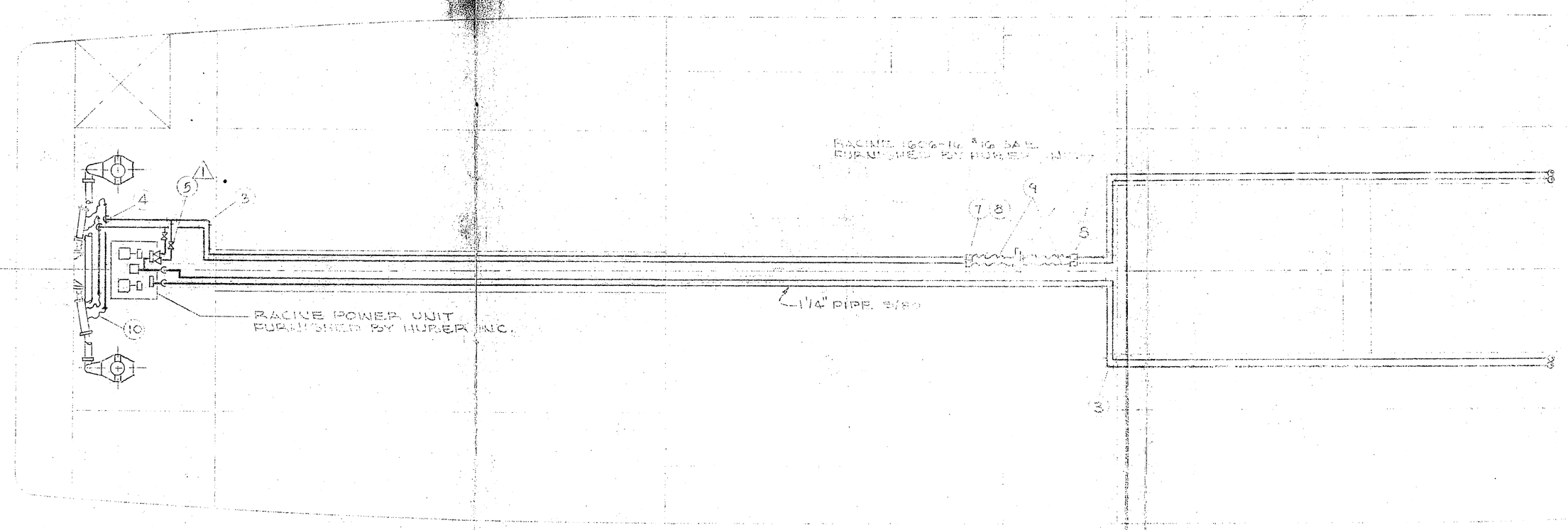

BILL OF MATERIAL

ITEM	SIZE	DESCRIPTION	QTY
1	1 1/4	PIPE, BLACK, SMLS, SCH 80, ASTM A106 GR B	302
2	1	PIPE, BLACK, SMLS, SCH 80, ASTM A106 GR B	1
3	1 1/4	BASE ELBOW, 90°, SCH 80, ASTM A234 GR B	4
4	1	PIPE, BLACK, SMLS, SCH 80, ASTM A106 GR B	1
5	1 1/4	BASE TEE, SCH 80, ASTM A234 GR B	1
6	1	PIPE, BLACK, SMLS, SCH 80, ASTM A106 GR B	1
7	1 1/4	BASE CROSS, SCH 80, ASTM A234 GR B	1
8	1 1/4	BASE ELBOW, 90°, SCH 80, ASTM A234 GR B	1
9	1 1/4	BUSHING, SCH 80, ASTM A234 GR B	2
10	1	PILOT HOUSE	1
11	1	HYDRAULIC STEERING GEAR	1
12	1	HYDRAULIC STEERING GEAR	1
13	1	HYDRAULIC STEERING GEAR	1
14	1	HYDRAULIC STEERING GEAR	1
15	1	HYDRAULIC STEERING GEAR	1
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82	1	HYDRAULIC STEERING GEAR	1
83	1	HYDRAULIC STEERING GEAR	1
84	1	HYDRAULIC STEERING GEAR	1

— TO BE FURNISHED BY HUPER, INC. —

A. CHARACTERISTICS:
1. 32,000 FT LBS. TORQUE
2. 90° "H TO H"
3. 15 SEC. "H TO H"
4. 2-15 H.P. MOTOR/PUMPS
5. ORBITROL STEERING IN PILOT HOUSE
6. INTERFACE FOR AUTO-PILOT

B. EQUIPMENT QUOTING:
1. RACINE HYDRAULIC POWER UNIT CONSISTING OF:
a. 2-15 HP ELEC. MOTOR, 230/460/3/60
b. 2-PSV-P550-20GPM, RACINE PUMPS
c. 2-STRAINERS
d. 1-RETURN LINE FILTER
e. 1-SOLENOID DIRECTIONAL CONTROL VALVE, FOR AUTO-PILOT
f. 1-SOLENOID DIVERTING VALVE
g. 2-CHECK VALVES

1-50 GAL. RESERVOIR, ALL COMPONENTS MOUNTED
2.-2 HYDRAULIC CYLINDERS ORTMAN-MILLER, PENIER 4"BORE - 2.5"ROD x 34" STROKE CLEVIS MOUNT
2-#433 BASE CLEVISES
2-#22.88 ROD EYES
6. 1-ORBITROL WITH COLUMN
4. 1-LOAD LOCK VALVE, RACINE

— CALCULATION OF PIPE WALL —

MAX. WORKING PRESSURE P = 1500 PSI
PIPE MATERIAL: CS ASTM A106 GR B
MINIMUM THICKNESS $T_M = \frac{PD}{2(SE + PY)} + A$

D = .840 I.D.
S = ALL. STRESS (12,000 x .8)
Y = .4 (FOR AMB. TEMP.)
A = .065 (FOR THREADING)

USE SCH. 80 T_M = .191

$T_M = \frac{(1500)(.840)}{2(9600 + 1500(.4))} + .065$

$T_M = \frac{1260}{20160} + .065$

$T_M = .062 + .065$

$T_M = .127$

SYM	DESCRIPTION	DATE	BY
2	FINAL AS BUILT		
1	CHANGE PER CHANGE NOTICE 1 SEE VR TS 1801		

REVISIONS

N.O. 60 26 MAR 78

APPROVALS

ABS 2.0 4 6 78 FCC
USCG
USPHS

U.S. NAVAL SHIP SYSTEMS COMMAND
WASHINGTON D.C. 20360

OCEANOGRAPHIC RESEARCH SHIP
AGOR (UTILITY) CLASS

HALTER MARINE SERVICES, INC.
P.O. BOX 29266 NEW ORLEANS, LA. 70129

DWG. NO. 00044

SCALE		DATE	HALTER
DRAWN BY		CK'D BY	
HALTER HULL NO.	376	HALTER JOB NO.	218
NAVSHIPS NO.		TYPE	

GYRE161

GYRE HYDRAULIC STEERING