INTERNATIONAL PHASE OF OCEAN DRILLING (IPOD)
DEEP SEA DRILLING PROJECT
DEVELOPMENT ENGINEERING
TECHNICAL NOTE NO. 2

DRILL-IN-CASING SYSTEM

SCRIPPS INSTITUTION OF OCEANOGRAPHY
UNIVERSITY OF CALIFORNIA AT SAN DIEGO
CONTRACT NSF C-482
PRIME CONTRACTOR: THE REGENTS, UNIVERSITY OF CALIFORNIA

DISCLAIMER

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TECHNICAL NOTE NO. 2

DRILL-IN-CASING SYSTEM

Prepared for the
NATIONAL SCIENCE FOUNDATION
National Ocean Sediment Coring Program
Under Contract C-482

by the

UNIVERSITY OF CALIFORNIA
Scripps Institution of Oceanography
Prime Contractor for the Project

June 1984

W. A. Nierenberg, Director
Scripps Institution of Oceanography

M. N. A. Peterson
Principal Investigator and
Project Manager
Deep Sea Drilling Project
Scripps Institution of Oceanography

INTRODUCTION

The "Drill-In Casing" system has been deployed only once--on Leg 78A, Hole 542B and was a qualified success. A 57 m string of 11-3/4" casing was drilled in to put the shoe (bit) at the desired depth of 323.5 m BSF with the coring extending through a fault zone which was to be isolated. The release mechanism failed to operate, however, and it was eventually necessary to sever the drill string above the BHA. Some weaknesses were identified in the system and will need further consideration before a second deployment is attempted.

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DRILL-IN-CASING SYSTEM
SEA TRIALS REPORT
LEG 78A

The "Drill-In Casing" system has been deployed only once--on Leg 78A, Hole 542B and was a qualified success. A 57 m string of 11-3/4" casing was drilled in to put the shoe (bit) at the desired depth of 323.5 m BSF with the coring extending through a fault zone which was to be isolated. The release mechanism failed to operate, however, and it was eventually necessary to sever the drill string above the BHA. The following weaknesses were identified and will need further consideration before a second deployment is attempted:

A) Release Mechanism - The failure of the release operation apparently resulted from the inability to move the release sleeve to the fully shifted position. This is evidenced by the failure of the shifting tool to disengage downhole. Two of the dog hinge pins sheared and the tool was recovered on the first attempt, but the overshot pin sheared on the subsequent two attempts, leaving the shifting tool in place.

   Since no failed components were recovered, primary failure analysis cannot be performed. A design review and further testing of the release mechanism are needed. It would seem possible that the vertical and torsional loading attendant to the 11-hour drilling operation may have caused distortion or failure of components of the drive/lowering system which, in turn, prevented proper actuation of the release mechanism.

B) Torque Transmission - Exceptionally high and irregular drill string torque was recorded throughout the drilling operation. This was attributed at the time to a "torsional spring" effect in the casing string. Since the casing bit is driven from the top of the casing, it was felt that energy was alternately stored and released by the casing, causing the drill string to "torque up" and then spin free. A spline or similar arrangement was proposed to key the casing and BHA together torsionally near the bit. The effect may have been simply the result of the high torque produced by 17-1/2" bit arrangement acting through the long drill string, however. The "spring" properties of the casing string should be analyzed to determine if this is a problem.

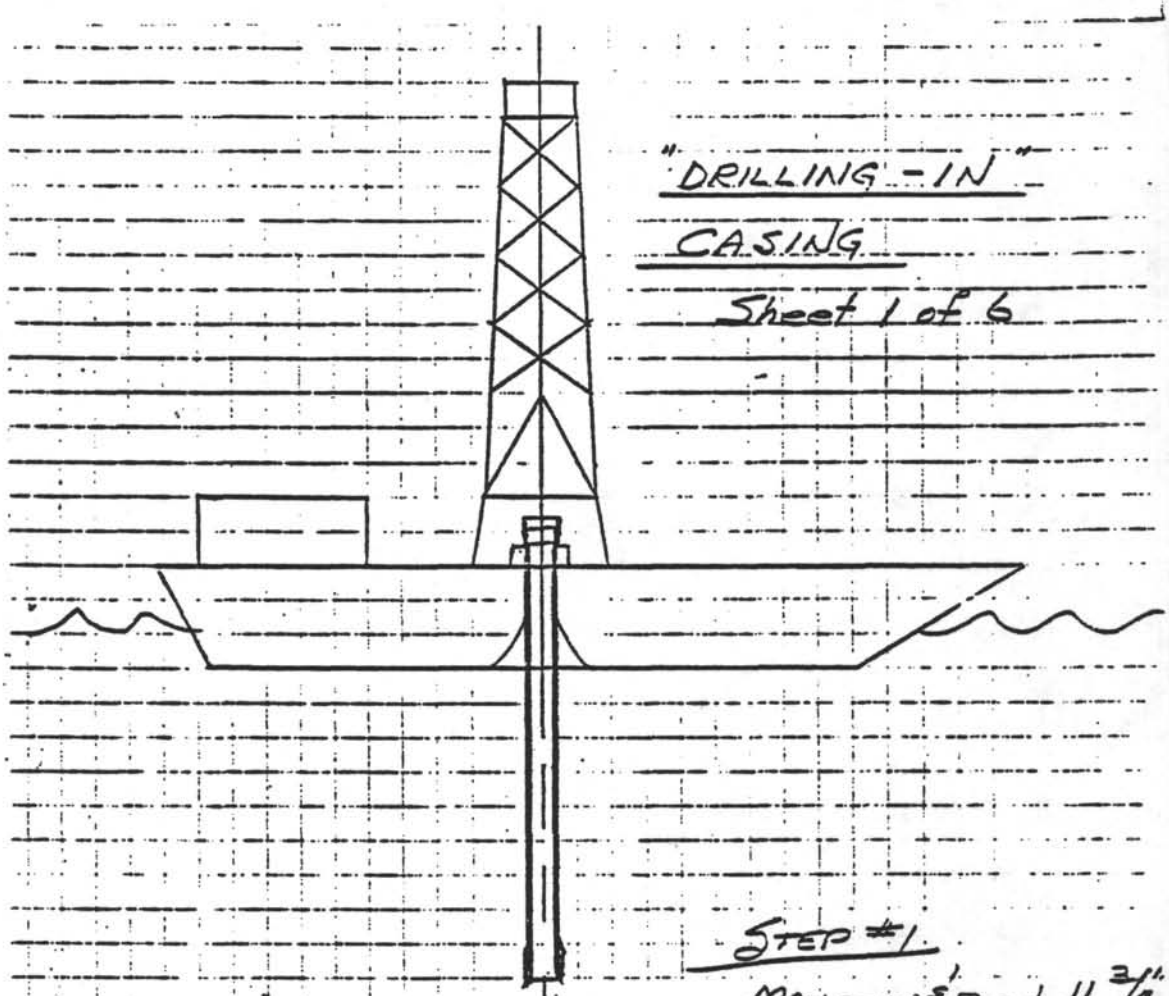
   NOTE that rotating friction against the wall of the hole will tend to loosen and "back off" the casing collar connections if the casing is driven from the bottom.

   A related problem was the requirement to rotate the string at about 60 rpm due to the low torque output at slow speeds of the GLOMAR CHALLENGER power sub.

C) Locking BHA Connections - A tendency for rotary-shouldered connections below the lowering sub to loosen and back off was foreseen due to vibration and irregular torque. To avoid using epoxy glue on the connections or tack welding the 4140 drill collars, a locking sleeve system was provided. The sleeves could not be installed on Leg 78A because their diameter was too small, and steel straps were tack welded across the drill collar connections. Observers agreed that the locking sleeve concept was unsatisfactory because it was felt that: (1) predrilling recesses in the drill collars was too time-consuming and difficult, (2) sleeves would never fit properly due to differences in collar diameter from wear and fabrication specifications and (3) the device would not be strong enough to resist torque sufficient to "break" a shouldered connection.

All indications are that the Drill-In Casing system would have been completely successful at Site 542, both in deployment and in isolating the unstable zone for further drilling, had the release failure not occurred. The high torque and low rate of penetration in the soft sediments penetrated leave serious doubts as to the feasibility of penetrating ingenous or even indurated sedimentary rock with the system.

Foss/Storms



"DRILLING-IN" CASING

Sheet 1 of 6

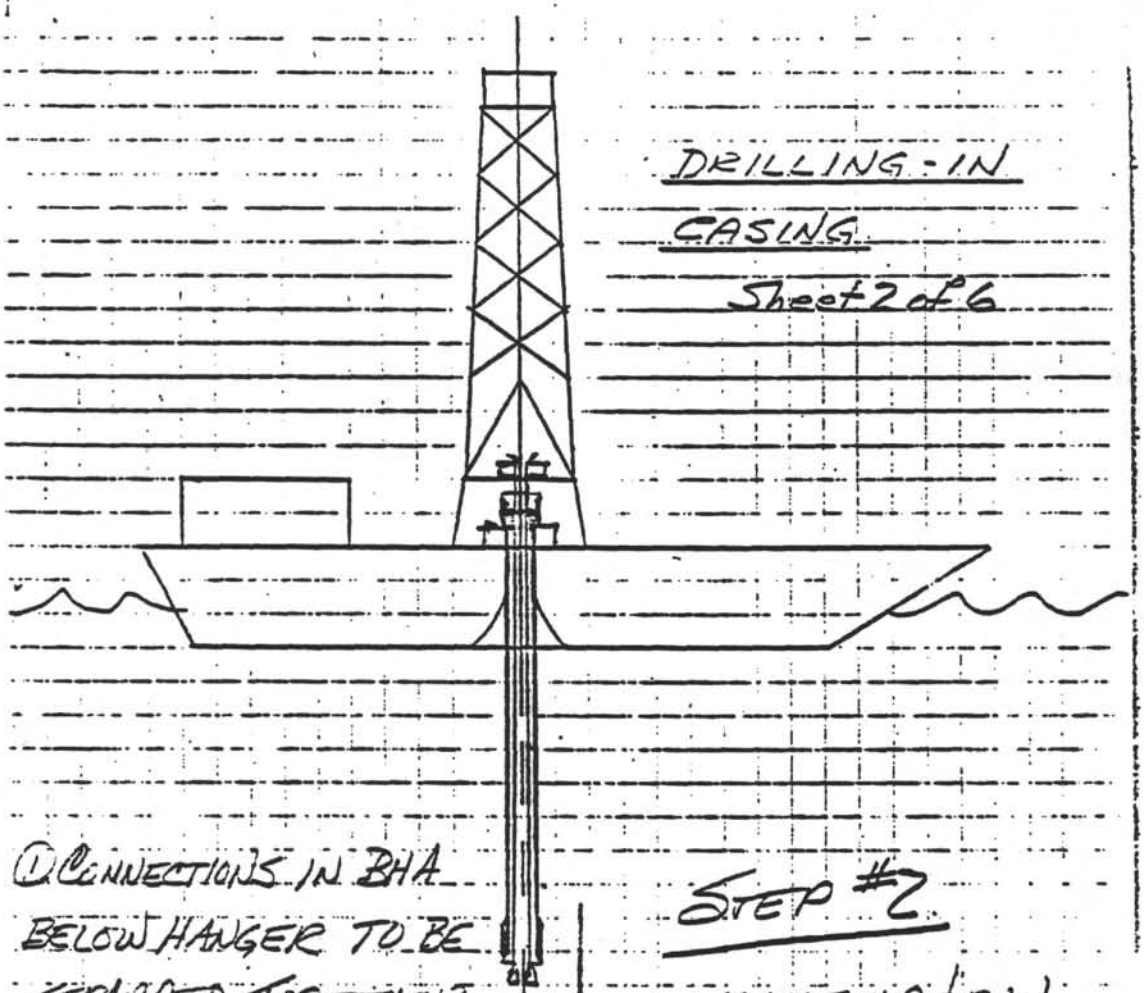
STEP #1

MAKE-UP & RUN 11 3/4" 54# BUTTRESS CASING AND HANG CASING ON ELEVATORS RESTING ON TOP OF HORN.

1. BOTTOM FITTED WITH 17½" x 10" SHOE WHICH HAS FOUR STANDARD ROLLER BIT CUTTERS.
2. TOP FITTED WITH HANGER FOR DRIVING WITH DRILL STRING AND RELEASE AT SFC. COMMAND
3. ALL JOINTS GLUED WITH EPOXY THREAD LOCKING COMPOUND.

VFL 3-17-78

DRILLING-IN CASING

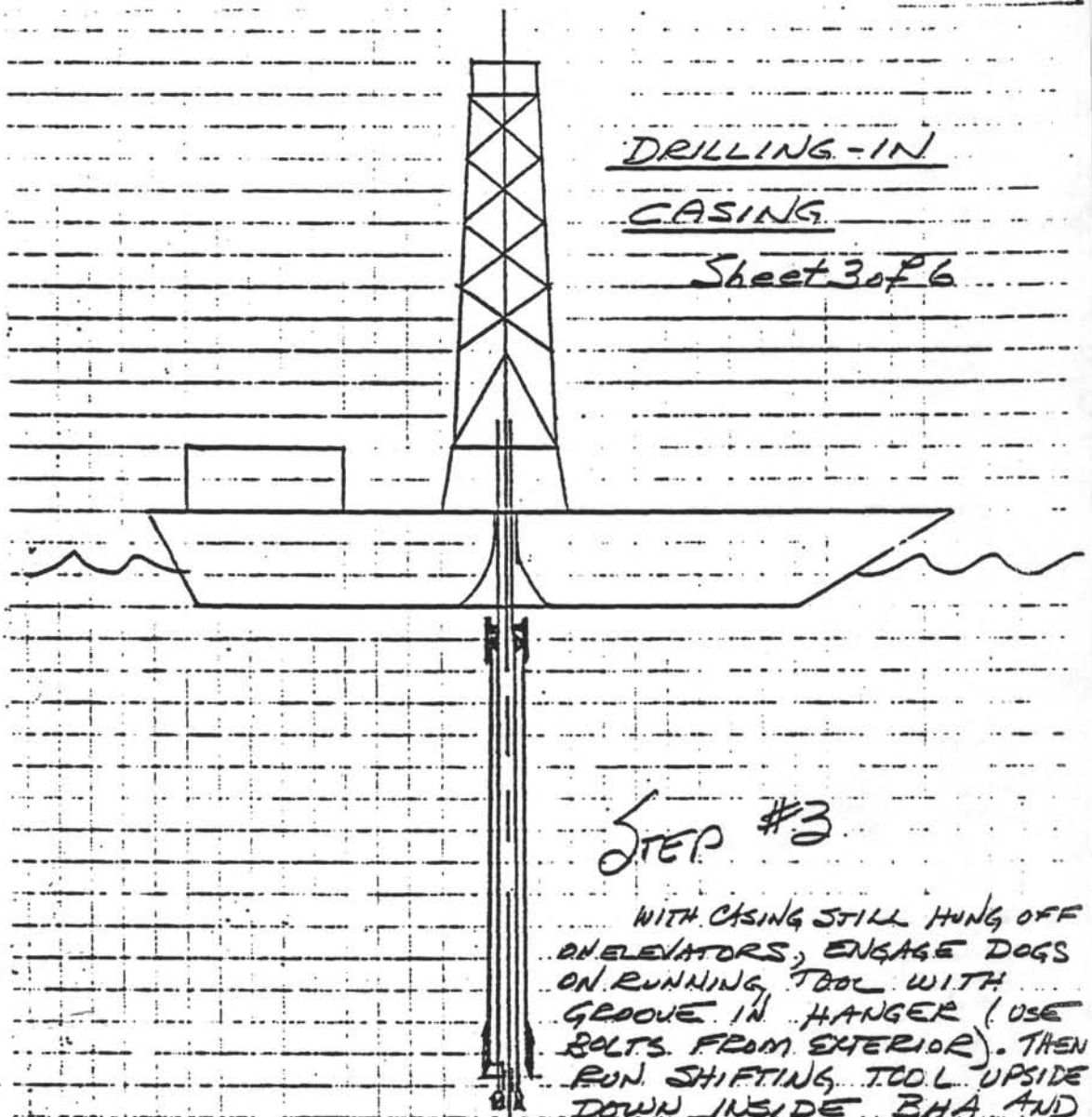


① CONNECTIONS IN BHA BELOW HANGER TO BE STRAPPED TOGETHER (WELD) OR LOCKED WITH EPOXY GLUE.

② BUMPER SUB TO BE POSITIONED IMMEDIATELY ABOVE RUNNING TOOL.

STEP #2

MAKE UP & RUN BOTTOM-HOLE ASSEMBLY SPACED SO THAT STANDARD 9 7/8" x 2 7/16" CORE BIT IS APPROX TWO FEET BEYOND CASING SHOE WHEN SPECIAL LOWERING SUB IS AT HANGER.



DRILLING-IN CASING

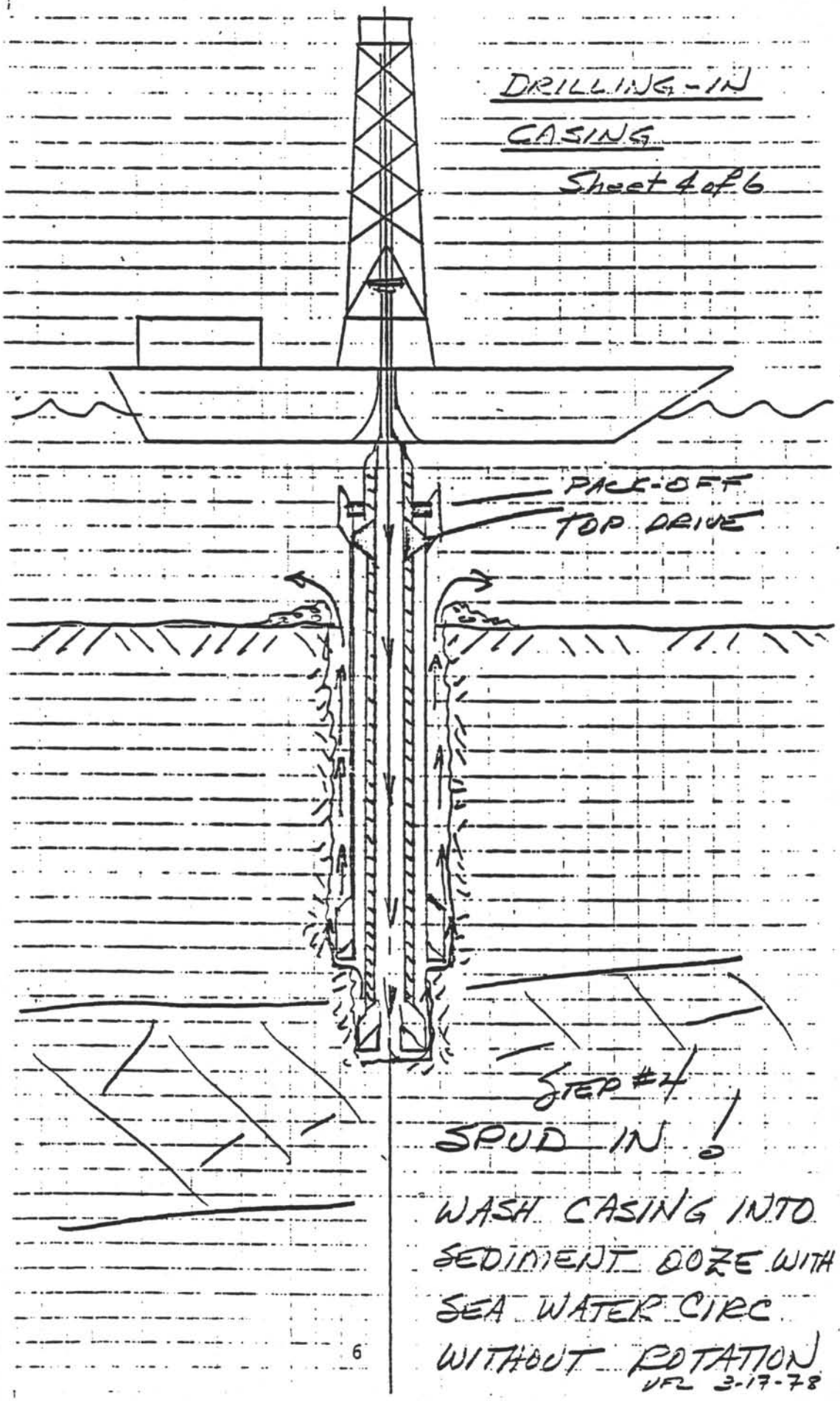
Sheet 3 of 6

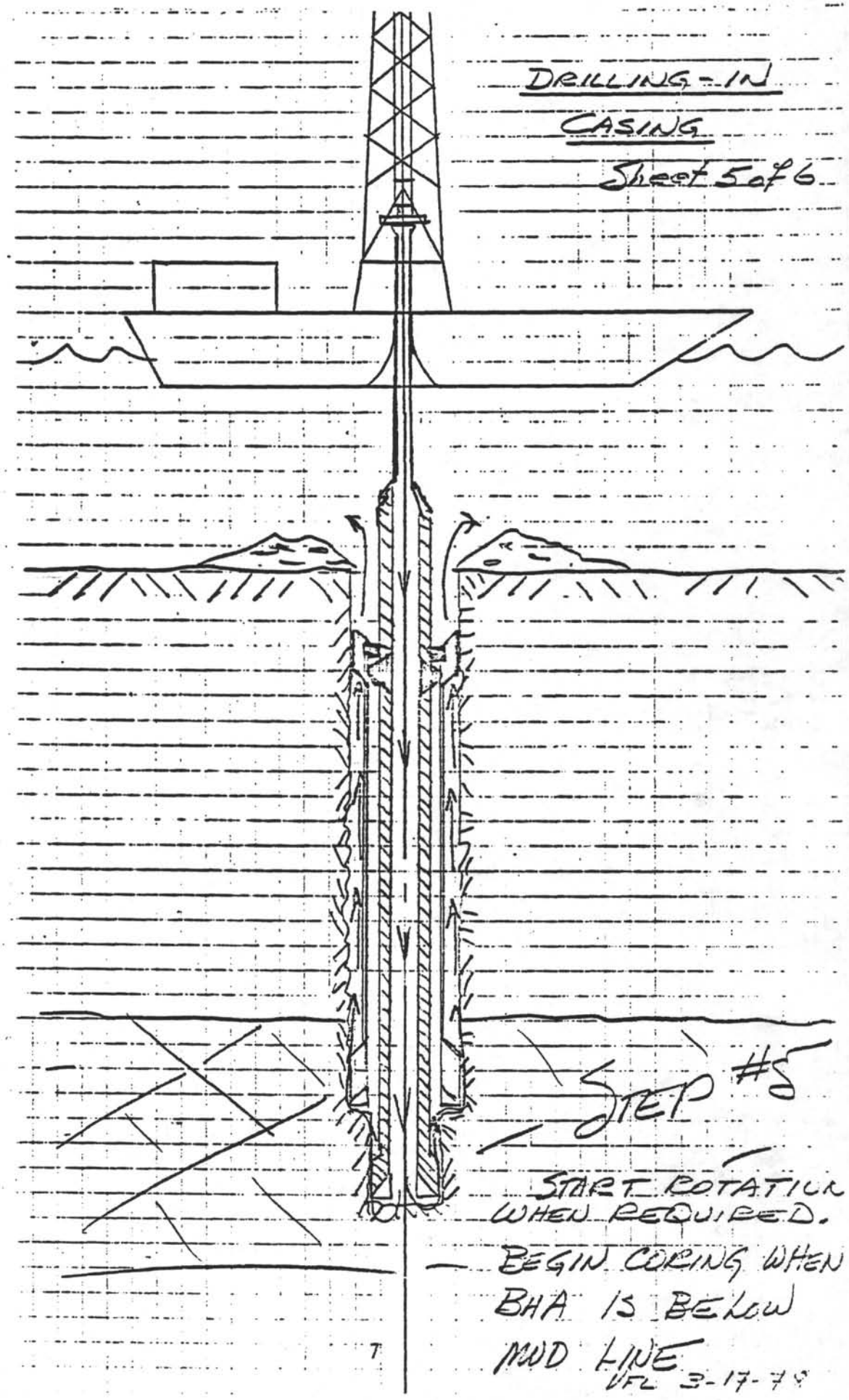
STEP #3

WITH CASING STILL HUNG OFF ON ELEVATORS, ENGAGE DOGS ON RUNNING TOOL WITH GROOVE IN HANGER (USE BOLTS FROM EXTERIOR). THEN RUN SHIFTING TOOL UPSIDE DOWN INSIDE BHA AND DRIVE SLEEVE DOWN TO HOLD DOGS ENGAGED. RUNNING TOOL INCLUDES PACK-OFF AND DRIVE ELEMENT.

PICK-UP CASING & GRADUALLY LOWER ON DRILL STRING.

VFL - 3-17-78


DRILLING-IN
CASING
Sheet 4 of 6
PACK-OFF
TOP DRIVE
STEP #4
SPUD IN!
WASH CASING INTO
SEDIMENT OOZE WITH
SEA WATER CIRC
WITHOUT ROTATION
VFL 3-17-78
6



DRILLING-IN CASING

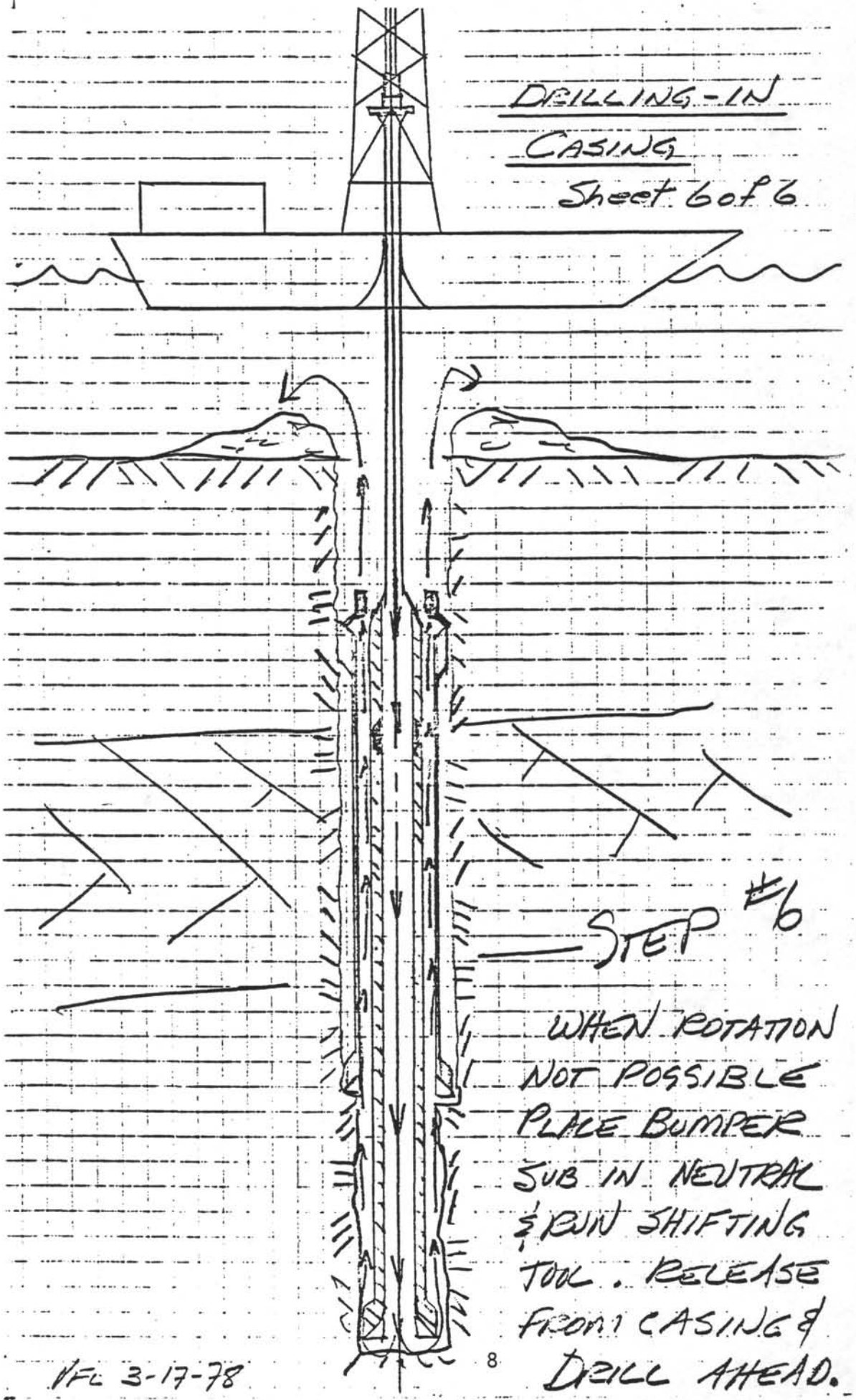
STEP #5

START ROTATION WHEN REQUIRED.

BEGIN CORING WHEN BHA IS BELOW MUD LINE

VFL 3-17-79

DRILLING-IN CASING

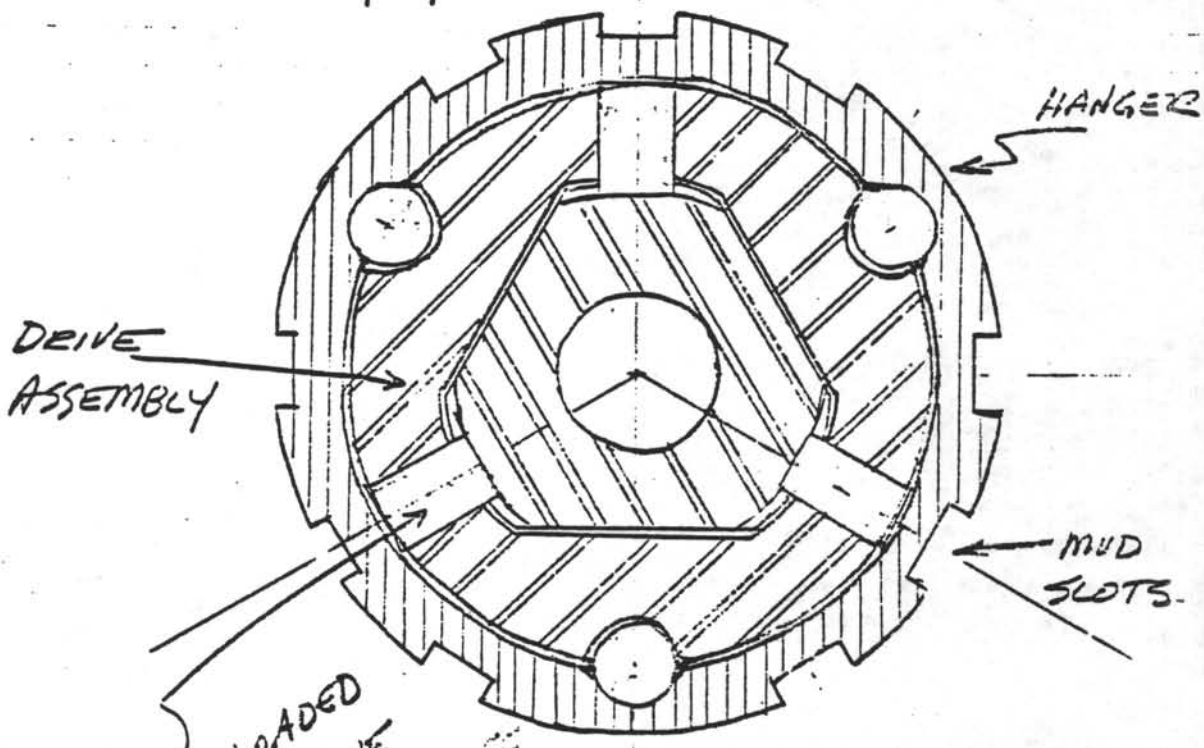


STEP #6

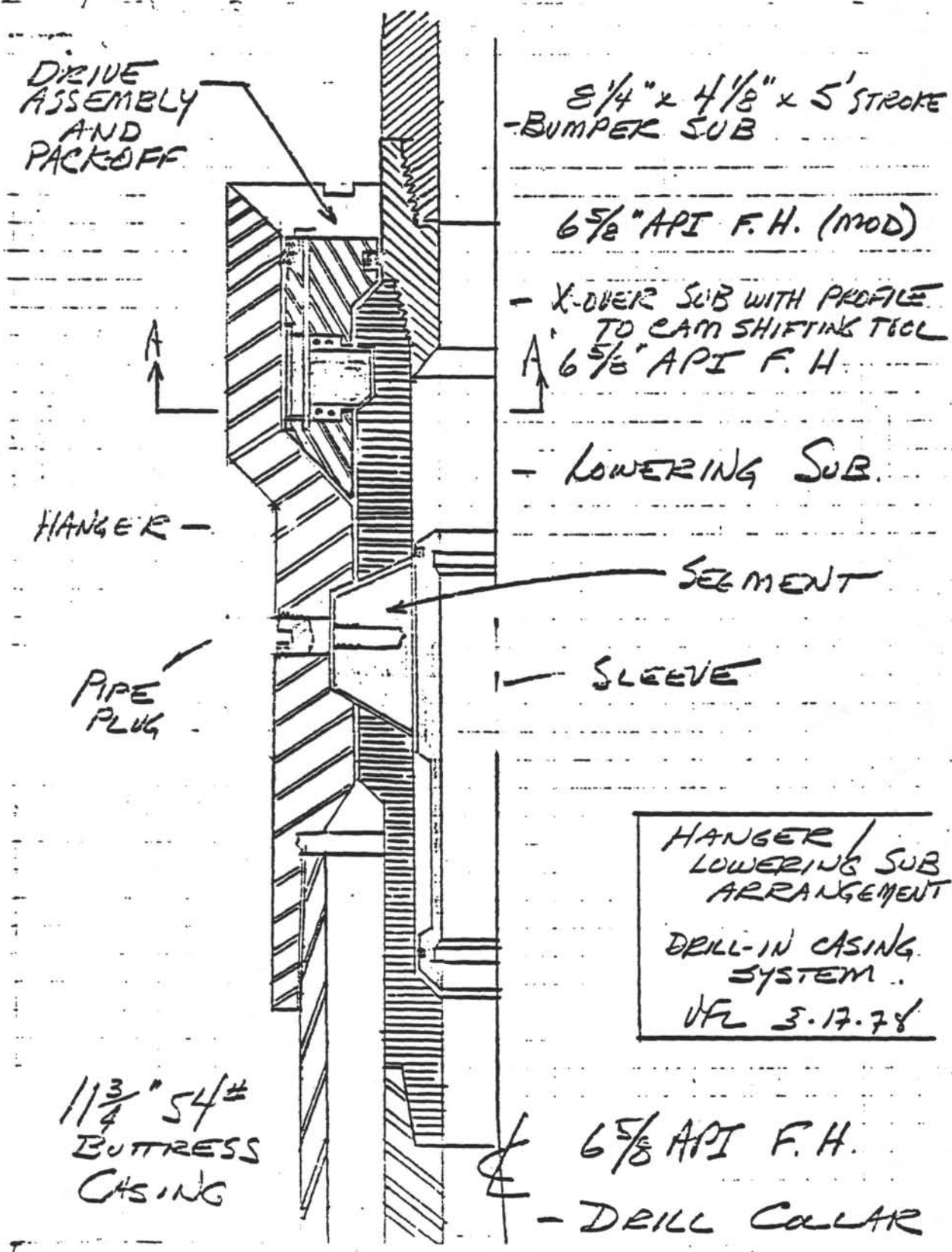
WHEN ROTATION NOT POSSIBLE PLACE BUMPER SUB IN NEUTRAL & RUN SHIFTING TOOL. RELEASE FROM CASING & DRILL AHEAD.

VFL 3-17-78

SECTION A-A
(DRILL-IN CASING)
VFL 3-17-78



SPRING LOADED PINS HOLD DRIVE ASSEMBLY AND PACKOFF IN PLACE AND TAKE LOAD OFF SEGMENTS WHEN SHIFTING SLEEVE. (WHEN DRILL STRING RAISED PINS EXTEND OUT & KEEP DRIVE ASSEMBLY FROM RE-ENGAGING & PACKING OFF.)



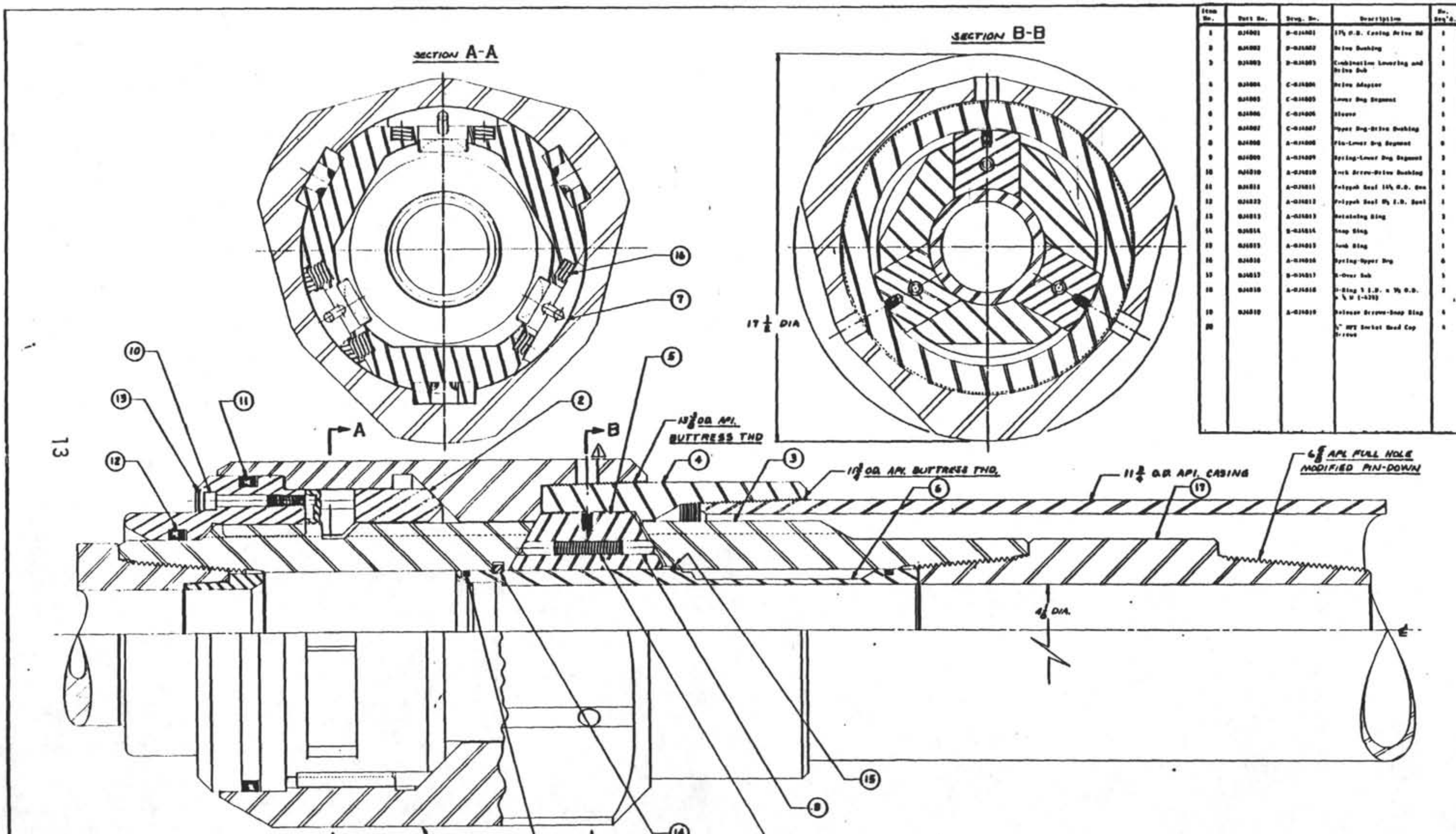
HANGER / LOWERING SUB ARRANGEMENT

DRILL-IN CASING SYSTEM.

VFL 3.17.78

INDEX - OPERATIONS - DEEP SEA DRILLING PROJECT

ITEM	DESCRIPTION DRILL-IN CASING	DRWG. NO.
OJ 4800	Drive and Lower Assembly	D-OJ4800-1
OJ 4801	17½ O.D. Casing Drive	D-OJ4801-2
OJ 4802	Drive Bushing	D-OJ4802-1
OJ 4803	Combination Lowering & Drive Sub	D-OJ4803-1
OJ 4804	Drive Adapter	C-OJ4804
OJ 4805	Lower Dog Segment	C-OJ4805-1
OJ 4806	Sleeve	C-OJ4806-1
OJ 4807	Upper Dog-Drive Bushing	C-OJ4807
OJ 4808	Pin-Lower Dog Segment	A-OJ4808
OJ 4809	Spring - Lower Dog Segment	A-OJ4809
OJ 4810	Lock Screw - Drive Bushing	A-OJ4810-1
OJ 4811	Polypak Seal 14½ O.D.	A-OJ4811-1
OJ 4812	Polypak Seal 8½ I.D.	A-OJ4812-1
OJ 4813	Retaining Ring	A-OJ4813
OJ 4814	Snap Ring	B-OJ4814-1
OJ 4815	Junk Ring	A-OJ4815-1
OJ 4816	Spring - Upper Dog	A-OJ4816-1
OJ 4817	X-Over Sub	D-OJ4817
OJ 4818	O-Ring 5 I.D. x 5½ O.D. x ½ W (-429)	A-OJ1818
OJ 4819	Release Screws-Snap Ring	A-OJ4819-1
OJ 4820	½" NPT Soc. HD. Cap Screws	- - -
OJ 4821	17½ Casing Bit Assembly	D-OJ4821-1
OJ 4822	17½ Casing Bit Body	D-OJ4822-2
OJ 4823	17½ Casing Bit Guide	D-OJ4823-2



Item No.	Part No.	Drwg. No.	Description	No. Req'd.
1	0J4001	D-0J4001	17½ O.D. Casing Drive Sub	1
2	0J4002	D-0J4002	Drive Bushing	1
3	0J4003	D-0J4003	Combination Lowering and Drive Sub	1
4	0J4004	C-0J4004	Drive Adapter	1
5	0J4005	C-0J4005	Lower Dog Segment	3
6	0J4006	C-0J4006	Sleeve	1
7	0J4007	C-0J4007	Upper Dog-Drive Bushing	3
8	0J4008	A-0J4008	Pin-Lower Dog Segment	6
9	0J4009	A-0J4009	Spring-Lower Dog Segment	3
10	0J4010	A-0J4010	Lock Screw-Drive Bushing	3
11	0J4011	A-0J4011	Polypak Seal 14½ O.D. Gen	1
12	0J4012	A-0J4012	Polypak Seal 8½ I.D. Seal	1
13	0J4013	A-0J4013	Retaining Ring	3
14	0J4014	B-0J4014	Snap Ring	1
15	0J4015	A-0J4015	Lock Ring	1
16	0J4016	A-0J4016	Spring-Upper Dog	6
17	0J4017	B-0J4017	X-Over Sub	1
18	0J4018	A-0J4018	O-Ring ⅞ I.D. x 1⅛ O.D. x ⅛ W (-420)	2
19	0J4019	A-0J4019	Release Screws-Snap Ring	6
20			⅜" NPT Socket Head Cap Screws	6

1	REVISED PER D-0158	P.K.	12-?-76	

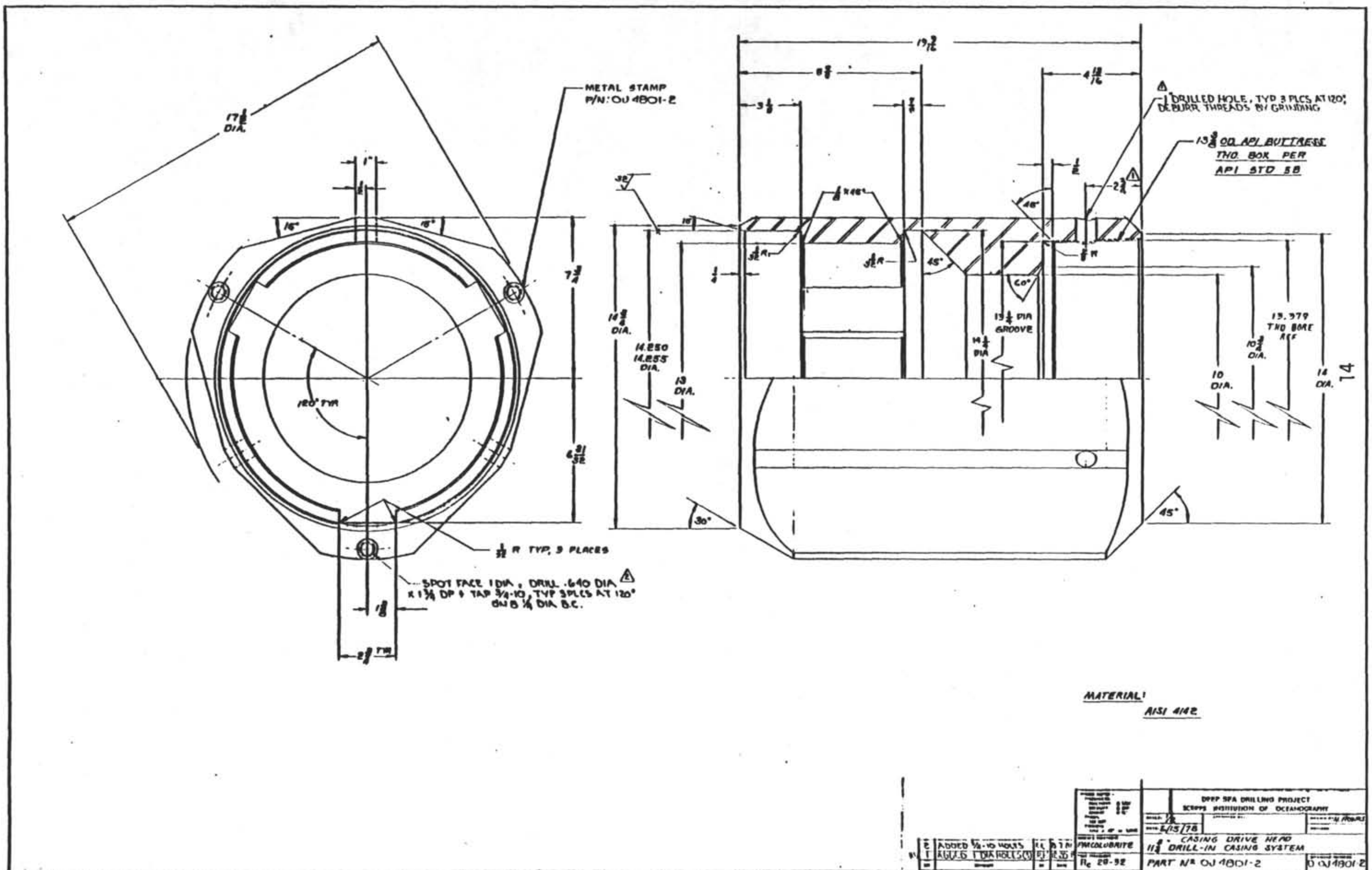
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

DRILL-IN CASING SYSTEM
DRIVE & LOWERING ASSEMBLY

N. FRANKS 6/30/76

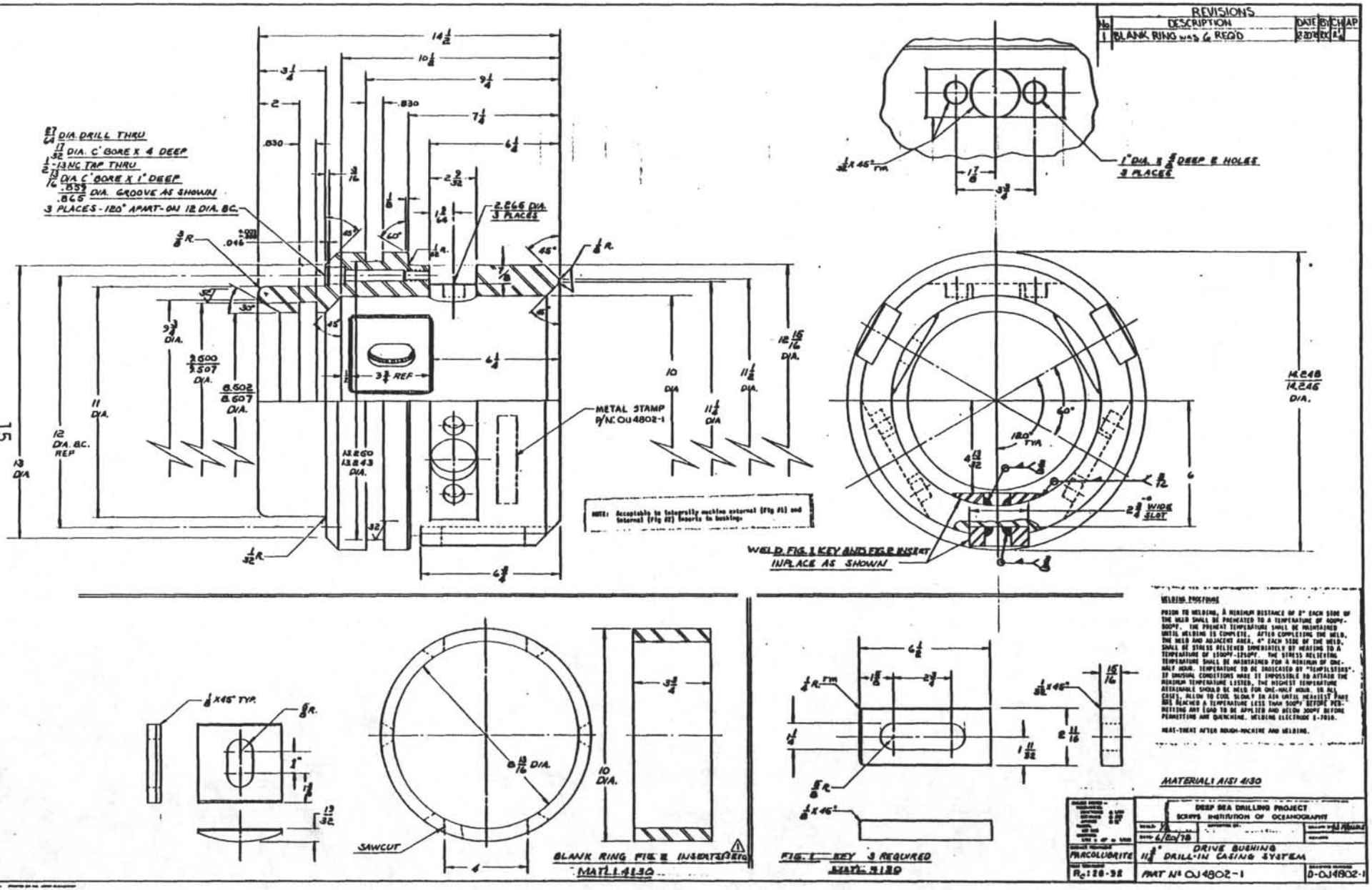
SCALE ½

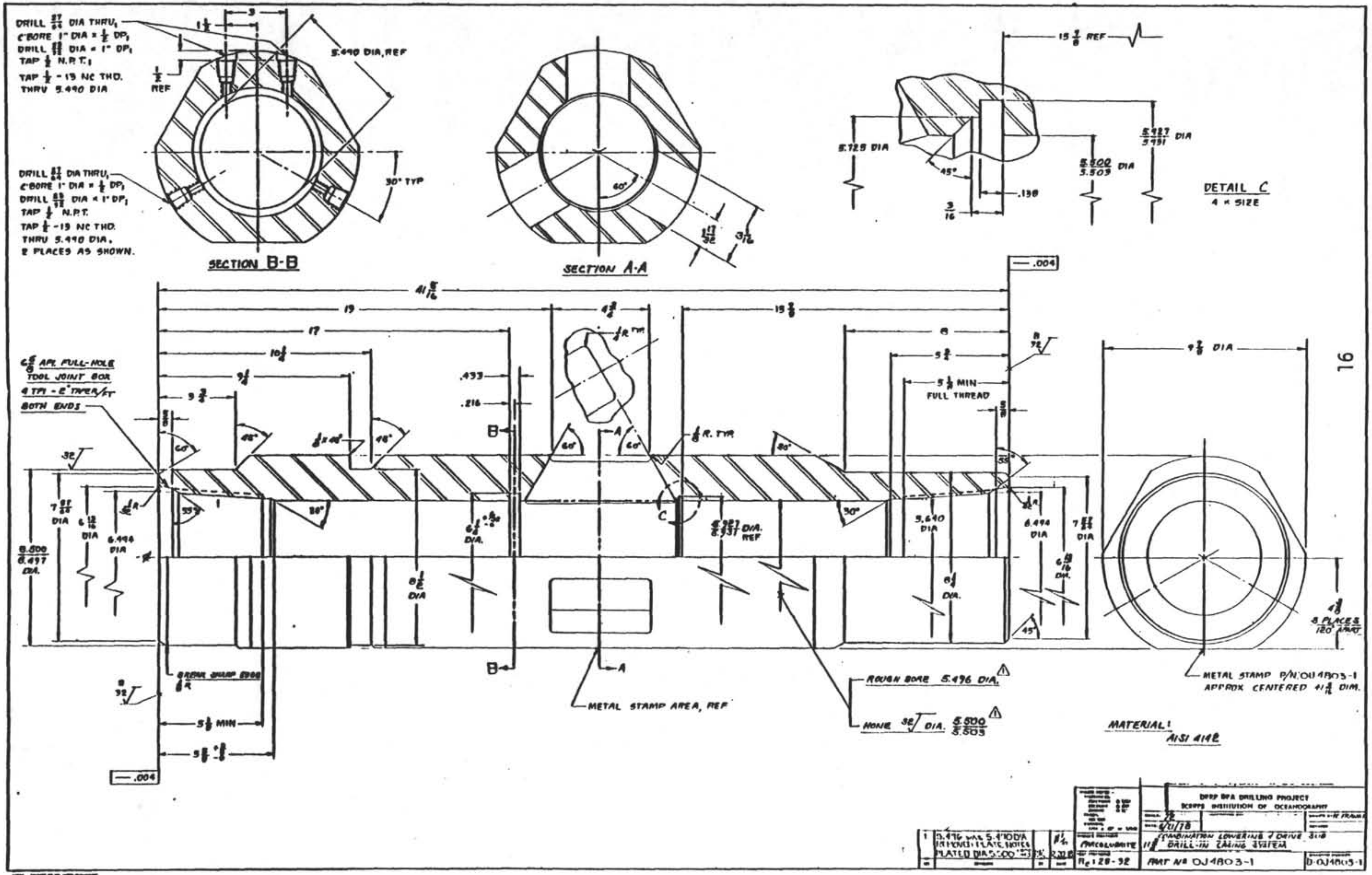
D-0J4800-1



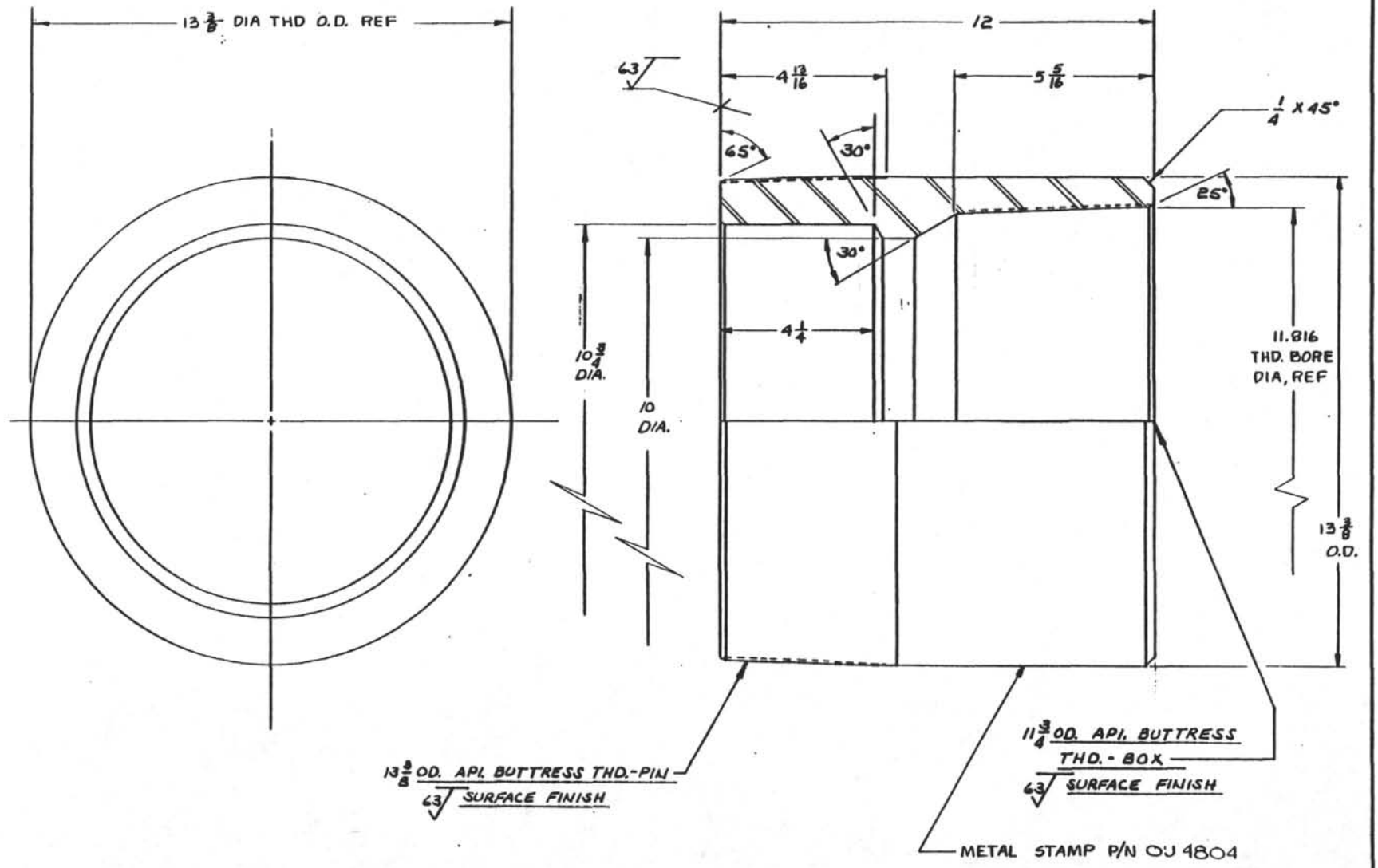
METAL STAMP
P/N: OJ 4801-2
DRILLED HOLE, TYP 3 PLCS AT 120°
DEBURR THREADS BY GRINDING
13⅜ OD API BUTTRESS
THD. BOX PER
API STD 5B
19⅜
13.979
THD BORE
REF
13¼ DIA
GROOVE
14.250
14.255
DIA.
120° TYP
1/32 R TYP, 3 PLACES
SPOT FACE 1 DIA, DRILL .640 DIA
X 1¾ DP & TAP ¾-10, TYP 3 PLCS AT 120°
ON 8¼ DIA B.C.
MATERIAL:
AISI 4142
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY
CASING DRIVE HEAD
DRILL-IN CASING SYSTEM
PART Nº OJ 4801-2
PARCOLUBRITE
Rc 28-32
ADDED ¾-10 HOLES

14


REVISIONS
No. DESCRIPTION DATE BY CHAP
1 BLANK RING was 6 REQ'D
87/64 DIA. DRILL THRU
17/32 DIA. C'BORE X 4 DEEP
1/2-13 NC TAP THRU
13/16 DIA. C'BORE X 1" DEEP
.859/.865 DIA. GROOVE AS SHOWN
3 PLACES - 120° APART - ON 12 DIA. B.C.
2.646 DIA. 3 PLACES
METAL STAMP P/N. OU 4802-1
NOTE: Acceptable to integrally machine external (Fig #1) and internal (Fig #2) inserts in bushing.
WELD FIG 1 KEY AND FIG 2 INSERT IN PLACE AS SHOWN
1" DIA. X 5/8 DEEP 8 HOLES 3 PLACES
14.248/14.246 DIA.
2 3/4 WIDE SLOT
BLANK RING FIG 2 INSERTED
MAT'L 4130
FIG. 1 KEY 3 REQUIRED
MAT'L 4130
WELDING PROCEDURE
MATERIAL: AISI 4130
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY
DRIVE BUSHING
11 3/4" DRILL-IN CASING SYSTEM
PART No. OU 4802-1
D-OU4802-1



SECTION B-B
SECTION A-A
DETAIL C
4 × SIZE
5.490 DIA. REF
30° TYP
TAP ½ N.P.T.
2 PLACES AS SHOWN.
FULL THREAD
TOOL JOINT BOX
BOTH ENDS
METAL STAMP AREA, REF
ROUGH BORE 5.496 DIA.
METAL STAMP P/N: OJ4803-1
APPROX CENTERED
MATERIAL:
AISI 4142
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY
COMBINATION LOWERING & DRIVE SUB
DRILL-IN CASING SYSTEM
PART Nº OJ4803-1
D-OJ4803-1

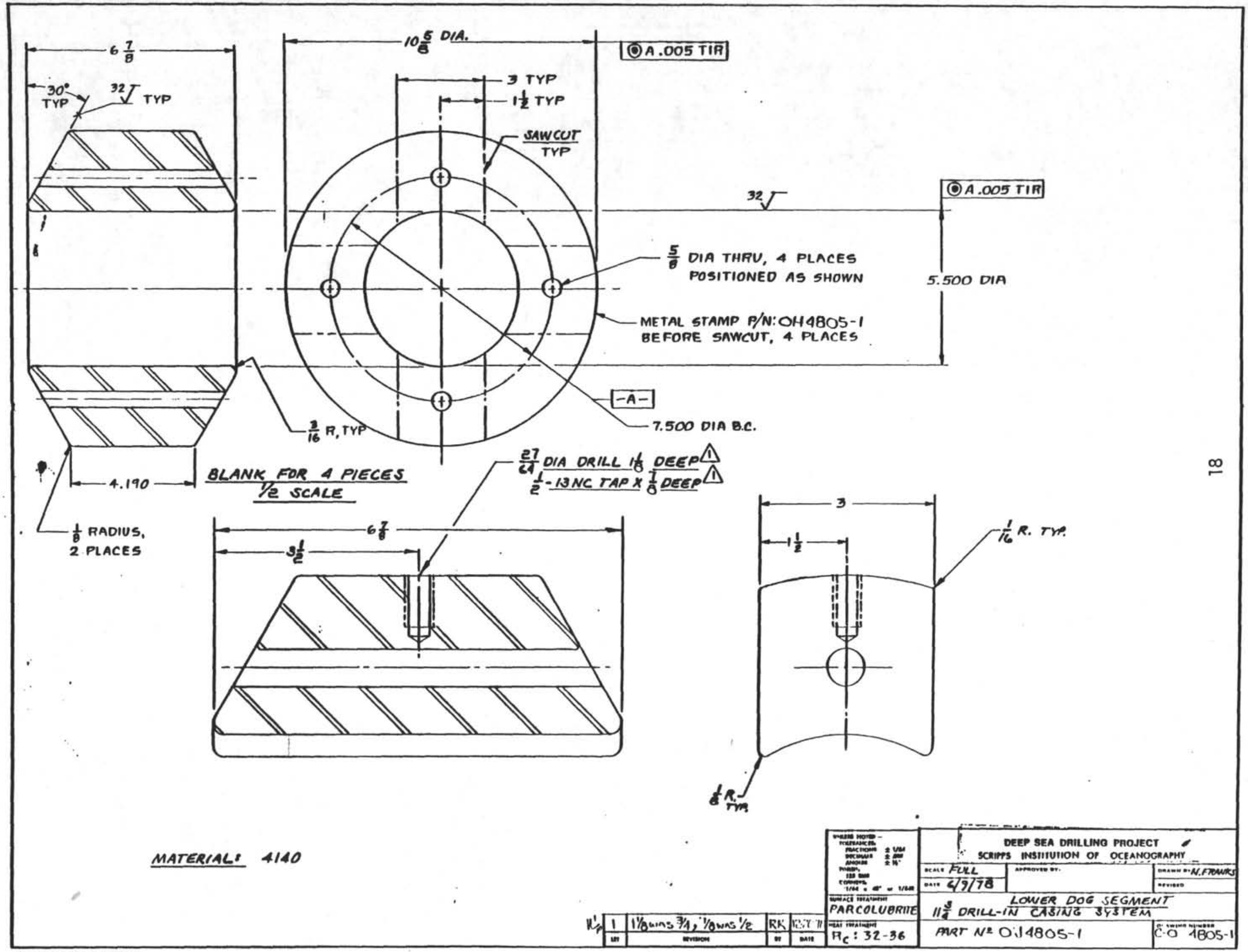


MATERIAL
AISI 4142

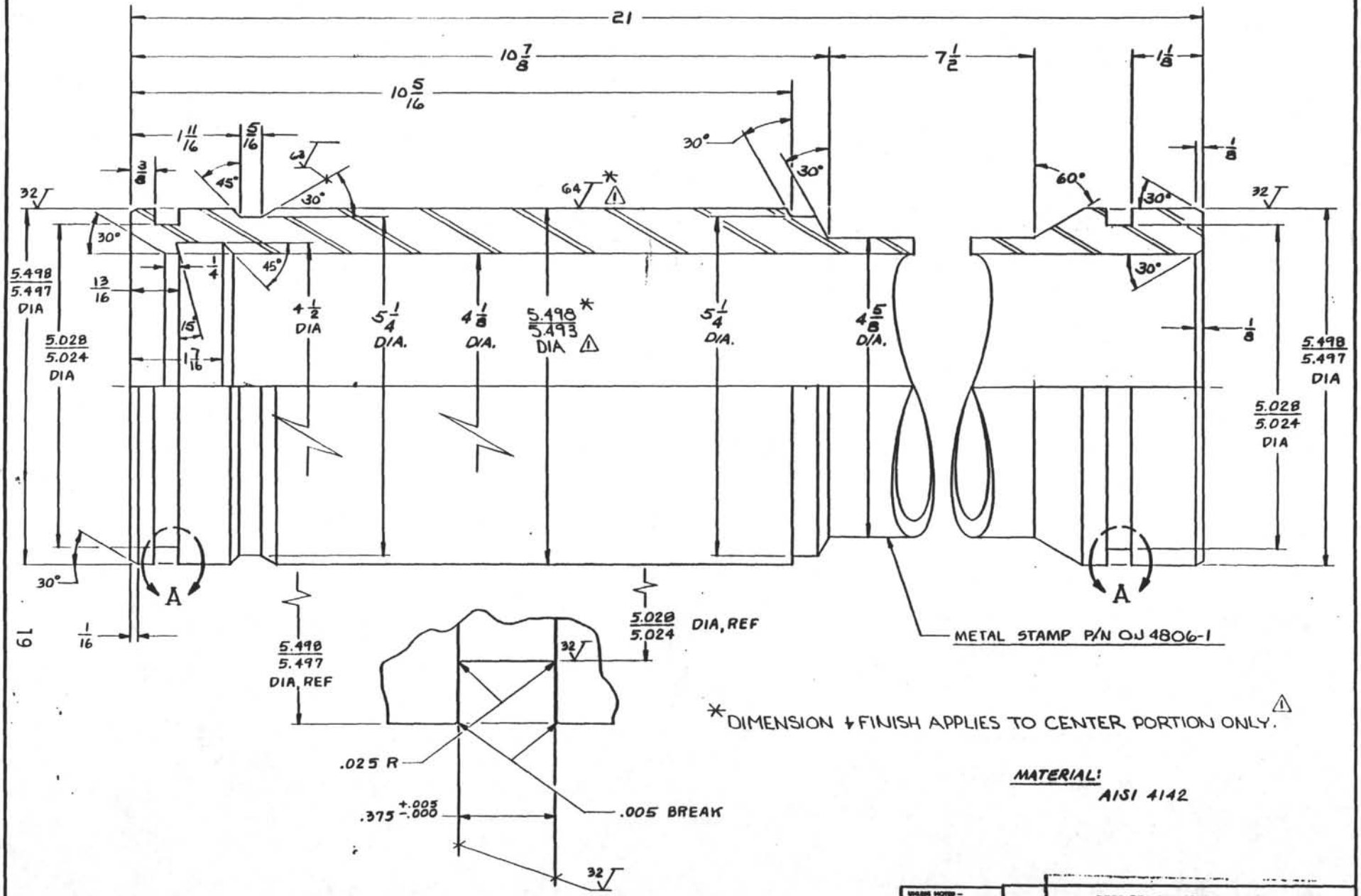
UNLESS NOTED – TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± .005, ANGLES ± ½°, RUNOUT .130 TIR, CONCENTR. 1/64 x 45° or 1/64R	DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY		
	SCALE: 1/2	APPROVED BY:	DRAWN BY N. FRANK
	DATE: 6/12/78		REVISED
SURFACE TREATMENT: PARCOLUBRITE	DRIVE ADAPTER 11 3/4" DRILL-IN CASING SYSTEM		
HEAT TREATMENT: Rc : 28-32	PART № OJ4804		DRAWING NUMBER C-OJ4804

LET	REVISION	BY	DATE

17



6 7/8
30° TYP
32 TYP
10 5/8 DIA.
◎ A .005 TIR
3 TYP
1 1/2 TYP
SAWCUT TYP
32
◎ A .005 TIR
5/8 DIA THRU, 4 PLACES POSITIONED AS SHOWN
5.500 DIA
METAL STAMP P/N: OH4805-1 BEFORE SAWCUT, 4 PLACES
-A-
3/16 R, TYP
7.500 DIA B.C.
27/64 DIA DRILL 1 1/8 DEEP
1/2 - 13NC TAP X 7/8 DEEP
4.190
BLANK FOR 4 PIECES
1/2 SCALE
1/8 RADIUS, 2 PLACES
6 7/8
3 1/2
3
1 1/2
1/16 R. TYP.
1/8 R. TYP.
MATERIAL: 4140
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY
SCALE FULL
DATE 6/9/78
DRAWN BY N. FRANKS
APPROVED BY:
REVISED
SURFACE TREATMENT PARCOLUBRITE
HEAT TREATMENT Rc: 32-36
LOWER DOG SEGMENT
11 3/4 DRILL-IN CASING SYSTEM
PART Nº OH4805-1
DRAWING NUMBER C-O 4805-1
1 1 1/8 was 3/4, 1/8 was 1/2 RK
LTR REVISION BY DATE



* DIMENSION & FINISH APPLIES TO CENTER PORTION ONLY. ⚠

MATERIAL:
AISI 4142

DETAIL A
2 PLACES
GROOVE FOR O-RING
6227-50 OR 568-429, REF

LET	REVISION	BY	DATE
1	* DIMEN & FINISH ADD.	RK	12-1-78

UNLESS NOTED – TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± .005, ANGLES ± ½°, FINISH, 250 RMS, CORNERS 1/64 x 45° or 1/16R

SURFACE TREATMENT: PARCOLUBRITE
HEAT TREATMENT: R_c: 30-33

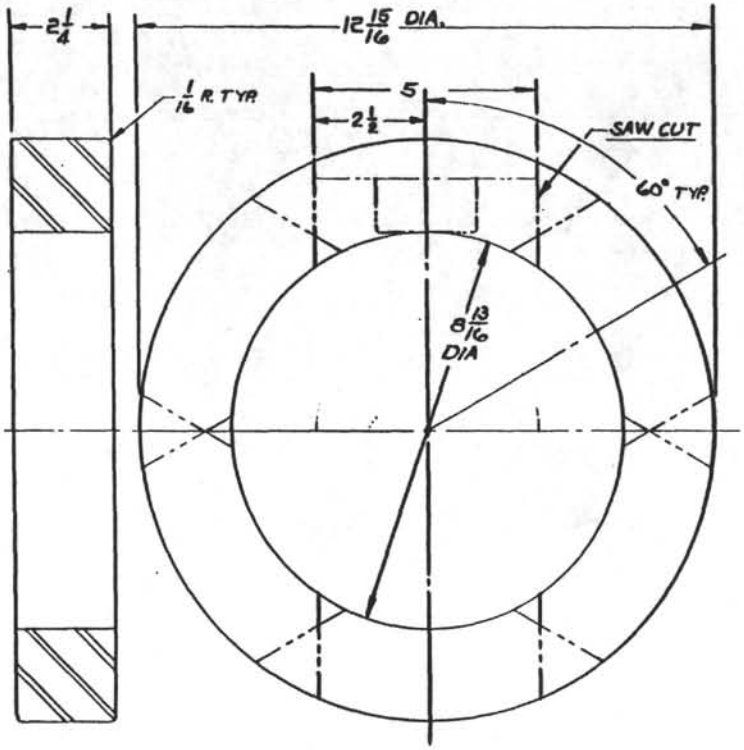
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE: FULL
DATE: 6/21/78
APPROVED BY:
DRAWN BY N. FRANKS
REVISED

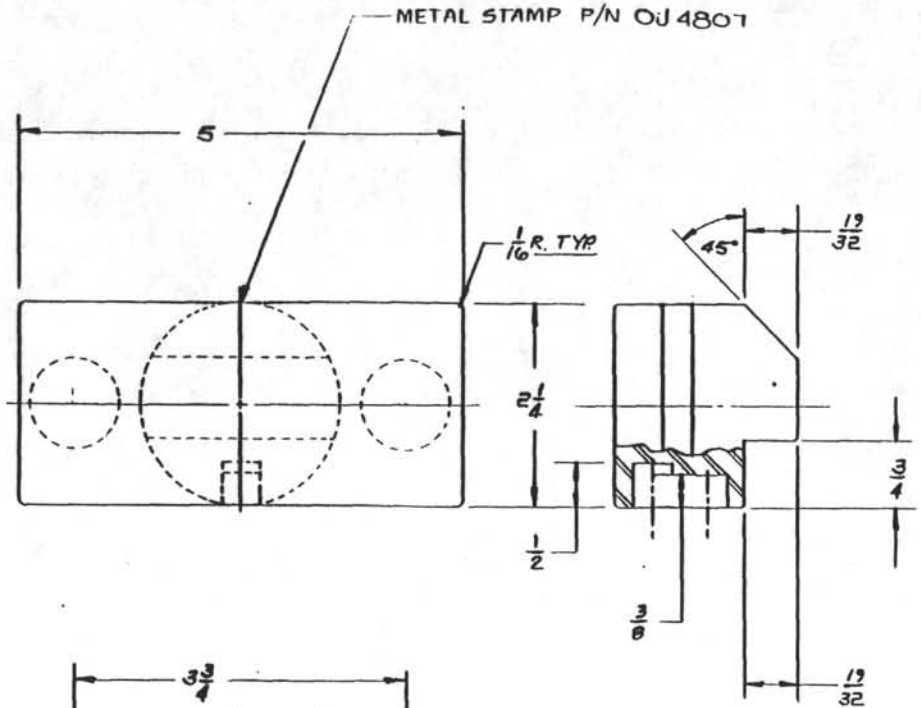
SHIFTING SLEEVE
11¾ DRILL IN CASING SYSTEM

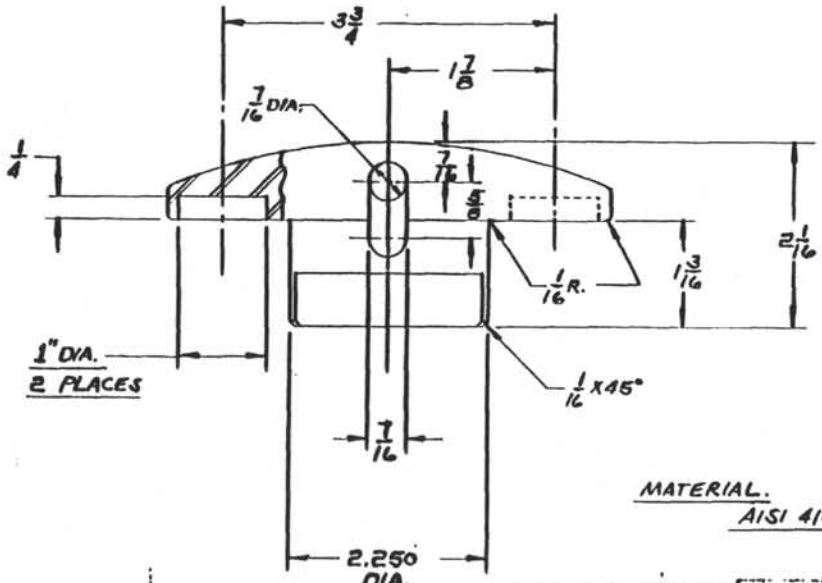
PART Nº OU4806-1

DRAWING NUMBER C-OJ4806-1



BLANK FOR 6 PIECES
1/2 SCALE

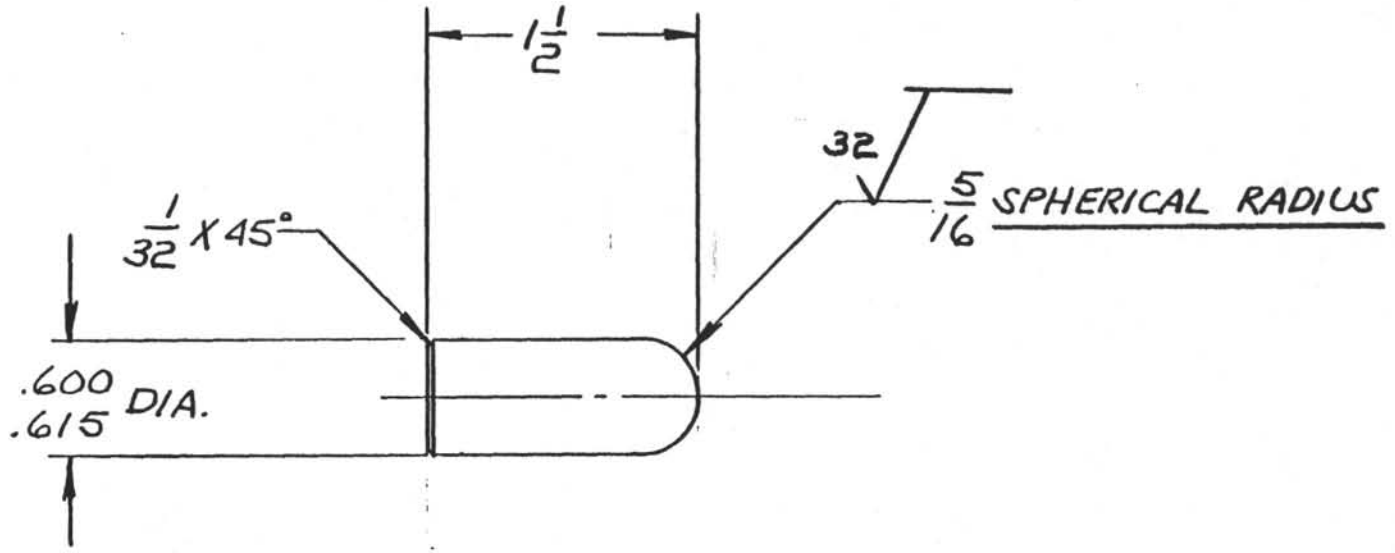




MATERIAL.
AISI 4142

UNLESS NOTED - TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± .005, ANGLES ± 1/2°, FINISH 125 MICRO, CORNERS 1/64 x 45° or 1/16R	DEEP SEA DRILLING PROJECT, SCRIPPS INSTITUTION OF OCEANOGRAPHY
SCALE FULL	APPROVED BY:
DATE 4/9/78	DRAWN BY N. FRANKS
SURFACE TREATMENT: PARCOLUBRITE	UPPER DOG - DRIVE BUSHING 11 3/4" DRILL IN CASING SYSTEM
HEAT TREATMENT: Rc : 28-32	PART No. OJ 1807
NO. REVISION BY DATE	DRAWING NUMBER OJ 4807

20



6 REQUIRED

MATERIAL

17-4PH SS H-900 CONDITION

UNLESS NOTED — TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± .005, ANGLES ± ½°; FINISH: 125 RMS; CORNERS: 1/64 x 45° or 1/64R	DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY
	SCALE: FULL — APPROVED BY: — DRAWN BY: N. FRANKS
	DATE: 6/22/78 — REVISED
SURFACE TREATMENT: PARCOLUBRITE	PIN - LOWER DOG SEGMENT 11 3/4" DRILL-IN CASING SYSTEM
HEAT TREATMENT	PART Nº OJ 4808 — DRAWING NUMBER: A-OJ 4808

DESCRIPTION:

Compression spring

SIZE:

O.D.:	9/16 inches
Wire Size:	.116 x .123 inches
Free Length:	4 inches
Rate:	152 lbs/inch
Solid Ht:	2.6 inches

MATERIAL:

Chrome vanadium spring steel painted, ASTM A232

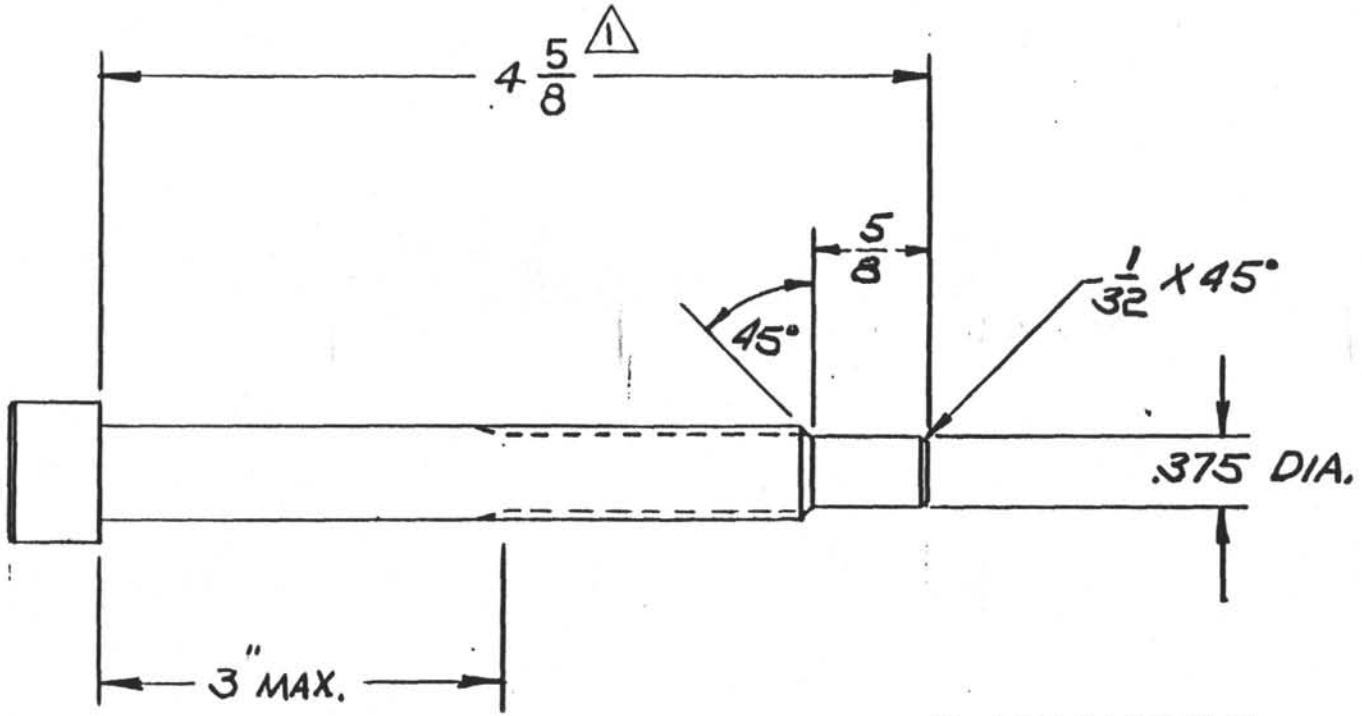
SUGGESTED VENDOR AND PART NO.

Danly #9-1016-36

QUANTITY:

Three Required

DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY		
SCALE:	APPROVED BY:	DRAWN BY MSF
DATE: 6/26/78		REVISED
Spring Lower Dog Segment 11 3/4" Drill-In Casing System		
Part No. OJ 4809		DRAWING NUMBER A-OJ 4809



3 REQUIRED

23

MATERIAL

ALLOY STEEL HEX SOCKET CAP SCREW

1/2-13 UNC X 4 1/2 LG.

No.	DESCRIPTION	DATE	BY
1	4 5/8 WAS 4 1/2 W/O	12-21-78	RK

REVISIONS

UNLESS NOTED —
TOLERANCES:
FRACTIONS ± 1/64
DECIMALS ± .005
ANGLES ± ½°
FINISH:
125 RMS
CORNERS:
1/64 x 45° or 1/64R

SURFACE TREATMENT

HEAT TREATMENT

DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE: FULL | APPROVED BY: | DRAWN BY N. FRANKS

DATE: 6/22/78 | REVISED

LOCK SCREW - DRIVE BUSHING
11 3/4" DRILL-IN CASING SYSTEM

PART Nº OJ 4810-1

DRAWING NUMBER A-OJ 4810-1

8½X11 PRINTED ON NO. 1000H CLEARPRINT

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	NOTE ADDED	12-21-78	RK		WL

DESCRIPTION:

Polypak Type "B" Piston Seal

SIZE:

14 1/4" OD x 13 1/4" ID x 3/4 Long

MATERIAL:

Urethane

SUGGESTED VENDOR & PART NO:

Parker Seal Company

#5001-3250-750B

QUANTITY:

One Required

24

NOTE: A TIME OF DRAWING THIS SEAL HAD NOT BEEN MADE. AN ACCEPTABLE SUBSTITUTE IS 14" O.D. X 13" I.D. X 3/4" LONG PARKER SEAL CO. #5001-3000-750B

DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE:	APPROVED BY:	DRAWN BY N. Franks
DATE: 6/26/78		REVISED

Polypak OD. Seal
11 3/4" Drill-In Casing System

P/N OJ48-1

DRAWING NUMBER A-OJ4811-1

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	NOTE ADDED	12-21-78	RK		

DESCRIPTION:

Polypak Type "B" Rod Seal

SIZE:

8 1/2 ID x 9 1/2 OD x 3/4 Long

MATERIAL

Urethane

SUGGESTED VENDOR & PART NO:

Parker Seal Company

#5000-8500-750B

QUANTITY:

One Required

25

NOTE: "A" TYPE SEAL IS ACCEPTABLE

DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE:	APPROVED BY:	DRAWN BY N. Franks
DATE: 6/26/78		REVISED

Polypak ID. Seal
11 3/4 Drill-In Casing System

Part No. OJ4812-1

DRAWING NUMBER A-OJ4812-1

DESCRIPTION:

Internal Retaining Ring

SIZE:

For 13/16 Dia. Bore

MATERIAL

AISI 1060-1090 Carbon Steel

Cadmium plate

SUGGESTED VENDOR & PART NO.

Waldes Truarc #N-5000-81

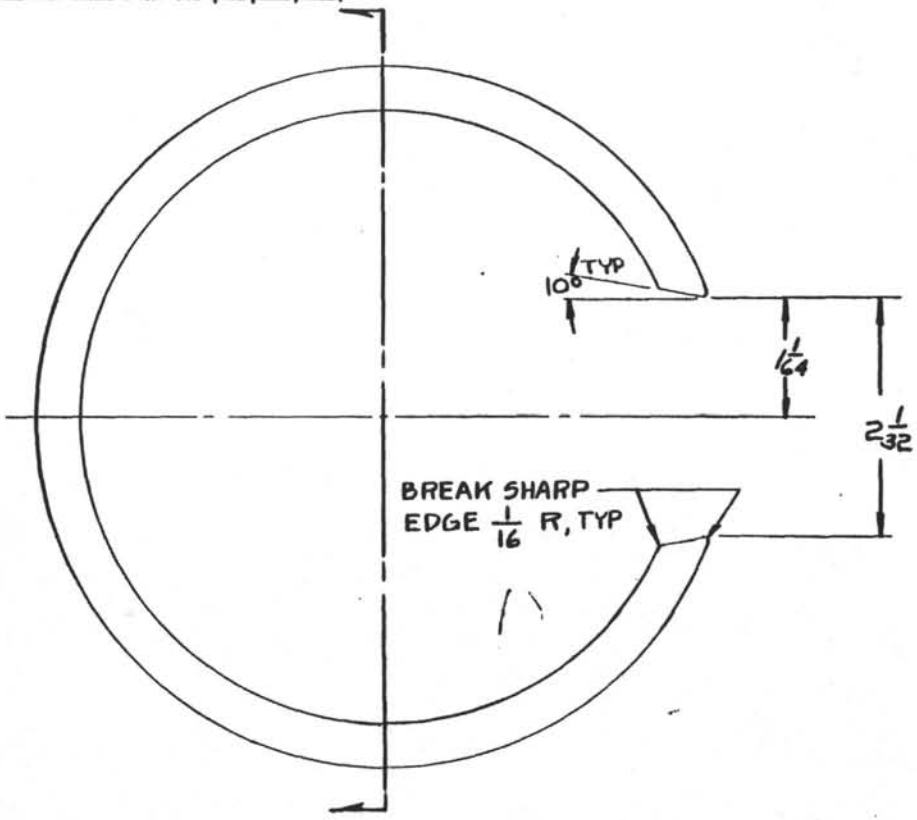
QUANTITY:

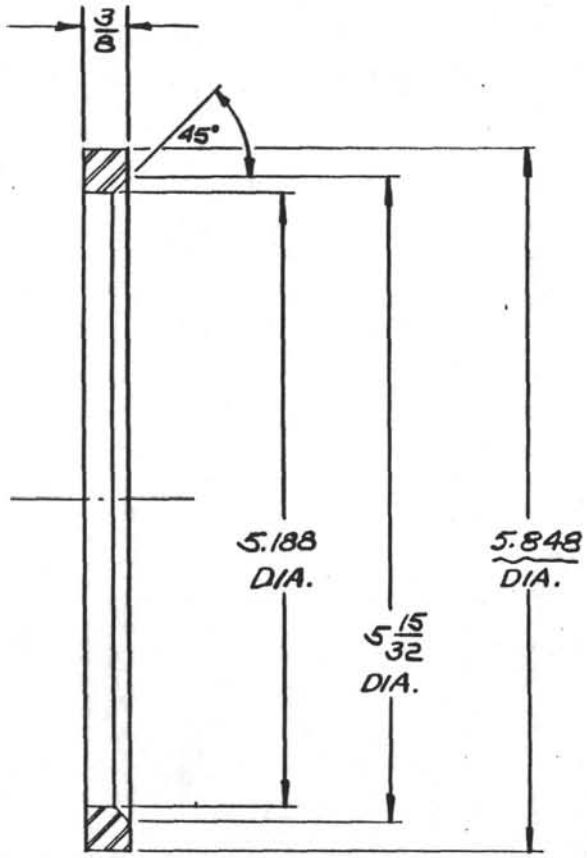
Three Required

26

DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY		
SCALE:	APPROVED BY:	DRAWN BY N. Franks
DATE: 6/26/78		REVISED
Retaining Ring 11 3/4" Drill-In Casing System		
Part No. OJ 4813		DRAWING NUMBER A-OJ4813

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	10° ADDED	12-21-78	RK		





MATERIAL: AISI 4140

SURFACE FINISH 63

UNLESS NOTED — TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± .005, ANGLES ± ½°, FINISH: 125 RMS, CORNERS: 1/64 x 45° ≈ 1/16R	DEEP SEA DRILLING PROJECT, SCRIPPS INSTITUTION OF OCEANOGRAPHY		
	SCALE: FULL	APPROVED BY:	DRAWN BY N. FRANKS
	DATE: 6/23/78		REVISED
SURFACE TREATMENT: PARCOLUBRITE	SNAP RING 11 3/8" DRILL-IN CASING SYSTEM		
HEAT TREATMENT: R_c: 40-44	PART N° OJ4814		DRAWING NUMBER B-OJ4814-1

11X17 PRINTED ON NO. 1000H CLEARPRINT

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	NOTE ADDED	12-21-78	RK		

DESCRIPTION:

Scraper Ring

SIZE:

For 5 1/2 OD. Rod (Nom.)

MATERIAL:

Copper Alloy

SPECIFICATION:

MS-28776M2-49

QUANTITY:

One Required

28

NOTE: MODIFY BY WIDENING GAP APPROXIMATELY 3/16" TO ALLOW INSTALLATION. DO NOT USE EXPANDERS IF FURNISHED. BEVEL INSIDE LOWER EDGE AS REQUIRED TO AVOID CUTTING O-RING DURING INSTALLATION.

DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE:	APPROVED BY:	DRAWN BY: N. Franks
DATE: 6/26/78		REVISED

Junk-Ring
11 3/4" Drill-In Casing System

PART NO. OJ 4815-1	DRAWING NUMBER A-OJ4815-1

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	S.S. WAS CAD. PLATE	12-21-78	RK		

DESCRIPTION:

Compression Spring

SIZE:

OD.:	.970 inches
Wire Size:	.105 dia.
Free Length:	2 inches
Rate:	49 lbs/inch
Solid Ht:	.820 inches

MATERIAL:

Music Wire, ASTM 228

Stainless Steel

SUGGESTED VENDOR AND PART NO.

LEE # LC-105L-3

QUANTITY:

Six Required

29

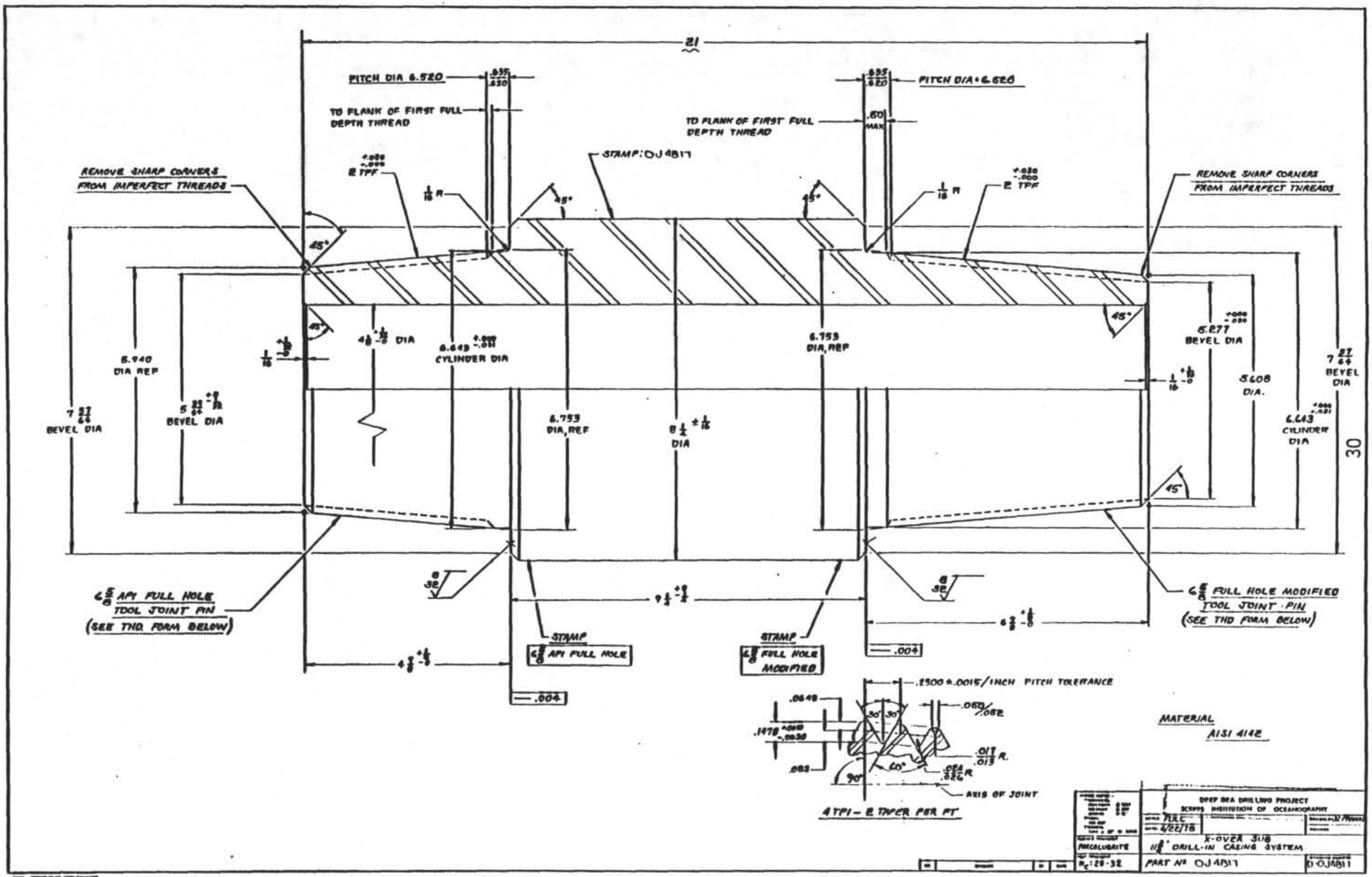
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY

SCALE:	APPROVED BY:	DRAWN BY NSF
DATE: 6/26/78		REVISED

Spring-Upper Dog
11 3/4" Drill-In Casing System

Part No. OJ4816

DRAWING NUMBER A-OJ4816-1


21
PITCH DIA 6.520
TO FLANK OF FIRST FULL DEPTH THREAD
PITCH DIA 6.520
TO FLANK OF FIRST FULL DEPTH THREAD
.60 MAX
STAMP: OJ4B17
REMOVE SHARP CORNERS FROM IMPERFECT THREADS
REMOVE SHARP CORNERS FROM IMPERFECT THREADS
2 TPF
45°
6.940 DIA REF
CYLINDER DIA
6.753 DIA, REF
6.277 BEVEL DIA
BEVEL DIA
DIA
5.608 DIA.
6.643 CYLINDER DIA
BEVEL DIA
6.753 DIA, REF
6 5/8 API FULL HOLE TOOL JOINT PIN (SEE THD. FORM BELOW)
6 5/8 FULL HOLE MODIFIED TOOL JOINT PIN (SEE THD. FORM BELOW)
STAMP 6 5/8 API FULL HOLE
STAMP 6 5/8 FULL HOLE MODIFIED
.004
.2500 ± .0015/INCH PITCH TOLERANCE
30° 30°
60°
90°
AXIS OF JOINT
4 TPI – 2 TAPER PER FT
MATERIAL
AISI 4142
DEEP SEA DRILLING PROJECT
SCRIPPS INSTITUTION OF OCEANOGRAPHY
4/22/78
X-OVER SUB
11 3/4" DRILL-IN CASING SYSTEM
PARCALUBRITE
Rc 28-32
PART No OJ4B17
D-OJ4B17

30

DESCRIPTION:

O-Ring

SIZE:

5" ID. x 5 1/2 OD. x 1/4 W.

MATERIAL:

70 Durometer

Nitrile Rubber (BUNA N)

SPECIFICATION:

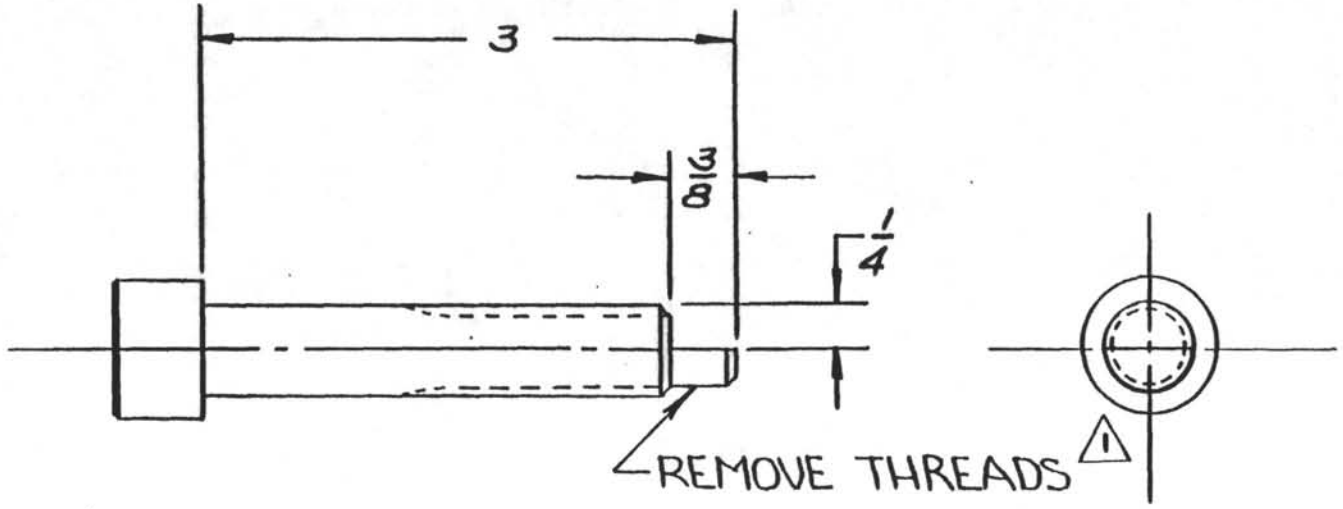
ARP-568-429

QUANTITY:

Two Required

DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY		
SCALE:	APPROVED BY:	DRAWN BY N. Franks
DATE: 6/26/78		REVISED
O-Ring 11 3/4" Drill-In Casing System		
Part No. OJ 4818		DRAWING NUMBER A-OJ 4818

REVISIONS					
No.	DESCRIPTION	DATE	BY	CH	AP
1	THDS. REMOVED	12-21-78	RK		W/O



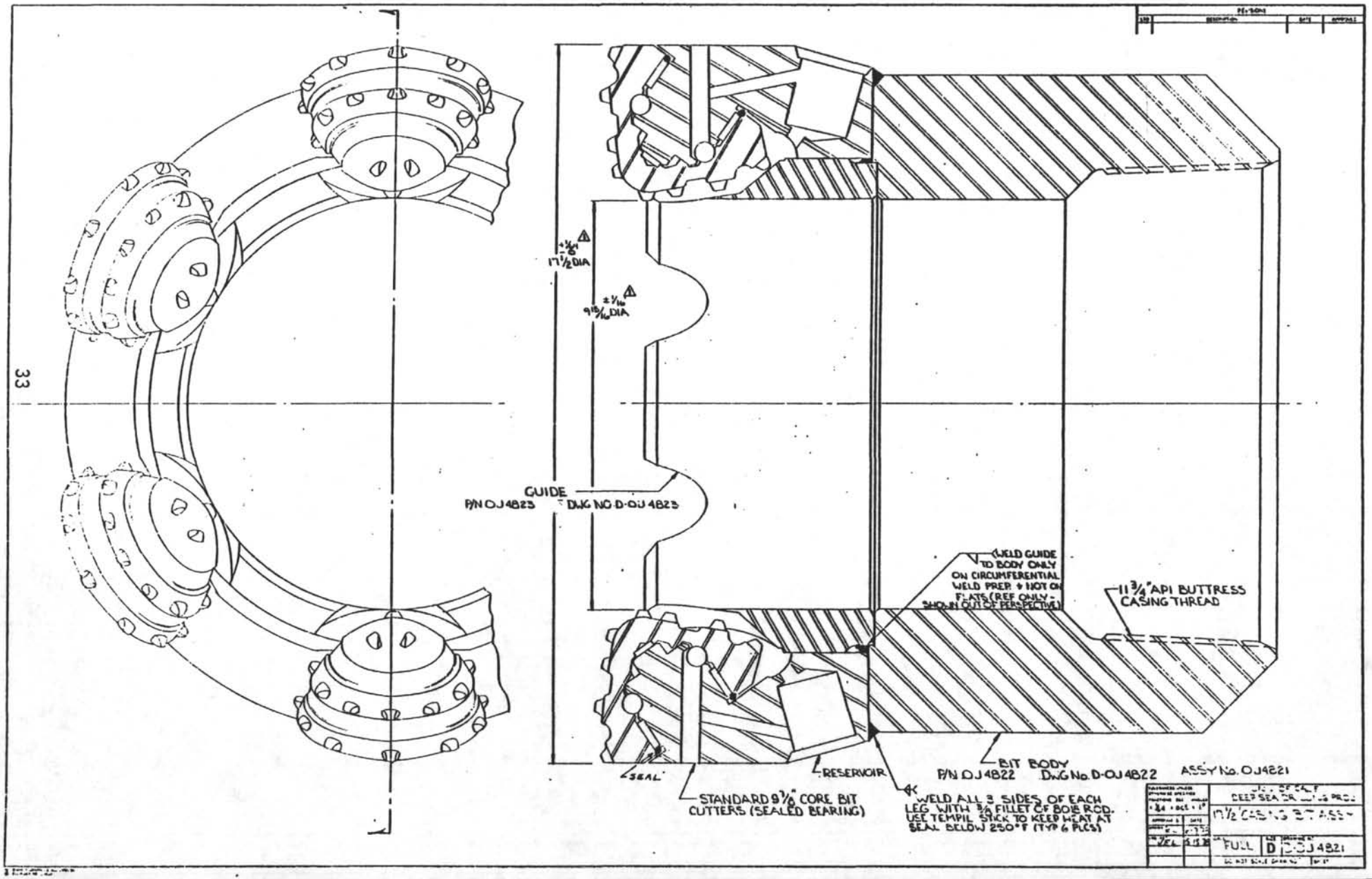
32

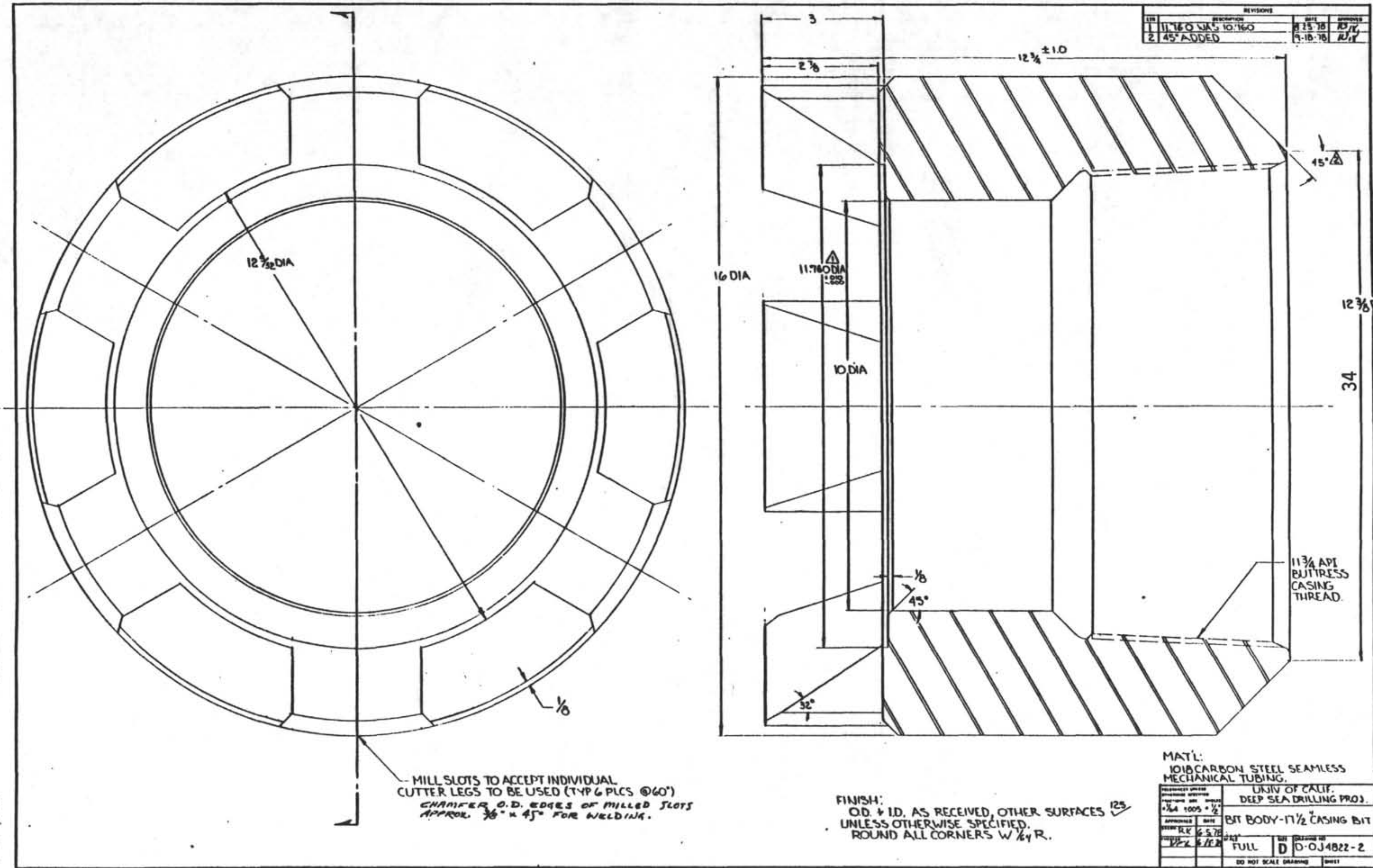
MATERIAL:

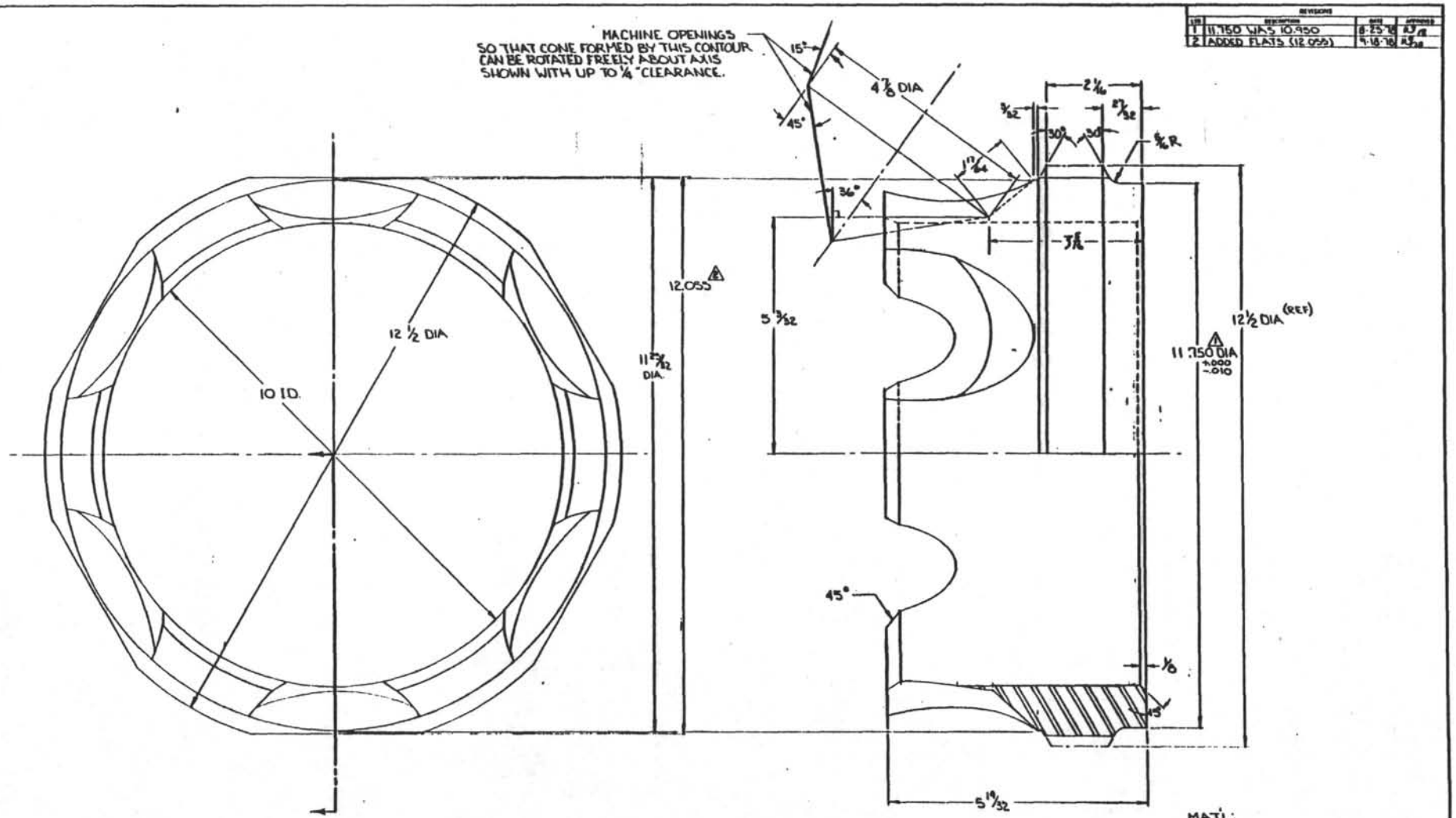
HEX SOCKET ALLOY STEEL CAP SCREW

1/2 - 13NC X 3LG.

DEEP SEA DRILLING PROJECT SCRIPPS INSTITUTION OF OCEANOGRAPHY		
SCALE: FULL	APPROVED BY:	DRAWN BY NSF
DATE: 8-23-78		REVISED
RELEASE SCREW - SNAP RING 11 3/4" DRILL-IN CASING SYSTEM		
PART Nº 0.14819-1		DRAWING NUMBER A-0J4819-1


GUIDE
P/N OJ4823 D.WG NO. D-OJ4823
WELD GUIDE TO BODY ONLY ON CIRCUMFERENTIAL WELD PREP & NOT ON FLATS (REF ONLY - SHOWN OUT OF PERSPECTIVE)
11 3/4" API BUTTRESS CASING THREAD
BIT BODY
P/N OJ4822 DWG No. D-OJ4822 ASSY No. OJ4821
SEAL
RESERVOIR
STANDARD 9 7/8" CORE BIT CUTTERS (SEALED BEARING)
WELD ALL 3 SIDES OF EACH LEG WITH 3/8 FILLET OF BOR ROD. USE TEMPIL STICK TO KEEP HEAT AT SEAL BELOW 250°F (TYP 6 PLCS)
FULL
D
OJ4821


REVISIONS
1 11.760 WAS 10.160 8-25-78
2 45° ADDED 9-18-78
3
2 7/8
12 3/4 ±1.0
12 13/32 DIA
16 DIA
11.760 DIA
10 DIA
12 3/8 DIA
34
45°
1/8
32°
11 3/4 API BUTTRESS CASING THREAD.
MILL SLOTS TO ACCEPT INDIVIDUAL CUTTER LEGS TO BE USED (TYP 6 PLCS @60°)
CHAMFER O.D. EDGES OF MILLED SLOTS APPROX. 3/16" x 45° FOR WELDING.
FINISH:
O.D. & I.D. AS RECEIVED, OTHER SURFACES 125
UNLESS OTHERWISE SPECIFIED.
ROUND ALL CORNERS W 1/64 R.
MAT'L:
1018 CARBON STEEL SEAMLESS MECHANICAL TUBING.
±1/64 ±.005 ±1/2°
RK 6-5-78
UNIV OF CALIF.
DEEP SEA DRILLING PROJ.
BIT BODY-17 1/2" CASING BIT
FULL
D
D-0J4822-2
DO NOT SCALE DRAWING



LTR	REVISIONS DESCRIPTION	DATE	APPROVED
1	11.750 WAS 10.950	8-25-78	RJ
2	ADDED FLATS (12.055)	9-18-78	RJ

MATL:
1018 CARBON STEEL TUBE OR EQUIV.
FINISH 125 EXCEPT WHERE TORCH CUT.
DO NOT SCALE

NOTE:
UNLESS OTHERWISE SPECIFIED,
BREAK ALL CORNERS WITH 1/64 R.

UNIV. OF CALIF DEEP SEA DRILLING PROJ.	
GUIDE - 17½ CASING BIT	
SCALE FULL	SIZE D
DRAWING NO D-OJ4823-2	
DO NOT SCALE DRAWING	SHEET