost, scope of reserves, production rate, and means of transporting oil, these are beyond the scope of this discussion.

The design criteria of one type of successful mobile platform are reviewed as a base of their applicability to deeper water. Other approaches to a practical and economical solution to this problem undoubtedly will be evolved, as the history of offshore operations progresses.

VERSATILITY IN THE "IDEAL" PLATFORM

In this approach to deep, open-water offshore drilling particular attention is directed to the platform aspects of the problem.

Depth of Wells

Well depths can be expected to vary, and when depth has been determined, this requirement will set limits on storage requirements for mud, pipe, and other supplies. Obviously, the deeper the wells contemplated, the greater the expense of platform and machinery.

Later in this discussion, an attempt is made to forecast drilling platform costs for drilling both 10,000 and 20,000 foot wells in over 150 to 300 feet of water.

Exploratory and Development Wells

The first question is to decide whether exploratory or development wells would be anticipated.

If the well is exploratory, a mobile unit is the proven economical answer. Today such platforms of various types are completely self-contained, including all drilling equipment, crew quarters, and approximately 10 days or more of operating supplies. (Fig. 1)

To utilize existing tenders, for operation in waters up to 100 feet, a self-elevating unit shown in Fig. 2 would be applicable. Such a mobile unit supports the sub-structure and derrick, draw-works, plus a small mud supply. The drilling tender provides the complementary services for drilling.

Both types of platforms illustrated completely salvage themselves in event of dry hole. Should the well turn out to be in a development field, multiple wells could be drilled from type shown in Fig. 1.

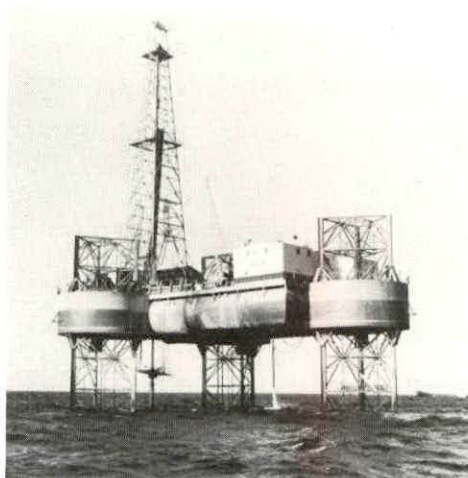


Fig. 1 - Tripod platform "Scorpion" is exploratory mobile unit, completely self-contained.

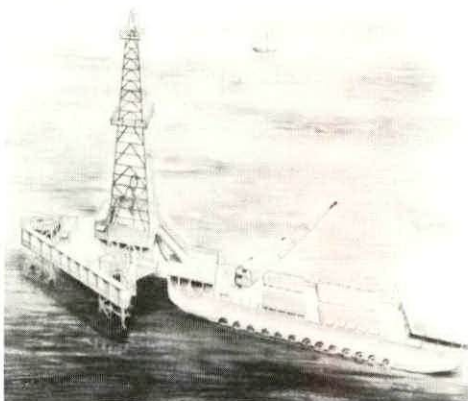


Fig. 2 - Mobile unit currently under construction is designed for 70 feet of water with tender.

Multiple Wells from Mobile Platform

Producing people do not agree on the most desirable number of wells to be drilled from one platform, but a trend seems to be indicated in Gulf of Mexico areas toward six or eight per platform, and sometimes 12. In development fields drilled from fixed platforms multiple wells are normal, and from some mobile platforms multiple wells are equally as practical. Employment of a multiple position derrick crown block is desirable, and Fig. 3 shows a method of drilling eight wells from one type of mobile self-elevating platform.

A two-position crown block provides two drilling positions, and by both lateral and longitudinal movement of the sub-structure, a total of eight positions can be established as shown. All well positions are six feet apart, and this separation distance could be varied.

In certain areas, such as coastal California, a still greater number of wells is indicated from one platform. In deep water, a mobile platform converted to a fixed platform can provide drill stem clearance right through the platform, if desired, and accommodate 30 wells or more.

Combination Drilling Platform and Elevated Construction Barge

If a well is completed, a jacket can be placed about the well with a heavy duty barge crane; or to further reduce costs, the jacket could be placed by a heavy duty crane on the mobile drilling platform. (Fig 4)

Sections of template are transferred from an ordinary barge by the platform crane and mechanically held in place as shown within the barge drilling slot.

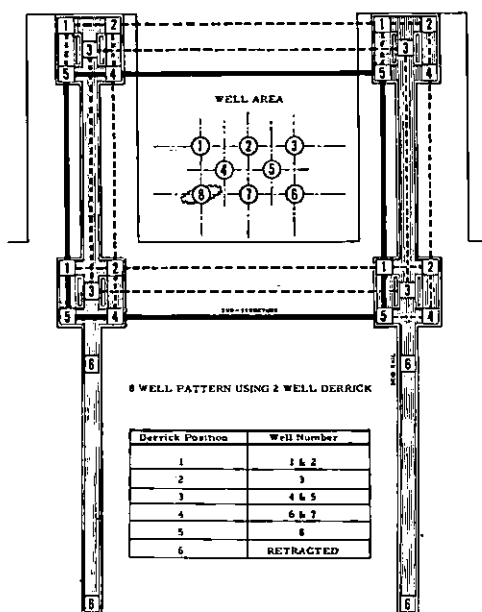


Fig. 3 - Two-well derrick permits from one to eight positions for multiple-hole operations. (See text.)

Other sections are added as required, then lowered to the ocean floor. Then piles can be driven with the same platform heavy duty crane that handles the template sections. If required, the jacket could be set with the crane of the elevated mobile platform even before the initial casing would be set. Another probability is that the same self-contained mobile platform could set or drive piling, and lift a cap for the piling into place completing a minimum jacket-type platform.

DESIGN CRITERIA FOR THE "IDEAL"

Supporting Structure Design

Based on the possibility that the ocean bottom at the well location may or may not be level, at least three spuds are required. With a provision for independent vertical adjustment on each spud with respect to the barge or platform itself, the platform can be maintained level. In shallow water, or where scouring may be expected, or unanticipated settling could occur, the barge could be readily maintained level by periodic adjustment.

When a self-elevating barge goes on a location, and either an uneven bottom, a hard bottom or other than calm sea is present, it is possible that one spud will take a substantial load on itself contacting the bottom; and two spuds may be expected to support the entire load. With the latter assumption that two legs must support the barge and its cargo, additional legs should be the same size. Since three spuds are required, they comprise the basic economical unit. More than three spuds, such as four or five, could very well be used, but only at substantially increased cost.

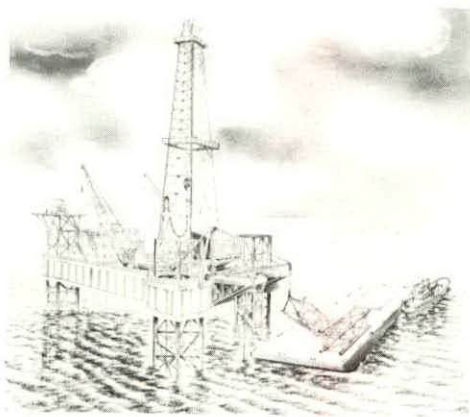


Fig. 4 - One method of placing jacket over well-head, by a self-contained mobile platform.

Soil Conditions

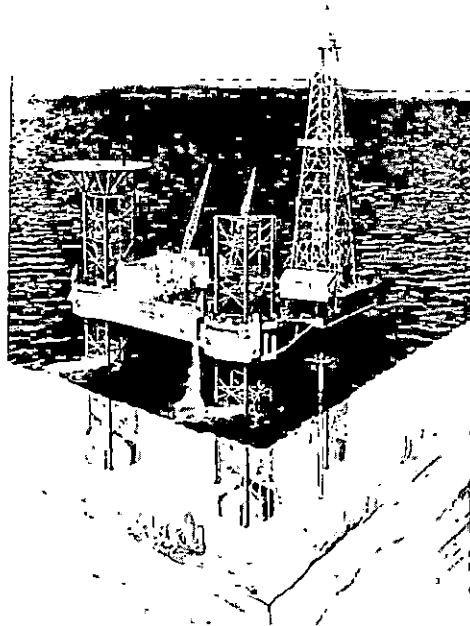
It will be noted in Fig. 5, a cutaway illustration of Zapata Offshore Company's Vinegarroon, that it is of tripod open truss construction. Each spud bottom extremity is enclosed to form a pontoon-like structure. These three individual pontoons provide a substantial bearing area, without interfering with the independence of action of each spud. Normally, the individual pontoons are full of water, and create a buoyant effect with resultant reduction of spud loading by the difference between the gravities of water and displaced mud.

While there is an abundance of data available from corings to predict the action of piling at varying depths *below* the surface, usable information on the *first 15 feet* below the ocean bottom is very sparse. Consequently, predictions of penetration of various size caissons with a given loading has been difficult.

Tripod platform results so far have indicated very small penetrations in dominantly sand and clay locations off the Texas coast (up to three feet), while penetrations off the Louisiana coast have varied from two feet to 12 feet. With spuds 100 feet apart, penetrations have varied on each location as much as three feet. Total loadings have been in the vicinity of 8,000,000 pounds with the spud-pontoon diameters 35 feet. Penetration is not only dependent upon loading per unit area and the character of the soil, but also is influenced by the shape of the pontoon and its approach to the soil as well.

Of the five units of the tripod type presently under construction, four are being built with a

Fig. 5 - Photo of "Vinegarroon," for 100-foot depths, includes cutaway to show how spud tanks afford controlled penetration.



concave bottom for use in relatively soft bottom, while one will taper to a point for use on coral or rocky bottom as well as soft bottoms. Three now in service have a concave bottom. For operation on exclusively hard bottom, the pontoon will generally not be required, while pontoon height of 32 feet in soft bottoms have proved more than adequate to date.

Wind Forces

Wind velocities vary considerably with locality, and generally can be pinned down when the geographical area of operation is known. The units in Fig. 1 and Fig. 5 were designed for use in the Gulf of Mexico and a maximum wind velocity of 125 MPH. The unit in Fig. 2 was designed for the Persian Gulf and a maximum wind velocity of 70 MPH.

Wave Forces

Considerable research is going on in the field, and efforts being made to record actual wave heights and forces. A common criteria is a wave force associated with storm waves of a maximum height of 40 feet, in waters up to 80 feet. In any case, attention is directed to the requirement that the bottom of the elevated platform be above all waves, with due regard for astronomical and storm tides, wave crests and wave interference. In waters upward of 100 feet, design waves of 50 feet or more may be indicated as reasonable. In areas where lesser wave heights are indicated, economies can be effected.

It is well known that the size and configuration of platform-supporting members will determine the net wave forces impinging against them. Thus, a lattice work structure essentially made up of small round members will offer the least resistance to the waves, whatever the direction. Such a structure provides a basis of design in this approach.

Stability Afloat

The tripod type self-elevating platform is basically a barge having three spuds in a retracted position when afloat. (Fig. 6) The barge is towed by tugs to its drilling location, where the spuds are lowered to the bottom with water in the pontoons, and the barge elevated to the

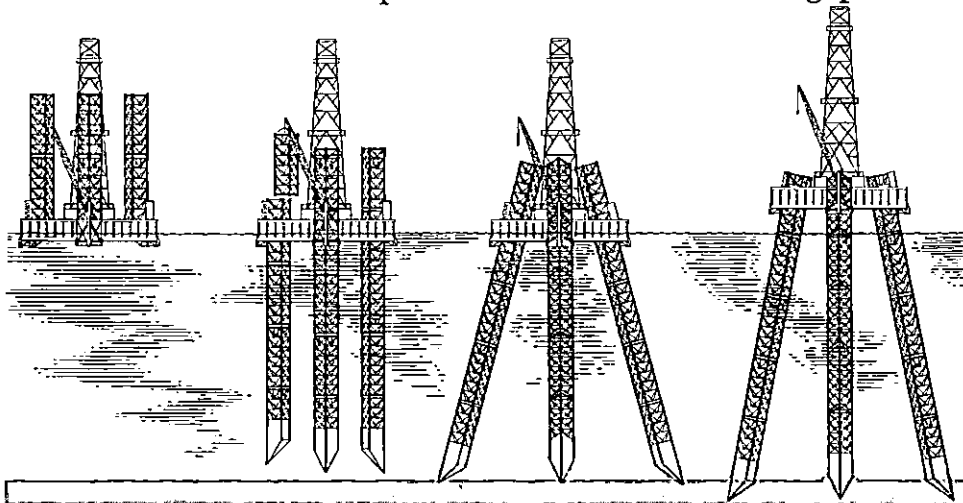
desired height. The bulk of the drilling machinery is located within the barge hull. The spud pontoons when afloat are normally empty, and are drawn up to a position within the spud wells of the barge. Even in heavy seas the barge is basically stable. Should an emergency arise when afloat, the crew on the barge can safely lower the spuds in roughening seas and increase the stability still further, or even elevate the barge above the waves. In the deep water approach, this basic feature of stability while afloat is retained.

Stability on Location

The milking stool, with its three legs, is basically stable. The tripod platforms, such as the Scorpion and Vinegaroon, are more stable than the stool under varying support conditions because of their ability to quickly adjust their spud lengths, if required. The ratio of spud length to chord of truss is about five to one. Or stated another way, the height of the platform at its maximum elevation is only five times the width of each of its legs. In the deep water approach with much longer spuds, stability is realized by spreading out the spud footings without increasing the size of the platform. (Figs. 8)

Speed on Location

Several methods have proven successful for elevating platforms



Figs. 6-9 - Combination self-erecting and self-elevating platform is shown in four stages of positioning.

above the ocean surface: One very successful method has been the rack and pinion method — the pinion driven by electric motors through gear reductions. (Fig. 10) Note the continuous engagement of the pinions with the rack throughout the elevating and lowering process. The Vinegarroon (Fig. 5) employs a total of 27 motor driven gear reductions for raising and lowering approximately 8,000,000 pounds, and has elevated itself to location above the water in 55 minutes. The design rate of elevation and lowering of the Vinegarroon was 12 inches per minute.

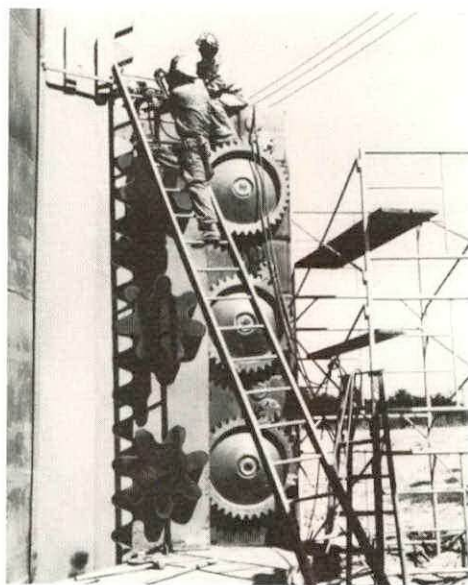


Fig. 10 — Three pinions, driven by electric motors through gear reductions, are shown in contact with one of three racks along each spud.

AN ANSWER

In depths between 100 and 600 feet we want to take advantage of the open truss and tripod design; however, there is no need to increase the barge or platform size. The answer is to spread out the footing centers.

A Simple Method for Increasing Footing Centers

In principle, the unit is a combination self-erecting and self-elevating drilling platform. See Figs. 6-9 for method of operation. In Fig. 6, showing the unit afloat, the unit appears to be a conventional tripod design. Upon arrival at location, additional sections of spud are added with the platform crane while spuds are in vertical position. Lowering in vertical position is continued until spud feet are about eight to 12 feet off of bottom. The spud feet are designed for penetration into both hard and soft bottoms. Then, as indicated in Fig. 8, the spuds are set

at a predetermined angle and lowered onto or into the bottom. When adequate bottom resistance is encountered, the barge is elevated to the desired height above the waves.

The platform is elevated by "spud locomotives," each of which is made up of several electric gear motors indicated at "A" in Fig.11. The "spud locomotives" are hinged to the barge at "B" to enable the barge to climb its inclined stairways on all spuds at once, or independently for adjustment. Guides within the "spud locomotive" frames maintain a firm grasp on the rack section of the spuds. Barge guides indicated at "C" provide additional spud to barge bearing. The "spud locomotive" drives are LeTourneau gearmotors and brake combinations. High capacity disc brakes on the motors hold the platform in place. An unusually high load on any one of the brakes could cause it to slip until the load was picked up and supported equally by each of the brakes.

When the barge arrives at the desired elevation above the water surface, it will be preloaded to its maximum weight and fixed in position. Since the platform in its elevated position is essentially an elevated construction barge, its own heavy duty crane can unload drilling equipment and supplies from a barge and place them in position on the platform. It is then ready to drill single or multiple wells, set templates, move off a dry hole or convert to a fixed platform if adequate production is indicated.

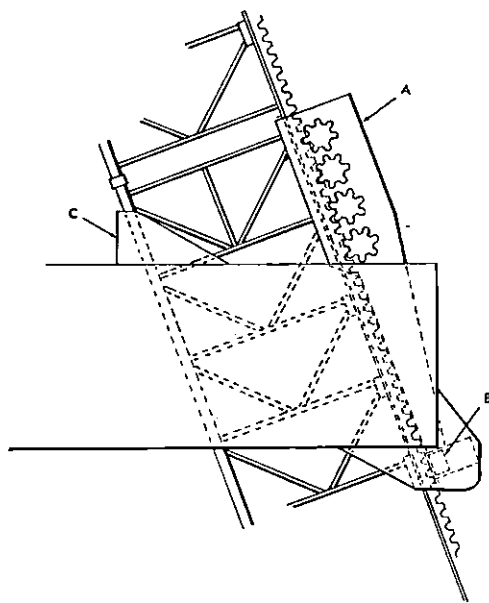


Fig.11- Drawing shows continuous engagement of spud rack and pinions; also barge guide and "hinge" arrangement of spud locomotives.

Estimated Costs:

This proposed deep water design has been cost analyzed with due regard to the mass production techniques in heavy fabrication that it

makes possible. A platform unit capable of drilling 10,000-foot wells in water depths of 150 to 300 feet will probably cost \$11,000 per foot of water depth. A unit for 20,000-foot wells in the same water depths will cost perhaps half again as much.

Equipment Obsolescence

Our hats should be off to some of the earliest open water drilling contractors active in the Gulf of Mexico, for those pioneer contractors assumed a large proportion of the obsolescence risk. I have suggested herein that obsolescence can be minimized with a self-elevating mobile platform so designed that it can serve also as a fixed platform, and eventually left permanently on a site. With the deep water design proposed, the large crane, and the spud locomotives' diesel electric power elevating source, etc., are removable, and could constitute up to one-third of the investment when put in service with another platform. The remaining two-thirds would be left on location as a multiple-well fixed platform.

CONCLUSION

Self-elevated mobile platforms as a base for well drilling operations in deep water are practical. Their use in "wildcatting" is a must. Their economical conversion to fixed platforms for multiple wells will contribute in large measure to reduce oil production costs offshore.