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TECHNICAL NOTE NO. 3

RE-ENTRY CONE/TRIPLE CASING HANGER DESIGN

Prepared for the
NATIONAL SCIENCE FOUNDATION
National Ocean Sediment Coring Program
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Scripps Institution of Oceanography
Prime Contractor for the Project

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Deep Sea Drilling Project
Scripps Institution of Oceanography
INTRODUCTION

Concept development and design of the "Triple Casing Hanger" system began in October 1976. William Fischer, a consultant with many years of experience in the oil industry was contracted to develop the original concept based on the successful "dual casing hanger" system already in use aboard the GLOMAR CHALLENGER drill ship.

The triple casing hanger design allowed for deployment of two distinct casing strings (16" and 11-3/4"), in addition to the 20" conductor pipe washed in with the re-entry cone itself.

Machine drawings and hardware requirements for the system were developed at Deep Oil Technology (now part of Fluor Drilling Services).

A Prototype assembly was fabricated in the fall of 1978. Latch-in and acuation testing of the system was begun but not completed. Additional testing should be performed prior to actual sea trials of the system.
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RE-ENTRY CONE/TRIPLE CASING HANGER SYSTEM

I. OPERATIONAL SEQUENCE DRAWINGS

II. PARTS LIST & MACHINE DRAWINGS
TRIPLE CASING STRING SYSTEM

SONAR REFLECTORS

DRILL STRING

RE-ENTRY CONE

16" CASING
CEMENTED
50-300 METERS

11 3/4" CASING
CEMENTED
300-1000 METERS

18 7/8" HOLE

14 7/8" HOLE

9 7/8" HOLE

10-50 METERS

"JETTED-IN"

& 20" CASING

SEA-FLOOR
TRIPLE CASING STRING
OPERATIONAL SEQUENCE
DRAWINGS 1 THROUGH 4

R-1071-00
R-1072-00
R-1073-00
R-1074-00
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>DRWG. NO.</th>
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<tbody>
<tr>
<td>OH 4700</td>
<td>Assembly - Re-entry Cone &amp; 20&quot; x 16&quot; x 11 3/4&quot; Casing Hangers</td>
<td>D-OH4700</td>
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<td>OH 4701</td>
<td>Assembly - 20&quot; x 16&quot; x 11 3/4&quot; Casing Hanger</td>
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<td>OH 4702</td>
<td>Landing Assembly - Re-entry Cone &amp; 20&quot; Casing</td>
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<td>Assembly - 20&quot; Casing Hanger</td>
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<td>Body - 20&quot; Casing Hanger</td>
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<td>OH 4705</td>
<td>Transition Sub - 20&quot; Casing Hanger</td>
<td>C-OH4705</td>
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<td>OH 4706</td>
<td>Latch Groove Ring - 20&quot; Casing Hanger</td>
<td>C-OH4706</td>
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<td>OH 4707</td>
<td>Landing Assembly - 16&quot; Casing</td>
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<td>Assembly - 16&quot; Casing Hanger</td>
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<td>Body - 16&quot; Casing Hanger</td>
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<td>Transition Sub - 16&quot; Casing Hanger</td>
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<td>16&quot; Latch Retaining Ring - 20&quot; x 16&quot; Assembly</td>
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<td>OH 4712</td>
<td>Landing Assembly - 11 3/4&quot; Casing</td>
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<td>OH 4713</td>
<td>16&quot; Hex-Kelly Landing Tool Assembly</td>
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<td>OH 4714</td>
<td>16&quot; Bushing - 11 3/4&quot; Hex-Kelly</td>
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<td>OH 4715</td>
<td>Assembly - 20&quot; Paddle Type Landing Tool</td>
<td>D-OH4715</td>
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<td>Latch Sleeve - 20&quot; Paddle Type Landing Tool</td>
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<td>20&quot; Paddle Actuation</td>
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<td>Paddles - 20&quot; Landing Tool Assembly</td>
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<td>15 7/8&quot; O.D. Modified Butt Gage</td>
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<td>Ribs - 16&quot; Casing Hanger Assembly</td>
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<td>OH 4721</td>
<td>Re-entry/Triple Casing String System Assembly</td>
<td>D-OH4721</td>
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MATERIAL
22" O.D. X 1/2" WALL PIPE
GRADE A 40 GB
MUST DRIFT 1/8"
TOLERANCES UNLESS OTHERWISE NOTED
FRACTIONS 1/8"
DECAHEDRAL 1/8"
ANGLES 1/8"
CONCENTRICITY 0.0/0.05
O.D. SURFACE FINISH R7
LOPER SPEC A 40 GB
BREAK SHARP CORNERS 1/4"

DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

20° Casing Hanger

DEPARTMENT NUMBER 204705
MATERIAL
AISI 4140, Rc 28
PARCOLUBRITE AFTER FINISH MACHINE

TOLERANCES UNLESS OTHERWISE NOTED
FRACTIONS \( \frac{1}{4} \), DECIMAL 2.005
ANGLES \( \pm \frac{1}{2}^\circ \), CONCENTRICITY .001 TIR.

SURFACE FINISH 125 UNLESS OTHERWISE NOTED
BREAK SHARP CORNERS \( \frac{1}{4} \times 15^\circ \)

STAMP
PIN-OHATOG

DEEP SEA DRILLING PROJECT
SCIENCE INSTITUTE OF OCEANOGRAPHY

LATCH GROOVE RING
80° CASING HANGER

PIN-OHATOG
OHATOG
DEEP SEA DRILLING PROJECT
SCRIPTS INSTITUTION OF OCEANOGRAPHY

MATERIAL:
17" OD. 1" WALL PIPE MUST DRIFT 18"
GRADE A106B

O.D. SURFACE FINISH PER API 5B C8

16" OD. API BUTTRESS
CSS: THD: BOX
PER API 5B

DEEP SEA DRILLING PROJECT
SCRIPTS INSTITUTION OF OCEANOGRAPHY

16" EASING HANGER
HARDFACE WITH STOOGY 4G OR EQUIVALENT 1/4 THICK
GRIND TO FINISHED DIMENSIONS 1/4 SURFACE FINISH