FILE FOLDER

DESCRIPTION ON TAB:

MCAS 161 well # 10

TC 1256

☑ **Outside/inside of actual folder did not contain hand written information**

☐ **Outside/inside of actual folder did contain hand written information**
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Confidential Records Management, Inc.
New Bern, NC
1-888-622-4425
9/08

TC 256

North Carolina Department of Environment, Health and Natural Resources
Division of Environmental Management
Groundwater Section
P.O.Box 27687
Raleigh, N.C. 27611

WELL ABANDONMENT RECORD

CONTRACTOR Cyclone Well Drilling REG. NO. 2395

1. WELL LOCATION: (Show a sketch of the location on back of form.)
Nearest Town: Camp Geiger County Onslow
North Carolina Quadrangle No.
(Road, Community, Subdivision, Lot No.)

2. OWNER: U.S. Marine Corps

3. ADDRESS: Camp Geiger

4. TOPOGRAPHY: draw, slope, hilltop, valley, flat

5. USE OF WELL: public DATE: 1/26/01

6. TOTAL DEPTH: 150' DIAMETER: 8"

7. CASING REMOVED:

feet	diameter

8. SEALING MATERIAL:

Neat cement	Sand cement
bags of cement 750 (155)	bags of cement
gals. of water 321	yds. of sand
	gals. of water

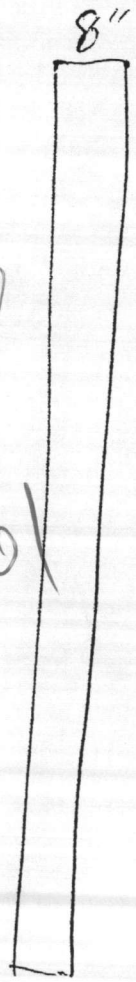
Other
Type material
Amount

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL.
pump

I do hereby certify that this well abandonment record is true and exact.

David S Quinn 1/26/01
Signature of Contractor or Agent Date

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.



D Bradshaw 2-21-01

Provide the well owner a copy of this record.

GW-30 (revised 1/90)

Division of Environmental Health, Public Water Supply Section

SOURCE INFORMATION
GROUND WATER

Date Form Completed: M M D D Y Y: 0 1 2 7 9 5

PWSID: 0 4 6 7 0 4 2

Owner Assigned Source Code: 2 56

Well Name (If purchase, name of system): ~~MCAS WATER PLANT~~ 1256

Code: G (G=Ground, W=Purchase/G, Y=G w/direct influence, Z=W w/direct influence)

If Purchase, seller ID#:

Source Begin Date: M M Y Y

Source exempt—SWTR? N

Direct Influence Date: M M D D Y Y

Availability: P (P=Permanent, E=Emergency, S=Seasonal, I=Interim, O=Other)

Location of well within the system (If purchase, location of master meter): CURTIS ROAD

Latitude (N): Deg. 34 Min. 43 Sec. 35.

Longitude (W): Deg. 077 Min. 28 Sec. 05.

How Determined: O (G=GPS, M=Map, S=Surveyed)

GPS Data: Q# or DOP #

No. of Sats. Locked on:

(If purchase, use seller's primary source lat/long)

Vulnerable (VOCs): N

Assessment Date: M M D D Y Y

ENTRY POINT INFORMATION

Use Code: C (C=Ground/Permanent, D=Ground/non-permanent)

Availability: P (P=Year-round, S=Seasonal, E=Emergency, I=Interim, O=Oth)

Owner Assigned Entry Point Code: 400

Entry Point Name: ~~TC #2 SC~~ MCAS NEW RIVER WTP

Location:

Well Site: Owned or controlled? Y (Y,N) Control Area (100' radius)? N (Y,N) If no, explain:

Sources of pollution/distance: 60' to Rd 40' to R/W ditch

Surface water within 200'? N If yes, actual distance feet If yes, bact. samples collected? (Y,N)

Adequate slope? Y (Y,N) Flooding? (Y,N) Maintenance: OK

Well House: Free of stored materials? Y (Y,N) Properly drained? Y (Y,N) Locked? Y (Y,N)

Condition of house: OK Type of freeze protection: None

Well: Diameter: 8" Type: SCREENED Yield (gpm): 200 Properly sealed? Y (

Properly vented? N (Y,N) Casing depth ft. (If unknown, put 'UNK') Well depth: 204 Meter available? N (

Concrete slab adequate? (Y,N) If no, explain: well not in center of slab Size: 60x

Size of blow-off: 4" Sample tap: Before treatment? Y (Y,N) After treatment? (

Pumps: Capacity: GPM: 108 HP: 7½ Pump intake depth: 70 Auxiliary Power? N (

Type pump: VERTICAL TURBINE Height above floor (pump/casing): 4" /

Storage at well site: Elev: Hydro: Ground:

If hydroautomatic, air volume control? (Y,N) Safety valves? (Y,N) Coded? (Y,N)

High service pumps: 1. gpm hp 2. gpm hp 3. gpm hp Auxiliary Power? (

Is the water treated at this well? N If yes, complete back of form.

If other wells are treated here, which ones? If treated elsewhere, where? MCAS/Water Plt

If purchase, retreat? N If yes, complete back of form.

(1) Noisy Bearings (4) No Vent

(2) Pkg leaking (5) ~~Pump~~ 6" AFF

(3) Seal pump base (6) No Meter

DEHNR 3803 (Revised 12/93)
Public Water Supply Section (Review 12/96)

WELL NUMBER	TC-1256	BY			DATE 1-22-96	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
80	32	80	48	20	100	

REMARKS

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 1256 H THOMAS/BROWN DATE 3-12-90

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
95	28	85	41	21	100.	50

REMARKS Dead hed @ 53 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER AS1256		BY Thomas-Brown			DATE 1-3-85	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1445
80'	6	56	50	18	105	1500

REMARKS left set @ 18 psi w/150 gpm P/L 56 S/L 6 A/L 80 D/D 50

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

#S 1256

10-10-85

A/L	S/L	P/L	D/D	PSI	GPM	TIME
80	15	69	54	10	104	

1256

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	TOTAL CAP.
7-23-82	80'	21"	43	42	4	90	0935

REMARKS:

used direct reading gage
at 0 pres pulled to 70' 108 GPM

TC 1256

TENCARVA
MACHINERY COMPANY

Telephone:
(919) 799-8800
Fax (919) 799-8801

Mailing Address:
P.O. Box 3407
Wilmington, NC 28406-0407

Shipping Address:
Suite A1, 108 N. Kerr Avenue
Wilmington, NC 28405

September 15, 198

Mr. Stanley Miller
Water & Wastewater Plant
Utilities Division
Camp LeJeune, N. C. 28542

Subject: Order M67001-89M-4502

Dear Stanley:

We enclose performance curves, dimensions, bill of materials and an installation, operation and maintenance instruction manual covering the Goulds Model 8 ILC/4 stage bowl assembly being furnished for a deep well turbine pump.

This information should assist you in the installation and future maintenance requirements for this pump.

We thank you for the opportunity to furnish this pump and remain

Very truly yours,

R. W. Tayloe

RWT/md
Enclosures

INSTALLED
2-19-90

September 15, 19--

Mr. Stanley Miller
Water & Wastewater Plant
Utilities Division
Camp Lejeune, N. C. 28542

Subject: Order M67001-89-A302

Dear Stanley:

This letter is to confirm our telephone conversation of September 14, 19-- regarding the performance curves, dimensions, etc., materials and an installation, operation and maintenance instruction manual covering the Gorman Model 6 TTC\1 stage bowl assembly being furnished for a deep well turbine pump.

This instruction should assist you in the installation and future maintenance requirements of the above pump.

We thank you for the opportunity to furnish this pump and remain

Very truly yours,

T. V. Taylor

TVT\md

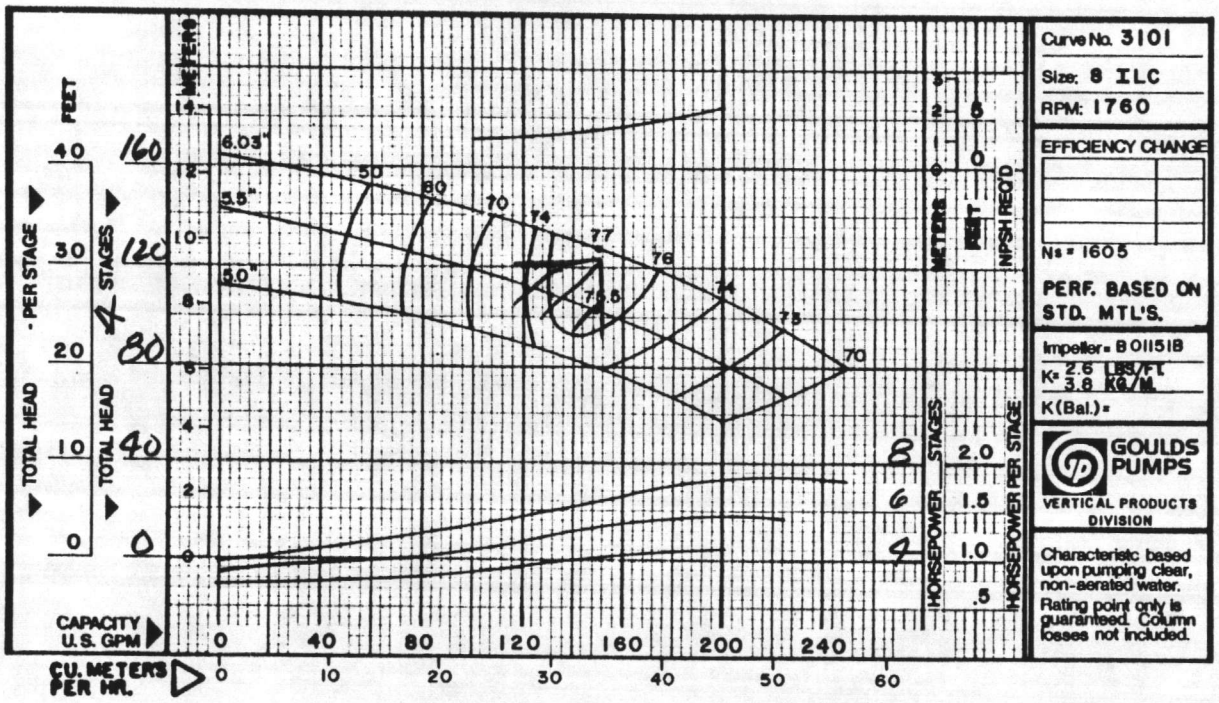
Enclosures

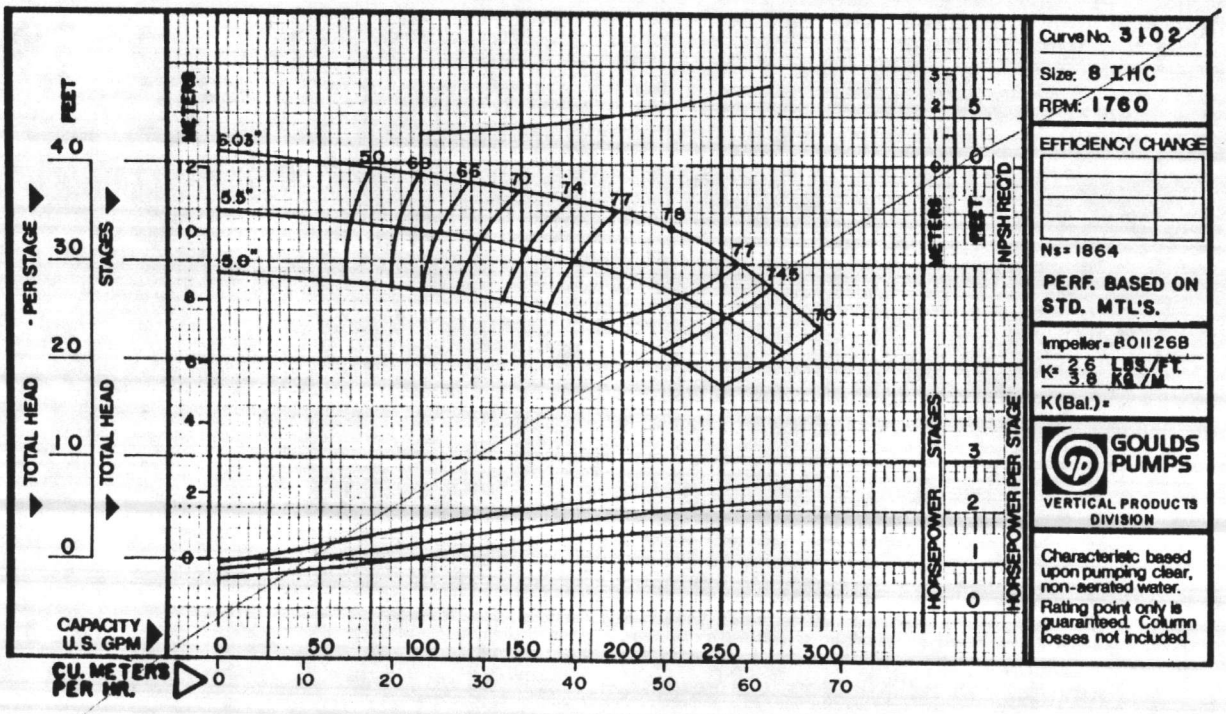
Customer MCB CAMP LEJEUNE, N.C. Project

Goulds Proposal No. Inquiry No.

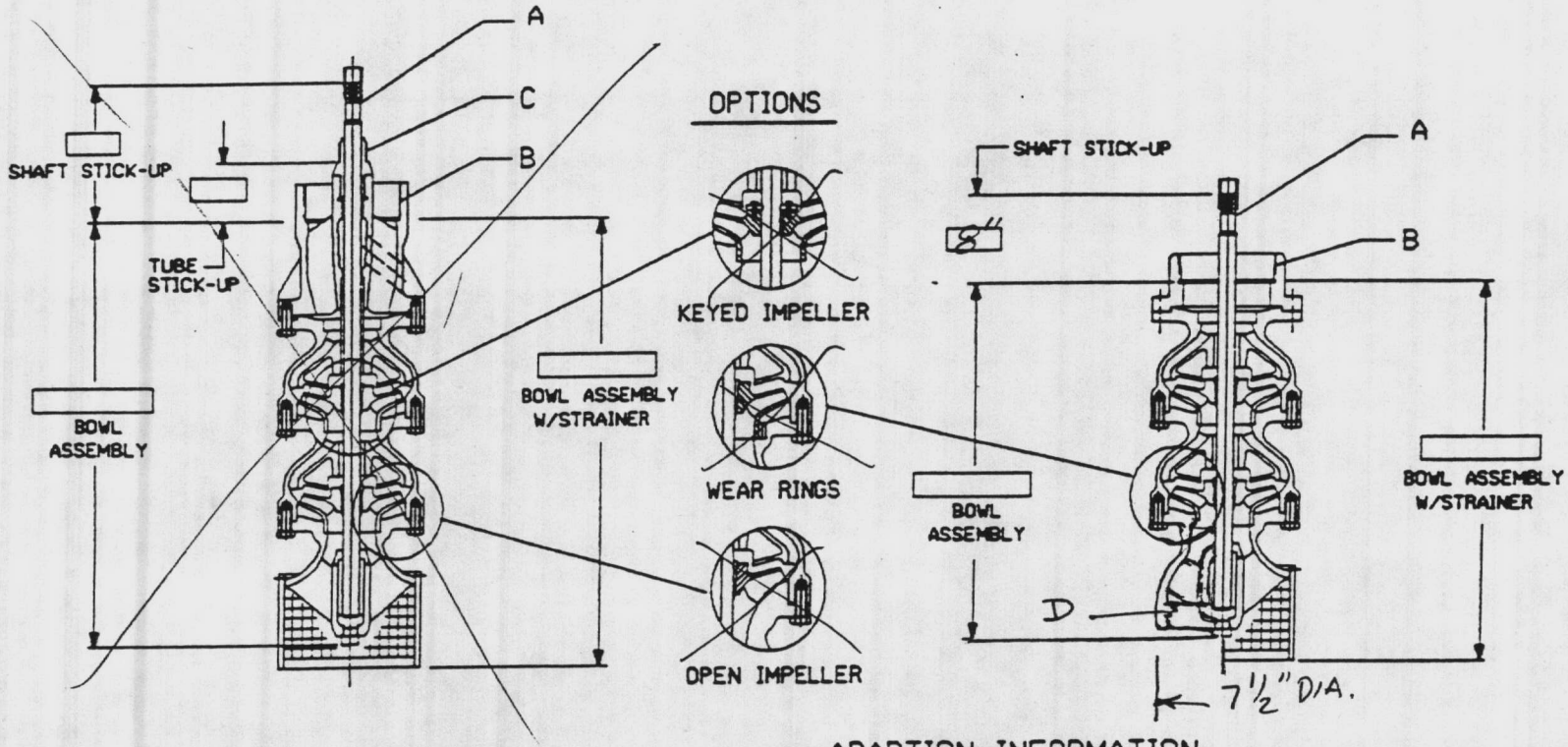
Item No. Customer P.O. No. M67001-89M-4502 P.O. Date 9-13-89

Service Capacity 150 TDH 124' Efficiency 77% RPM 1760 Curve No. 3101





GOULDS PUMPS, INC.



GOULDS PUMPS,INC.	
CUSTOMER	MCB
P.O. NO.	M67001-89M-4502
ITEM NO.	
SERVICE	WATER
GPM	150 TDH 124'
RPM	1760
PUMP SIZE	8ILC STGS 4
GOULDS S.O. NO.	

ADAPTION INFORMATION

A - SHAFT: DIAMETER 1" 12TPI
☐ LEFT HAND THREAD

B - COLUMN PIPE SIZE: 4"

D - SUCTION PIPE - 4"

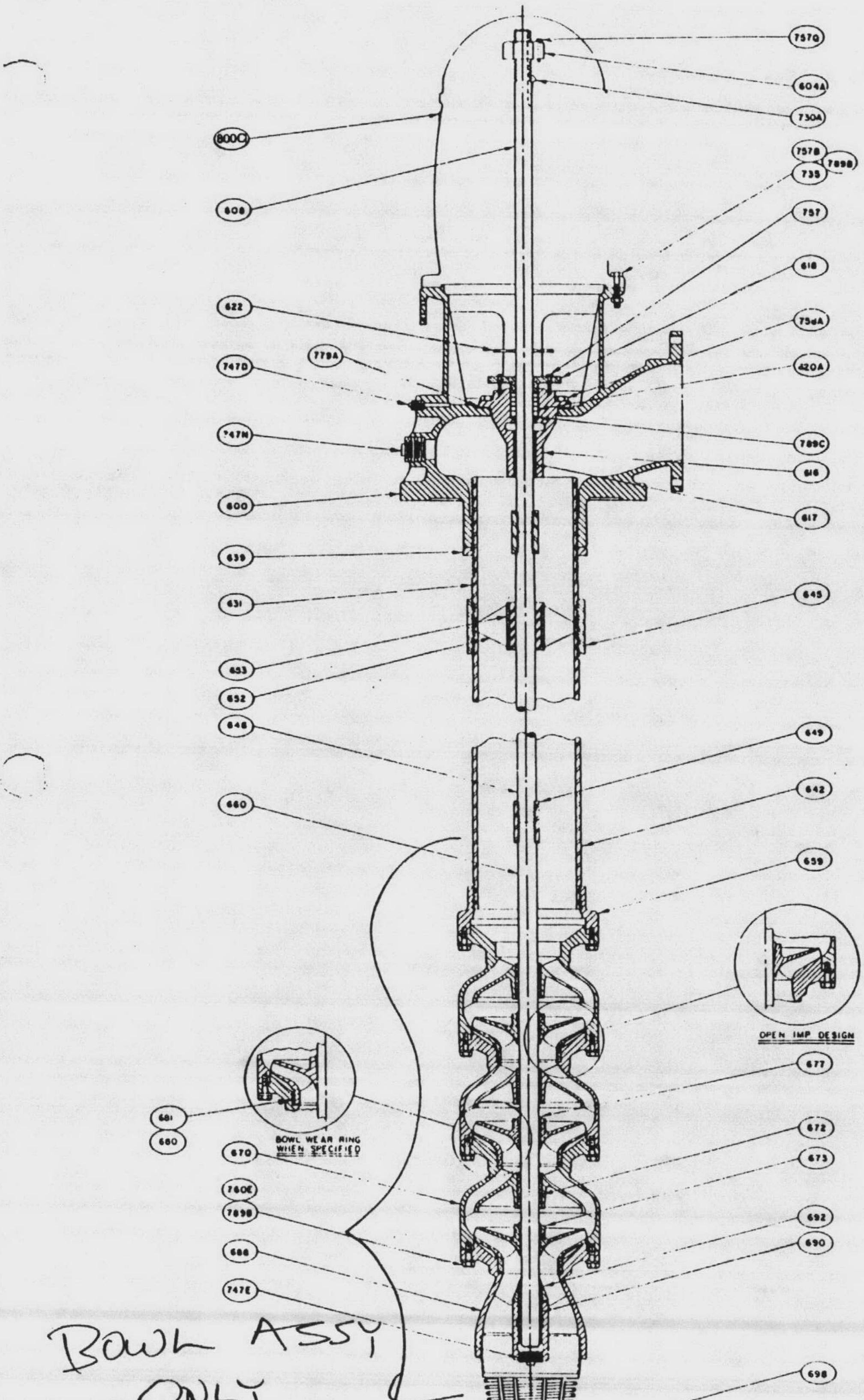
C - TUBE: DIAMETER —
☐ LEFT HAND THREAD ☐ RIGHT HAND THREAD

ORIGINAL PUMP MFG. _____

FILL IN APPROPRIATE DIMENSIONS IN BOXES ABOVE.

September 15, 1984

300.2C.21



STD DWT — Water Lube

CERTIFIED CORRECT
☐ FOR APPROVAL
☒ FOR RECORD

BY RWT DATE 9/15/85

DRAWING NO.	REV	DATE
D01035B		

SPECIAL CONSTRUCTION
BOWL ASSY ONLY

PUMP SIZE	NO. OF STAGES	IMP. DIA.	BHP	QTY.
8ILC	4	6"	6.1	1
LIQUID	G.P.M.	T.D.H.	SP. GR.	TEMP.
WATER	150	124	1.0	
LUBE	BOWL BRG.		LINE SHAFT BRG.	
☒ WATER ☐ OIL ☐	BRONZE			
	BOWL SHAFT DIA.		LINE SHAFT DIA.	
	1 3/16"		1"	
COLUMN SIZE	NO. OF COLUMNS		BRG. SPAN	
4"				

GOULDS PUMPS, INC.
TEXAS DIVISION
PO BOX 5487,
LUBBOCK, TEXAS 79417

GOULDS SERIAL NO. MCB
CUSTOMER
CUSTOMER P.O. *
BRANCH ORDER NO.
EQUIP. OR ITEM
SERVICE

* MG7001-89M-4502

Goulds Model DWT
Bill of Materials

300.2C.20
Effective Date:
September 15, 1984

MODEL DWT TURBINE — WATER LUBE

I. BOWL ASSEMBLY

Item No. (See Dwg)	Qty. Req'd.	Description	Material Code	Description
688	1	Suction Bowl	1003	C.I. ASTM A48 CL30B
747E	1	Pipe Plug	2210	Steel ASTM A108 GR1211
690	1	Bushing, Suction Bowl	1104	Bronze ASTM B584
692	1	Sand Collar	1101	Leaded Semi-Red Brs B584
760E	8①	Cap Screw, Hex 62"	2210	Steel ASTM A108 GR1211
789B	8①	Lockwasher for 760E	2210	Steel ASTM A108 GR1211
673	1①	Impeller Open____ Enclosed X	1102	Leaded Red Brs B62
677	1①	Taperlock Impeller	2242	C.I. ASTM A48 CL30B
670	1①	Bowl Intermediate	1003	C.I. ASTM A48 CL30B
672	1①	Bushing, Inter-Bowl	5121	Rubber
659	1	Adapter, Column	1003	C.I. ASTM A48 CL 30B
660	1	Shaft Bowl	2227	S/S ASTM A582 TYPE 416

Optional Bowl Assembly Items

677 Alt.	1①	Taperlock, Impeller	2227	S/S ASTM A582 TYPE 416
698	1	Strainer Cone/Basket	6952	Hot Galv. ASTM A123
680	1①	Wear Ring, Bowl	1104	Bronze ASTM B584
681	1①	Wear Ring, Impeller	1104	Bronze ASTM B584

① Indicates Qty. Required Per Bowl Assembly.
② Indicates Qty. Required Per Stage.

II. COLUMN AND LINESHAFT

642		Pipe Column, Thrd'd ____in. x ____ft.	6501	Pipe ASTM A120 GRB
646		Lineshaft ____in. x ____ft.	2210	Steel ASTM A108 GR1211
649		Coupling, L.S. ____in. Dia.	2218	S/S ASTM 582 TYPE 416
645		Coupling, Col.____in.	6501	Pipe ASTM A120 GR B
653		Bearing Lineshaft (Spider)____in. x ____in.	1104	Bronze ASTM B584

8 INC / 4 STAGE

M67001-89M-4502 9/13/89

GOULDS PUMPS, INC.
TEXAS DIVISION

TC 1256

TENCARVA
MACHINERY COMPANY

Mailing Address:
P.O. Box 3407
Wilmington, N.C. 28406-0407 • (919) 799-8800

Shipping Address:
1417 S. College Road
Wilmington, N.C. 28403

November 19, 1987

Mr. Stan Miller
Water Treatment Plant
Utilities Division
Base Maintenance Department
Camp LeJeune, N. C. 2854 0

Dear Stan:

To replace your old Deming 6" Deep Well Turbine pump bowl assembly with a bowl assembly for a new rating of 150 GPM @ 110' TDH, we offer the following. It will be necessary to go to a 7-1/2 HP motor as your existing 5 HP will not be quite large enough.

1 Goulds Model 8ILC/4 stage Vertical Turbine Bowl assembly bronze fitted for 1" line shaft and 4" column and tail pipe. Pump rated 150 GPM @ 110' TDH. Weight - 169#.

PRICE.....$1,554.00
FOB- Camp LeJeune, N. C.
Terms- Net 30 days
Shipment- 2 weeks

We could furnish this pump with full 6" impellers for a rating of 150 GPM @ 128' TDH, which still would not overlaod your 7-1/2 HP motor. This 8" pump is 7-1/2" in diameter and would fit into your existing 8" well.

We thank you for the opportunity to furnish this information and would be pleased to receive your order.

Very truly yours,

R. W. Tayloe

RWT/md
Enc.

Regenerations
typed 11-23-87
apk

Goulds Vertical Turbine Pumps

Performance Curve

5C26.1a

July 1985
(New)

GOULDS PROPOSAL NO.	GOULDS S.O. NO.	INQUIRY NO.	CUSTOMER P.O. NO.	P.O. DATE	ITEM NO.	CUSTOMER:			
PROJECT:			SERVICE:				GPM CAPACITY:	FT. TDH:	% EFFICIENCY	RPM:

DATE 6-21-85 REV. DATE

GOULDS PUMPS, INC.
SENECA FALLS, NEW YORK 13148

CENTRIFUGAL PUMP CHARACTERISTICS
BASED ON GOULDS STANDARD CLEARANCES

RPM 1760 **CDS** 3416

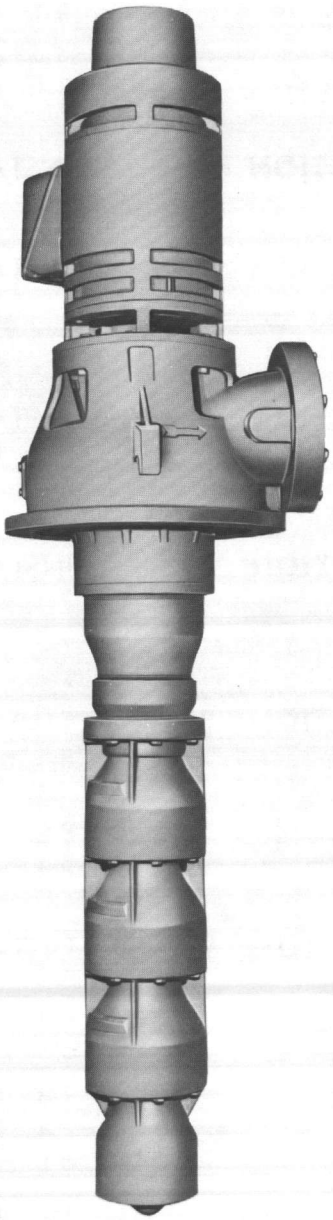
MODEL	8 ILC
SIZE	8"
IMP. DWG.	B01151B
PATTERN	58840
EYE AREA	6.10 in² K = 2.6 LB/FT
IMP. DIA.	6.03 K = 3.8 KG/G

GOULDS PUMPS, INC.
TEXAS DIVISION-STD. PRODUCTS GROUP

GOULDS PUMPS
VERTICAL PUMP DIVISION

Installation, Operation and Maintenance Instructions

Model DWT
Deep Well
Turbine Pumps



TENCARVA MACHINERY CO.
P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 799-8800

TABLE OF CONTENTS

SECTION 1
INTRODUCTION

1-1. INTRODUCTION

1-2. The design, material, and workmanship incorporated in the construction of Goulds Pumps makes them capable of giving long, trouble-free service. The life and satisfactory service of any mechanical unit, however, is enhanced and extended by correct application, proper installation, periodic inspection and careful maintenance. This instruction manual was prepared to assist operators in understanding the construction and the correct methods of installing, operating and maintaining these pumps.

Study thoroughly Sections 1 - 13 and carefully follow the instructions for installation and operating. Sections 14 - 16 are answers to trouble and maintenance questions. Keep this instruction manual handy for reference. Further information can be obtained by contacting the Vertical Turbine Division, Goulds Pumps, Inc., City of Industry, California or your local branch office.

WARNING: Goulds Pumps, Inc. will not be liable for any damages or delay caused by failure to comply with the provisions of this instruction manual.

1-3. RECEIVING AND CHECKING

1-4. The pump shall be carefully supported prior to unloading from the carrier. Handle all components carefully. Inspection for damage of the shipping crate shall be made prior to unpacking the pump. After unpacking, visually inspect the pump, and check the following:

A. Contents of the pump assembly against shipping list.

B. All components against damage.

C. The shaft is not bent.

1-5. Any shortages or damages should be immediately called to the attention of the local freight agent of the carrier by which the shipment arrived and proper notation made on the bill. This shall prevent any controversy when claim is made and facilitate prompt and satisfactory adjustment.

1-6. MATERIALS AND EQUIPMENT REQUIRED

1-7. The material and equipment necessary for installation of the pump, will vary with the size of the pump and the type of installation.
The following list of standard tools and supplies are offered only as a guide.

A. BULK MATERIAL

Anti-Galling Lubricant such as ("MOLYKOTE" DOW CORNING).
Thread Compound
Lubrication Oil
Turbine Oil (SEE SECTION 17)
Grease (SEE SECTION 17)
Solvent, petroleum-base (kerosene, distillate or unleaded gasoline)
Grouting material, non-shrinking

B. RIGGING EQUIPMENT

Mobile power hoist; or a traveling crane; or a derrick
Dragline and blocks
Deep throat clamp
Elevator clamps
Clevises — for use with eyebolts
Capstan drive (Cat head and cat line) for making threaded joints (optional)
Timbers — size, length and quantity as required to support long pump parts on the floor
I-Beams or timbers to support pump over well
Tail rope — size and length as required

C. HAND TOOLS

Pipe wrenches
Chain tongs
Chain wrench (clamp type)
Clean rags
Feeler gages
Set of mechanic's tools including: files, wire brush, pliers, wirecutters, pocket knife and pipe wrenches

OPTIONAL TOOLS TO FACILITATE PUMP ASSEMBLY AND DISASSEMBLY:

All pumps:

1. Ammeter to assist in final impeller adjustment (SEE SECTION 13).

All pumps with impeller taper collets:

1. Collet hammer to assist in bowl assembly and disassembly (SEE SECTION 16).

Oil lubrication (enclosed line shaft).

1. Tube tension adapter. (SEE SECTION 9).
2. Dynamometer Scale.

SECTION 2
STORAGE

2-1. STORAGE

2-2. Goulds Pumps carefully preserves and protects its products for shipment. However, the effective life of the preservatives applied at the factory can vary from 3 to 18 months depending on the severity of the environment in which the equipment is stored. This section provides procedures for preparation prior to storage and maintenance during storage of Goulds' pumps. These procedures are necessary to protect the precision parts of the pumps. Specific procedures for storing motors, gearheads, and engines, should be obtained from the equipment manufacturer. This section is intended to be of general assistance to users of Goulds' pumps. It shall not modify, amend and/or otherwise alter the scope of Goulds Pumps warranty in any way whatsoever.

2-3. STORAGE PREPARATION

2-4. Goulds vertical pumps require proper preparation for storage, and regular maintenance during storage. The pump shall be considered in storage when it has been delivered to the job site and is waiting installation. If a pump has been installed but is not in regular operation, such as seasonal shutdown, see Section 14.

2-5. RECOMMENDED STORAGE PROCEDURES

A. Controlled storage facilities should be maintained at an even temperature 10°F or more above the dew point with relative humidity less than 50% and little or no dust. (If these requirements cannot be met the pump is to be considered in uncontrolled storage).

B. For uncontrolled storage periods of 6 months or less, the pump is to be inspected periodically to insure that all preservatives are intact.

C. All pipe threads and flanged pipe covers are to be sealed with tape.

D. The pump must not be stored closer than 6 inches to the ground.

2-6. PREPARATIONS FOR UNCONTROLLED LONG TERM STORAGE

2-7. Storage periods over 6 months require the preceding uncontrolled storage procedure plus the following:

A. Inspect the lube oil and seal flush piping, and either fill the piping with rust preventative oil, or recoat the piping periodically to prevent corrosion.

B. Place 10 pounds of moisture absorbing dessicant or 5 pounds of vapor phase inhibitor crystals near the center of the pump. If the pump is assembled, place an additional one pound in the discharge nozzle securely fastened to the discharge flange.

C. Install a moisture indicator near the perimeter of the pump. Cover the pump with 6 mil minimum thickness black polyethylene or equal and seal it with tape. Provide a small ventilation hole approximately ½ inch diameter.

D. Provide a roof or a shed shelter to protect from direct exposure to the elements.

SECTION 3
PREPARING THE SITE

3-1. PREPARING THE FOUNDATION

3-2. The foundation must be rigid, level and of adequate strength to support the complete weight of the pump plus the weight of the liquid passing through it. Weight data is given on the Certified Pump Outline Drawing, if provided, or may be calculated from data given in Section 17. For fluid weight see Table 17-5 (SECTION 17). Concrete foundations shall have bolts with a pipe sleeve 2½ times the bolt diameter embedded in the concrete, sized and located in accordance with the dimensions given on the Pump Certified Outline Drawing or established by actual measurement of discharge head or subbase mounting holes. The pipe sleeve allows movement for final positioning of the foundation bolts. A dam for grouting shall be constructed. (SEE FIGURE 3-1). Occasionally there is a gradual settling of the ground around a well. If settling is anticipated pour a foundation on opposite sides of the well, outside the area of potential settling, and bridge across the well with suitable I-Beams to carry the weight of the pump. When mounted directly on a structural steel frame, the pump shall be located directly over or as near as possible to the main

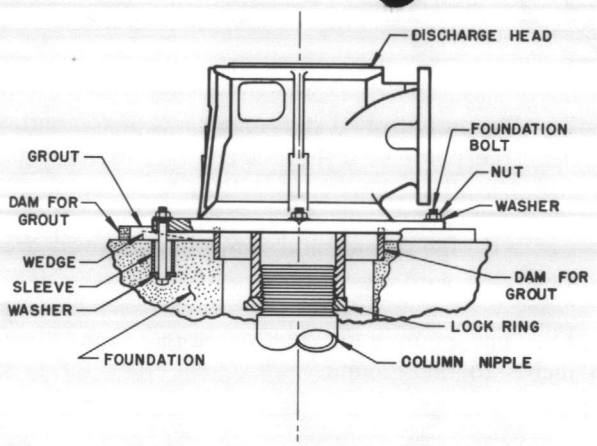


Figure 3-1 Preparing the Foundation

building members, beams or walls. Base plates shall be bolted to the supports to avoid distortion, prevent vibration, and retain proper alignment.

3-3. DEEP WELL TURBINE PUMP

Install the pump only after the well has been proven and production characteristics established, by means of a test pump. The lowest extremity of the pump must be above the perforations of the well casing, to avoid air entrainment, and excessive friction which may cause extensive pump damage.

3-4. WATER LEVEL

3-5. To establish the water level in a well proceed as follows:

A. Install a pipe or copper tube of known length, 10 to 20 feet below the lowest possible pumping level. Make all joints air tight utilizing thread compound.

B. Pump air into the line until the indicated air pressure stabilizes. This indicates that all the water has been expelled from the pipe. The gage reading indicates the pressure necessary to support a column of water of a height equal to the depth that the pipe is submerged.

WATER LEVEL = AIR LINE LENGTH (FT.)
(Ft. Below Ground)

$$\text{MINUS} \quad \frac{\text{GAGE READING IN PSI} \times 2.31}{\text{SPECIFIC GRAVITY OF LIQUID}}$$

3-6. The first stage (closest to suction bowl) must be completely submerged at the minimum standing water level. With a tail pipe the minimum pumping water level may fall below the first stage, but this distance must be subtracted from the NPSH available. The NPSH available must always exceed NPSH required by the pump. The suction bowl or tail pipe must be sufficiently submerged to prevent vortexing.

SECTION 4
INSTALLING THE BOWL

4-1. BOWL INSTALLATION

4-2. Pumps that are 20 feet or less in length are usually shipped completely assembled with exception of the driver, vent piping, mechanical seal or packing, and headshaft, if a vertical hollow shaft driver is supplied.

WARNING

DO NOT WORK UNDER A HEAVY, SUSPENDED OBJECT UNLESS THERE IS A POSITIVE SUPPORT UNDER IT, WHICH WILL PROTECT PERSONNEL SHOULD A HOIST OR SLING FAIL.

4-3. Prior to installing the bowl, remove all accumulated dust, oil or other foreign matter from external surfaces of the pump components and proceed as follows:

A. Position a suitable lifting device over the well or sump opening. Place two timbers or I beams across the well or sump opening strong enough to safely support the weight of the entire pump.

NOTE

IF THE PUMP IS COMPLETELY ASSEMBLED, PROCEED TO SECTION 7.

B. If pump exceeds 200 feet measure available bowl lateral (shaft end play) by pushing shaft towards suction bowl, mark shaft, pull shaft out and mark again and record, this will later aid in adjusting impellers.

C. If provided, install tail pipe (697). Place an elevator clamp just below the tail pipe threads. Attach a sling to the clamp and to hoist hook. Hoist over the well or sump and attach strainer (698) if provided. Lower tail pipe until clamp rests firmly on the supporting timbers. (SEE FIGURES 5-1 AND 6-1).

D. Attach and secure an elevator clamp just below and firmly butted against the top intermediate bowl flange (670). Attach a sling to the clamp and pass the loop end of the sling over the hoist hook. Guide the pump suction to prevent bumping or dragging and hoist the assembly over the well or sump opening.

E. If pressure flush lines to the tail bearing are provided, attach the flush lines to suction bowl and along the length of the bowl assembly. Lubricate joints with thread compound.

F. If a tail pipe is provided, apply thread compound to the tail pipe threads and carefully thread tail pipe into bowl assembly, until joints butt.

G. If a suction strainer (698) is provided, assemble to suction bowl.

H. Lower the bowl assembly into well or sump until elevator clamp rests firmly on the supporting timbers.

J. Place a cover over bowl assembly to prevent entrance of dirt or other foreign matter. Check to see that pump shaft coupling (649) is clean.

K. If keyed shaft coupling is used, remove upper split ring and key.

CAUTION

DO NOT DROP ANY FOREIGN OBJECT INTO THE BOWL ASSEMBLY. SUCH AN OBJECT CAN CAUSE SERIOUS DAMAGE TO THE PUMP AND ANY DOWNSTREAM COMPONENTS. ANY FOREIGN OBJECT DROPPED INTO THE BOWL ASSEMBLY MUST BE RETRIEVED PRIOR TO CONTINUING ASSEMBLY.

SECTION 5
INSTALLING PRODUCT LUBRICATION COLUMN (OPEN LINESHAFT)

5-1. INSTALLING PRODUCT LUBRICATION COLUMN (SEE FIGURE 5-1).

5-2. Installation of product lubrication column, proceed as follows:

A. Check that bottom line shaft is not bent and insert into bottom column section.

B. Place an elevator clamp near top of column just below, and butted firmly against, column pipe coupling (645). For flanged columns, place the elevator clamp just below the flange.

NOTE

FOR FLANGED PIPE, TOP OF COLUMN HAS A FLANGE WITH UNTAPPED HOLES.

CAUTION

ELEVATOR CLAMP PADS MUST BE BUTTED FIRMLY AGAINST THE FLANGE, NOT AGAINST FLANGE TO COLUMN WELD, AND POSITIONED IN SUCH A MANNER AS TO ALLOW MAXIMUM INSERTION OF FLANGE BOLTS. BEFORE PROCEEDING, CHECK BY INSERTING FLANGE BOLTS THROUGH FLANGE. A MINIMUM OF ONE-HALF OF THE FLANGE BOLT HOLES MUST NOT BE OBSTRUCTED.

C. Attach a sling to elevator clamp and to hoist hook. Tie bottom of shaft (646) to column (644), by tying a tail rope to deep throated clamp attached to the bottom of column, then tie a clove hitch or double half hitch around the shaft in the threaded area. Figure 5-2 also shows the alternate method (dotted lines).

D. For all keyed shafts, threaded shafts, and for safety, use chain wrenches (clamp type) attached to shaft just above the shaft tail rope hitch. For keyed shafts, the tail rope hitch shall be above the keyway.

E. Utilize the remaining tail rope to keep tension on the knots during hoisting. Lower end of column section shall be guided by drag line which is pulled by the hoist. A traveling block for the drag line shall be attached to a deep throated clamp, which is secured to bottom of the column.

NOTE

FOR FLANGED COLUMN, TRAVELING BLOCK SHALL BE ATTACHED TO AN EYE BOLT, THREADED THROUGH A FLANGE BOLT HOLE.

F. Hoist column section over pump, keeping tension on tail rope. With column in a vertical position, remove drag line and traveling block, lower column until bottom line shaft is properly aligned with impeller shaft coupling.

CAUTION

USE "MOLYKOTE" DOW-CORNING OR EQUAL FOR ALL GALLING MATERIALS SUCH AS 316 STAINLESS STEEL.

G. For keyed shaft, install retaining ring, and insert key onto line shaft. Lower into shaft coupling approximately one inch. Insert split ring, lower lineshaft until split ring bottoms in the groove.

H. With line shaft in proper position on coupling, remove tail rope, and start threading line shaft into coupling. Clean any dirt which may have entered the threads underneath the tail rope, and apply a few drops of oil to shaft threads if non-galling material. Thread manually until resistance is felt. Finish the joint utilizing a pair of pipe wrenches. Use care not to apply wrenches on bearing journal areas.

NOTE

SHAFT THREADS ARE LEFT HAND.

CAUTION

MAKE UP THREADED JOINTS MANUALLY TO VERIFY THAT THREADS ARE PROPERLY ENGAGED PRIOR TO APPLYING A WRENCH OR A POWER DRIVE. IF CROSS - THREADING OCCURS, BREAK THE JOINT AND REPAIR THREADS. IF THREADS ARE BEYOND REPAIR, REPLACE THE DAMAGED PART.

J. Pumps equipped with keyed coupling, secure retaining ring with capscrews.

K. Clean column threads and lubricate with thread compound.

L. Lower column section (644) until column aligns with discharge bowl threads. Manually, thread column into discharge bowl.

M. Complete joint by tightening column with chain tongs, or capstan drive, and rope until end of column butts firmly against discharge bowl (661).

N. Flanged columns-lower column section until column flange engages the flanged top bowl register. Insert as many capscrews through both flanges as possible, a minimum of one-half the total. Tighten capscrews gradually in diametrically opposite pairs.

CAUTION

DO NOT DROP ANY FOREIGN OBJECT INTO THE PUMP ASSEMBLY. SUCH AN OBJECT CAN CAUSE SERIOUS DAMAGE WHEN THE PUMP IS STARTED, AND ALSO TO DOWNSTREAM COMPONENTS. ANY FOREIGN OBJECT DROPPED INTO THE PUMP ASSEMBLY MUST BE RETRIEVED PRIOR TO CONTINUING ASSEMBLY.

P. Pump with flanged column — Lift pump assembly high enough to allow rotation of the elevator clamp one-quarter turn. Realign and lower assembly. Install and tighten remaining capscrews. Repeat rotation and tightening procedure until all the capscrews are uniformly tight.

Q. If required, attach the next section of pressure flush line and secure to column.

R. Lift the assembly and remove the elevator clamp secured to bowl assembly. Slowly lower assembly into well or sump until column elevator clamps gently come to rest on timbers, and remove sling.

S. Place bearing retainer (652) over shaft (646) and locate it in the column flange register or column coupling recess, whichever the case may be.

NOTE

POUR A SMALL AMOUNT OF OIL BETWEEN BEARING AND SHAFT OR SHAFT SLEEVE. (METAL BEARINGS ONLY).

T. REMOVABLE SHAFT SLEEVE — Slip sleeve on shaft and through bearing retainer, align sleeve hole and shaft hole, and press in roll pin.

CAUTION

DO NOT STRIKE PIN WITH A HAMMER. THIS WILL KNOCK THE SHAFT OUT OF ALIGNMENT.

NOTE

PLACE A COVER OVER COLUMN OPENING TO PREVENT ENTRANCE OF FOREIGN MATTER.

NOTE

AFTER THE FIRST COLUMN SECTION, THE SHAFT SHOULD BE SUPPORTED WITHIN THE LINESHAFT BEARING (653). THE SHAFT SHOULD EASILY BE PULLED TO THE CENTER OF THE BEARING. IF RESISTANCE IS FELT, WHEN MOVING THE SHAFT A BENT LINESHAFT MAY BE INDICATED. PULL PUMP AND CHECK LINESHAFT FOR STRAIGHTNESS.

U. Clean shaft (646) threads and lubricate with oil if non-galling material. Thread shaft coupling (649) on shaft until one-half of coupling threads are engaged.

V. KEYED COUPLING — Install lower half of keyrod coupling on shaft. Remove upper retaining ring, upper split rings, and key.

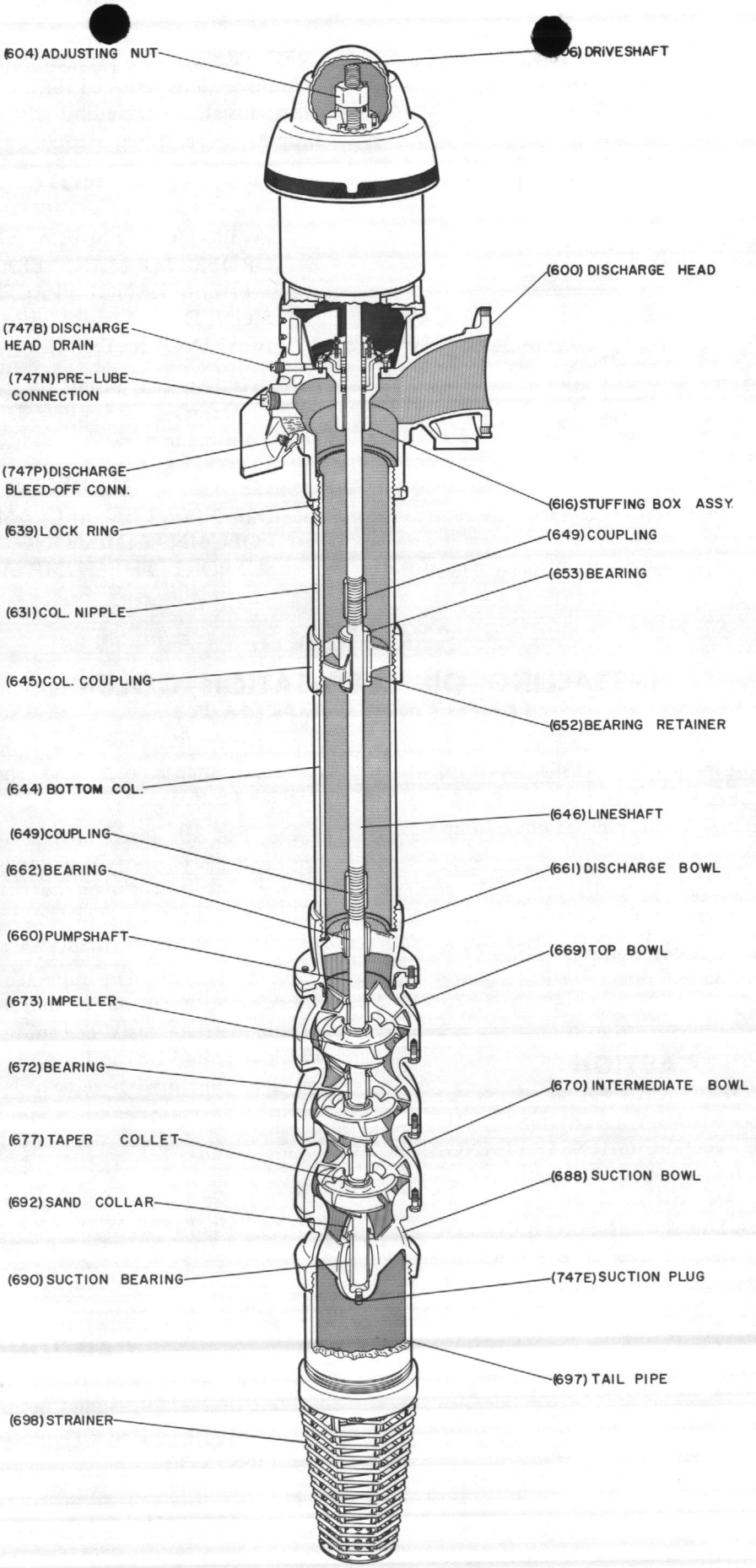


Figure 5-1 Product Lubrication Pump

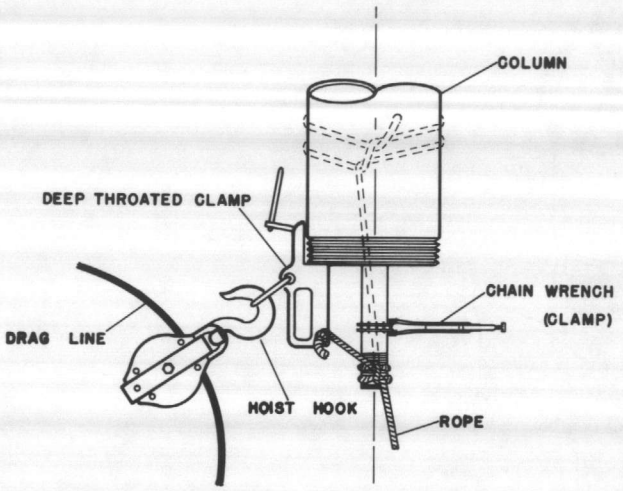


Figure 5-2 Product Lubrication Column Hoisting

W. Repeat the preceding procedures until all column sections required for the proper setting have been installed excluding the column adjusting nipple (631), if required.

NOTE

FOR FLANGED COLUMN, DO NOT OVER-TIGHTEN FLANGE BOLTS IN ORDER TO MAKE FLANGE FACES MEET. FLANGE FACES ARE DESIGNED TO BE SEPARATED BY BEARING RETAINER.

X. If required, install the column nipple with longest threaded end upward. Thread lock ring (639) on column.

CAUTION

DO NOT USE A CLAMP ON THE COLUMN ADJUSTING NIPPLE TO SUPPORT THE PUMP ASSEMBLY.

SECTION 6

INSTALLING OIL LUBRICATION COLUMN (ENCLOSED LINESHAFT)

6-1. INSTALLING OIL LUBRICATION COLUMN (SEE FIGURE 6-1).

6-2. Installation of oil lubrication column, proceed as follows:

A. Insert tube (654) and shaft (646) sections into column section.

B. Place an elevator clamp near top of column just below and butted firmly against column pipe coupling (645). For flanged columns, place the elevator clamp just below the flange.

CAUTION

ELEVATOR CLAMP PADS MUST BE BUTTED FIRMLY AGAINST THE FLANGE, NOT AGAINST FLANGE TO COLUMN WELD, AND POSITIONED IN SUCH A MANNER AS TO ALLOW INSERTION OF FLANGE BOLTS. BEFORE PROCEEDING, CHECK BY INSERTING FLANGE BOLTS THROUGH FLANGE. A MINIMUM OF ONE-HALF OF FLANGE BOLT HOLES MUST NOT BE OBSTRUCTED FOR INSERTION OF FLANGE BOLTS.

C. Attach a sling to elevator clamp and to hoist hook. Attach bottom of shaft (646) to column (644), by tying a tail rope to deep throated clamp attached to bottom of column. (SEE FIGURE 6-2). Tie a clove hitch or double half hitch around the enclosing tube and then around the shaft in threaded area. Figure 6-2, also shows the alternate method (dotted lines).

D. For all keyed shafts, and for safety, on threaded shafts, use chain wrenches (clamp type) on the shaft just above the shaft tail rope hitch. (SEE FIGURE 6-2). For keyed shafts the tail rope hitch shall be above the keyway.

E. Utilize the remaining tail rope to keep tension on the knots during hoisting. Lower end of column section shall be guided by a drag line which is pulled by the hoist. A traveling block for the drag line shall be attached to a deep-throated clamp, which is secured to bottom of the column. Take care that clamp does not damage the column threads.

F. Hoist column section over pump, keeping tension on tail rope. With column in a vertical position, remove drag line and traveling block, lower column until bottom line shaft is properly aligned with pump shaft coupling.

CAUTION

USE "MOLYKOTE" DOW-CORNING OR EQUAL FOR ALL GALLING MATERIALS SUCH AS 316 STAINLESS STEEL.

G. For keyed shaft, install retaining ring and insert key onto line shaft, lower into shaft coupling approximately one inch. Insert split ring, lower lineshaft until split ring bottoms in the groove.

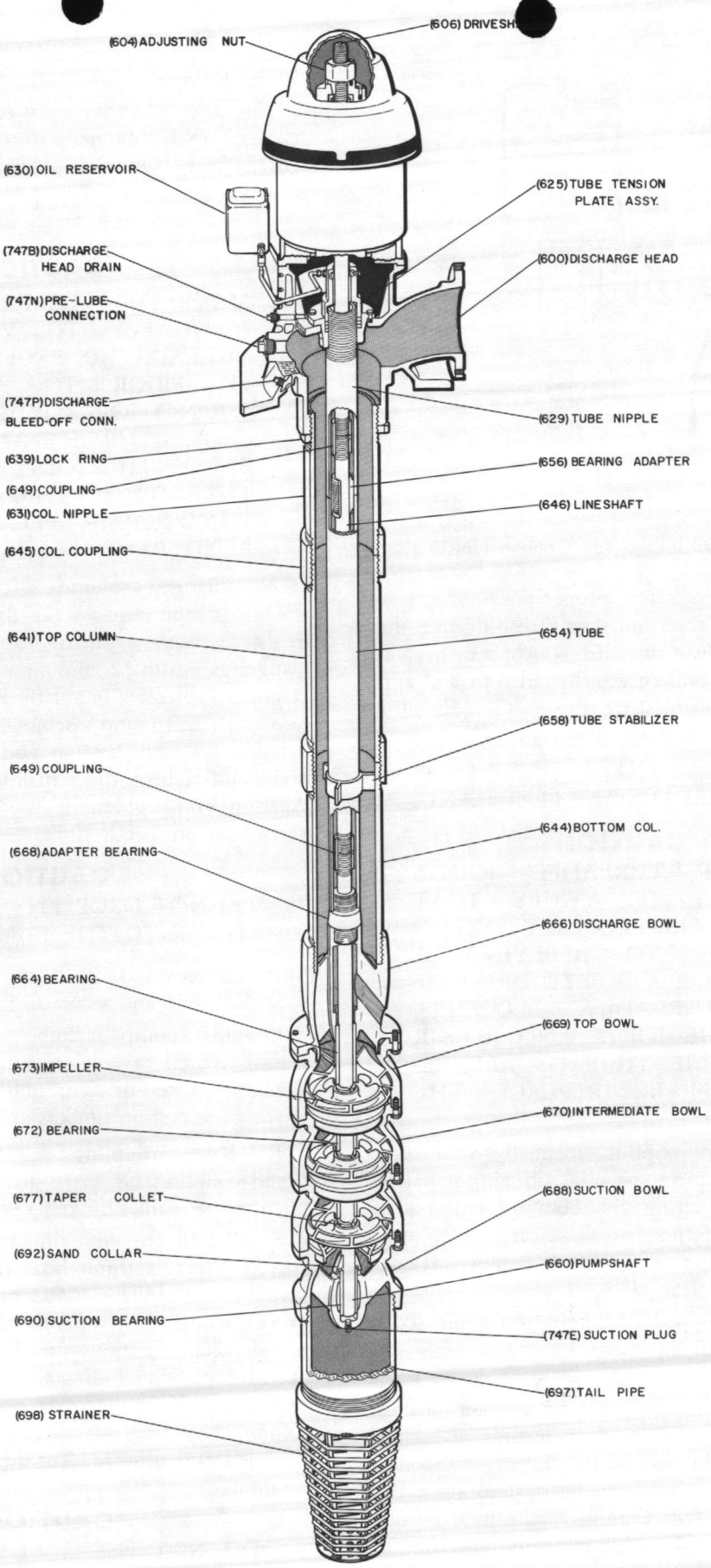


Figure 6-1 Enclosed Lineshaft Pump

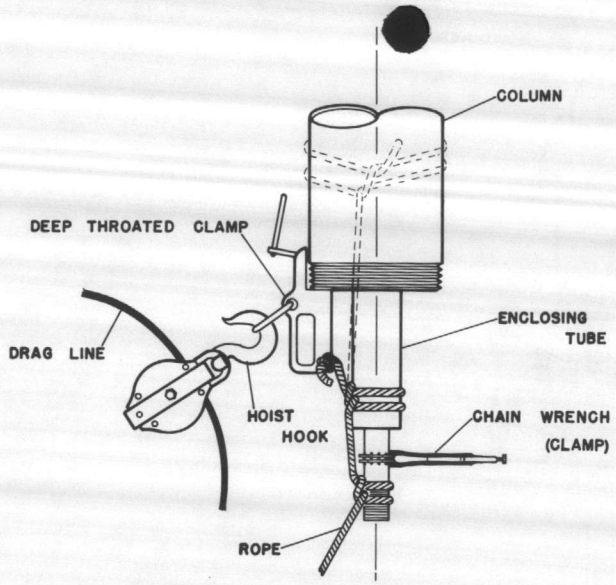


Figure 6-2 Oil lubrication Column Hoisting

H. With line shaft in proper position on coupling, remove tail rope and start threading line shaft into coupling. Clean any dirt which may have entered the threads underneath the tail rope and apply a few drops of oil to shaft threads (If non-galling material).

NOTE

SHAFT THREADS ARE LEFT HAND.

CAUTION

MAKE UP THREADED JOINTS MANUALLY TO VERIFY THAT THREADS ARE PROPERLY ENGAGED PRIOR TO APPLYING A WRENCH OR A POWER DRIVE. IF CROSS - THREADING OCCURS, BREAK THE JOINT AND REPAIR THREADS. IF THREADS ARE BEYOND REPAIR, REPLACE THE DAMAGED PART.

Thread shaft into coupling, manually until resistance is felt. Complete the joint utilizing a pair of pipe wrenches, butting the bottom of the shaft against the top of the shaft. Use care not to apply wrenches on bearing journal areas. Remove all burrs and chips with a clean cloth.

J. Pumps equipped with keyed coupling, secure retaining ring with capscrews.

K. Carefully lower column section until lower end of the tube section rests on adapter bushing (668). Remove tail rope, clean outside of adapter bushing and lubricate with thread compound. Thread tube section onto adapter bushing manually, until resistance is felt. Complete tube joint by utilizing a pair of pipe wrenches or chain tongs, butting the end of the tube against the upper end of the tube adapter bushing.

L. Clean column threads and lubricate with thread compound.

M. Lower column until column aligns with discharge bowl. Manually thread column into discharge bowl. Complete joint by tightening column, utilizing chain tongs or capstan drive and rope until end of column butts firmly against discharge bowl.

CAUTION

MAKE UP THREADED JOINTS MANUALLY TO VERIFY THAT THREADS ARE PROPERLY ENGAGED PRIOR TO APPLYING A WRENCH OR A POWER DRIVE. IF CROSS - THREADING OCCURS, BREAK THE JOINT AND REPAIR THREADS, IF THREADS ARE BEYOND REPAIR REPLACE THE DAMAGED PART.

N. Flanged columns — lower section until column flange engages the flanged discharge bowl register. Insert as many capscrews through both flanges as possible a minimum of one-half the total. Tighten capscrews gradually in diametrically opposite pairs. Lift pump assembly, rotate elevator clamp one-quarter turn, realign and lower assembly. Install, and tighten the remaining capscrews. Repeat rotation and tightening procedure until all capscrews are uniformly tight.

CAUTION

DO NOT DROP ANY FOREIGN OBJECT INTO THE PUMP ASSEMBLY.

P. If provided, attach the next section of pressure flush line and secure to the column.

Q. Lift pump assembly and remove elevator clamp secured to bowl assembly. Slowly lower assembly into well or sump until elevator clamp gently comes to rest on timbers and remove the sling.

R. Keyed coupling — Install lower half of keyed coupling on shaft. Remove upper retaining plate, upper split ring and key.

S. Repeat the preceding procedures. At equally spaced intervals throughout the column assembly, install tube stabilizer (658) over the enclosing tube (654), using soapy water as lubricant. Continue until all column sections for the proper setting have been installed, excluding the column adjusting nipple (631), if provided. If pump is equipped with column adjusting nipple, install it with longest threaded end upward. Thread lock ring (639) on column.

CAUTION

DO NOT USE A CLAMP ON THE COLUMN ADJUSTING NIPPLE TO SUPPORT PUMP ASSEMBLY.

SECTION 7
INSTALLING THE DISCHARGE HEAD

7-1. INSTALLING A COMPLETELY ASSEMBLED PUMP

7-2. For pumps shipped from the factory assembled with driver, suction bearing pressure flush line, suction strainer, and/or tail pipe, remove these components prior to installing the pump assembly.

A. Attach a sling to the discharge head and hoist the pump assembly over the well. Carefully guide the pump to avoid dragging or bumping the suction end.

B. If applicable, reassemble suction bearing lube line, tail pipe and/or suction strainer. Refer to SECTION 4.

C. Continue assembly procedure with paragraph 7-4 step H.

7-3. INSTALLING THE DISCHARGE HEAD

7-4. If a subbase is provided, remove any burrs and clean thoroughly. Install the discharge head on the subbase and secure it with capscrews provided.

A. If the stuffing box (SEE FIGURE 8-1) or oil tube tension nut (SEE FIGURE 9-1), is assembled to the head, remove these components at this time.

B. Thread two eyebolts in the head driver mounting holes diametrically opposite. Attach a sling to eyebolts and hoist discharge head over the pump.

CAUTION

DO NOT LIFT HEAD BY LIFTING LUGS IF PUMP IS NOT ATTACHED. THE HEAD IS HEAVIER ON THE DISCHARGE SIDE AND WILL TIP.

C. Clean the threads at upper end of column assembly and lubricate with thread compound.

CAUTION

DO NOT BUMP OR SCRAPE THE SHAFT PROTRUDING ABOVE THE COLUMN. THIS COULD RESULT IN BENDING OR DAMAGING THE SHAFT.

D. Slowly lower the discharge head, aligning the vertical hole in the center with the shaft protruding above the column. Continue to lower the discharge head (600), until the large threaded hole in the bottom of discharge head rests squarely on top of column. Rotate discharge head, threading onto column, butting the top of column tightly against the discharge head. (SEE FIGURE 6-1).

E. If pump has a column nipple (631) with product lube, screw the discharge head onto the column nipple until the head shaft (608) extends above the top of pump base, about one inch plus adjusting nut thickness, and the distance through the motor or gearhead drive, often referred to as the C.D. Dimension. For oil lube (enclosed line shaft), the tube nipple (631) should be approximately ¾" above the surface where the tube tension plate (625) mates with the head (600).

F. If a pressure flush line is being installed, terminate above the discharge head base.

G. Hoist the discharge head by lifting lugs, and remove elevator clamp attached to column.

H. Remove the supporting timbers or I beams and clean the top of foundation area. Orient the discharge head in the required position. Lower the pump, until the base of the discharge head engages the foundation bolts. If a concrete foundation is used place leveling wedges near the foundation bolts. In case of a structural foundation or pump which will not be grouted to the foundation use shims for leveling the pump.

J. Continue to lower the pump until base of discharge head or subbase rests firmly on the wedges or shims.

K. Check the levelness of the discharge head in all directions, utilizing a spirit level across the driver mounting surface of the discharge head. The discharge head must be level with all wedges or shims butting tightly against the base of discharge head and against the foundation. Install nuts on foundation bolts, tighten them gradually and uniformly. Check to see that pump has remained level in all directions after final tightening.

SECTION 8
STUFFING BOX INSTALLATION (PRODUCT LUBRICATION)

8-1. STUFFING BOX INSTALLATION

A. If provided install headshaft sleeve and press pin into shaft.

NOTE

DO NOT STRIKE PIN WITH A HAMMER, THIS WILL BEND SHAFT OR KNOCK IT OUT OF ALIGNMENT.

8-2. FOR STYLE "A"

A. Position gasket (779A) on discharge head. Slide stuffing box (616) down over the headshaft (608) into position on the gasket. Secure with capscrews (758B).

B. Insert lantern rings (621), and packing rings (620A) as shown in figure 8-1. Install packing rings 180° apart, for each successive packing ring installed.

C. Install split gland (618), and insert studs (739A) through split gland and into stuffing box. Install nuts (735A) finger tight. Install grease line or pipe plug (747G) in grease port, and bypass line (624) in bypass port.

NOTE

GREASE PORT IS DESIGNATED AS PORT "A" AND BYPASS AS PORT "B" STAMPED ON STUFFING BOX.

CAUTION

DO NOT OVER-TIGHTEN STUFFING BOX. IT CAN WEAR OUT PACKING PREMATURELY AND SERIOUSLY DAMAGE THE SHAFT.

8-3. FOR STYLE "B"

A. Same as for style "A".

B. Insert packing washer (789C) and packing (620A) as shown in figure 8-1.

C. Install split gland (618) and insert studs (739A) through split gland and into stuffing box. Install nuts (735B) finger tight. Install bypass line in bypass port (624).

NOTE

GREASE LINE MAY BE INSTALLED AS AN OPTION TO BYPASS LINE IF DISCHARGE PRESSURE IS LESS THAN 100 PSI.

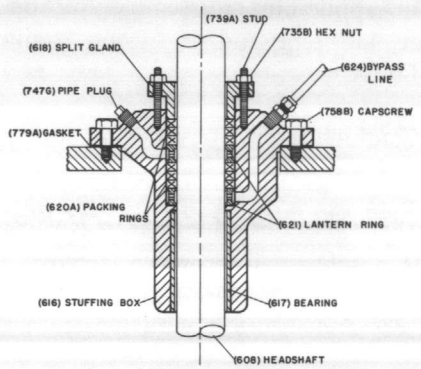
8-4. FOR STYLE "C"

A. Same as for style "A".

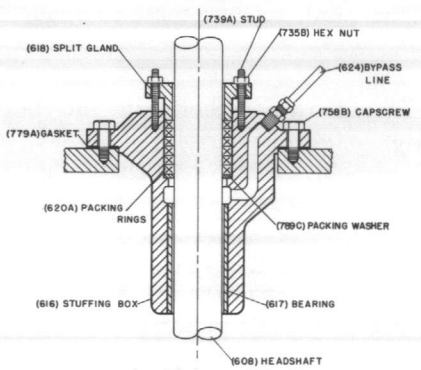
B. Install packing rings (620A).

C. Install split gland (618) and insert studs (739A) through split gland and into stuffing box. Install nuts (735A) finger tight.

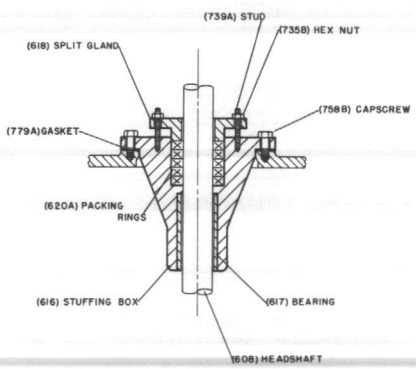
8-5. Instructions for installing the mechanical seal are provided by the manufacturer of the seal. These instructions must be carefully followed to prevent leakage or premature wear of the seal or the pump shaft.



Style A



Style B



Style C

Figure 8-1 Stuffing Box

SECTION 9

INSTALLING TUBE TENSION PLATE ASSEMBLY AND LUBRICATION SYSTEM (OIL LUBRICATION)

9-1. INSTALLING THE TUBE TENSION NUT

A. Lubricate tube threads and underside of tension plate flange with thread compound. Thread the tension plate (625) onto the enclosing tube nipple (629) manually until its shoulder rests on the discharge head. (SEE FIGURE 9-1).

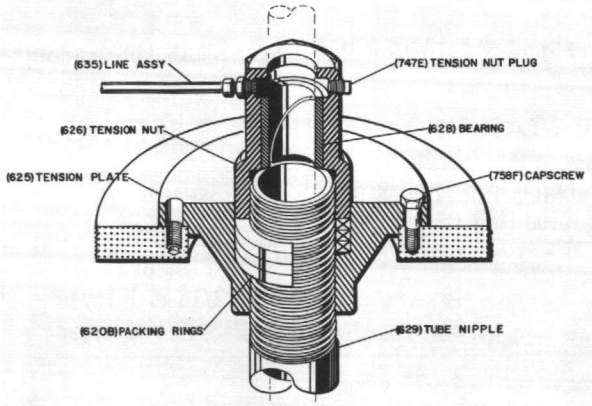


Figure 9-1 Tension Plate Assy (Drip Feed Lubrication)

9-2. TENSIONING THE ENCLOSING TUBE

A. The enclosing tube sags from its own weight as it is installed, and must be pulled tight (tensioned) to make it straight. This section describes two methods of tensioning the tube. The direct pull method is more precise and is preferred. The second method — the wrenching method — is given as an alternate.

NOTE

THE CORRECT TENSION IS EQUAL TO THE WEIGHT OF THE ENCLOSING TUBE PLUS 10%.

B. Weights per foot for each tube size are given in Table 9-1. Multiply by total length of the tube to determine the total weight.

9-3. DIRECT PULL METHOD

A. The upper end of the tube may be pulled by the hoist to obtain the pre-determined tension value. This requires the use of a dynamometer scale and an adapter fitting to grip the tube. (TUBE TENSION ADAPTER AVAILABLE THROUGH FACTORY). With the tension plate installed manually but not tightened, thread the special fitting onto the top of the tube to full engagement. Attach the dynamometer scale to the fitting, and connect the upper end of the scale to the hoist hook. Operate the hoist hook to apply the required tension. This shall pull the tension plate off the discharge head. Manually thread the tension plate to reset it. Release tension, remove dynamometer scale and special fitting.

TABLE 9-1
WEIGHT-PER-FOOT OF ENCLOSING TUBE

TUBE SIZE (INCH)	WEIGHT PER FOOT (LB.)
1¼	2.99
1½	3.63
2	5.02
2½	7.66
3	10.25
3½	12.50
4	14.98
5	20.78
6	28.57

9-4. WRENCHING METHOD

A. If a dynamometer scale is not available, the tube can be tensioned by wrenching the tube nut. Torque the tension plate to take all slack out of the tube, and induce a reasonable amount of tension by turning tension plate counterclockwise.

NOTE

DO NOT TURN CLOCKWISE TO ALIGN HOLES IN TENSION PLATE AND DISCHARGE HEAD.

9-5. DIRECT PULL AND WRENCHING METHOD

A. Install capscrews (758F) in the tension plate. Pour one pint of oil down the oil tube.

B. Install packing in the tension plate and thread the tension nut (626), tightening it firmly against the packing.

C. If a packed type tension nut (623) is used, install packing (620C), packing gland (618) and secure with stud (739E) and nut (735B). Screw nut finger tight. Install line assembly (635) and connect to flush liquid supply. (SEE FIGURE 9-2).

CAUTION

BE SURE THAT THE TOP OF THE ENCLOSING TUBE DOES NOT INTERFERE WITH THE TENSION NUT.

D. If top of the tube interferes with the tension nut determine the distance, if tube is too long or too short. Remove tension plate, raise pump assembly, unthread lock ring (639), and adjust nipple (631) (SEE FIGURE 6-1) the required distance to eliminate interference. Reinstall and relevel pump. Refer to SECTION 7 paragraphs J and K.

9-6. LUBRICATION SYSTEM

A. Connect solenoid valve (IF PROVIDED), oil lines, and fill the oil reservoir with oil. Refer to SECTION 18.

B. Check the lubricator feed and see that the oil reservoir is flowing freely. (In the case of a solenoid valve, temporary power connections are required). Set the proper drops per minute on the regulator. Table 9-2 shows recommended regulator setting.

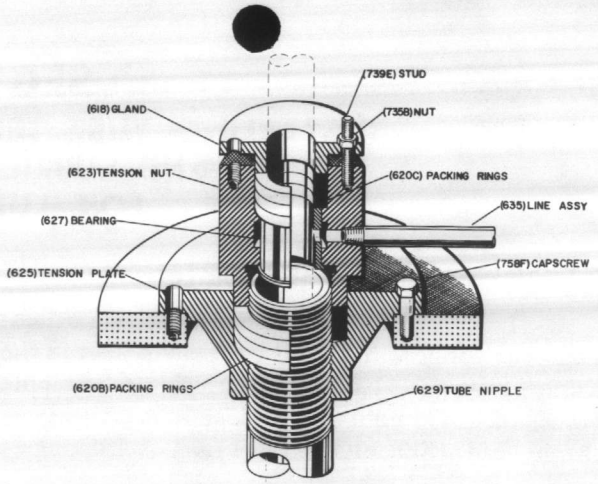


Figure 9-2 Tension Plate Assy (Flush Lubrication)

TABLE 9-2 REGULATOR SETTING

DROPS PER MINUTE PER 100 FEET OF SETTING	SHAFT SIZE (INCH)
8	¾ to 1
16	1 3/16 to 1 15/16
20	2 3/16 and larger

SECTION 10
INSTALLING THE DRIVER (VHS)

10-1. INSTALLATION OF HOLLOW SHAFT DRIVER

WARNING

DO NOT WORK UNDER A HEAVY SUSPENDED OBJECT UNLESS THERE IS A POSITIVE SUPPORT UNDER IT WHICH WILL PROTECT PERSONNEL SHOULD A HOIST OR SLING FAIL.

10-2. DRIVER SUPPORT. If a driver support is furnished proceed as follows:

A. Hoist driver support and inspect mounting surfaces and register and clean these surfaces thoroughly.

B. Install driver support on discharge head and secure with capscrews.

CAUTION

USE "MOLYKOTE" DOW-CORNING OR EQUAL FOR ALL GALLING MATERIALS SUCH AS 316 STAINLESS STEEL.

10-3. COMBINATION DRIVESHAFT. In the case of a pump having a combination driveshaft (shaft extends above the motor mounting flange) proceed as follows:

A. Remove driver cover and drive coupling. (SEE FIGURE 10-1).

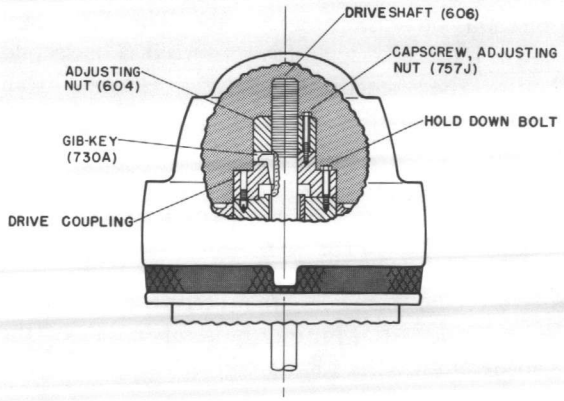


Figure 10-1 Hollow Shaft Adjusting Nut

B. Attach a sling to the lifting lugs on driver. Hoist driver, inspect the mounting surfaces and register, and clean these surfaces thoroughly. If any burrs are found, remove burrs with a smooth mill file.

C. Lower driver slowly, aligning the driver hollow shaft with the combination driveshaft, and onto the discharge head or driver support being extreme-

ly careful that combination driveshaft does not bind in the driver hollow shaft. Orient the driver conduit box in the required position and align the mounting holes with the mating tapped holes in the discharge head or driver support.

D. Secure driver to discharge head or driver support with capscrews provided.

E. Check that the pump shaft is concentric with the hollow shaft of driver by sliding the driver coupling over the combination headshaft. If the driver coupling freely engages the drive pins at the top of the driver, the pump headshaft is properly concentric. Eccentricity at this point may be to a bent shaft or to foreign particles between butting ends of shaft sections. The cause must be found and corrected before proceeding. Remove driver coupling.

10-4. SEPARATE HEADSHAFT AND DRIVESHAFT. In the case of a pump having a separate headshaft and driveshaft (headshaft terminates below the driver mounting flange) proceed as follows:

A. Slowly lower the driver onto driver mounting flange, orient the driver conduit box in the required position and align the mounting holes with the mating tapped holes in the discharge head.

B. Apply a thin film of oil to headshaft threads (if non-galling material), install coupling to headshaft utilizing a strap wrench below the coupling.

CAUTION

DO NOT DAMAGE HEADSHAFT OR COMBINATION HEADSHAFT. ANY BURRS RAISED ON SHAFTING SHALL MAKE IT DIFFICULT TO REMOVE SEAL, SLEEVE, OR STUFFING BOX.

C. Slide the driveshaft (606) downward through the hollow shaft of the driver to meet the headshaft coupling. Apply a thin film of oil to the shaft threads (if non-galling material) and screw into coupling. Make sure the shaft is not damaged in any way.

10-5. ALL PUMPS. The following information applies to all pumps.

A. On drivers having non-reverse ratchet, manually turn the driver shaft clockwise until the non-reverse ratchet fully engages.

B. Lubricate the driver bearings in accordance with the instructions given on the lubrication plate attached to the driver case.

WARNING

THE MOTOR MUST NOT BE TESTED FOR DIRECTION OF ROTATION WHEN COUPLED TO THE PUMP. IF PUMP SHOULD ROTATE IN THE WRONG DIRECTION, SERIOUS DAMAGE TO THE PUMP AND DRIVER AND SERIOUS INJURY TO NEARBY PERSONNEL COULD RESULT.

C. Make temporary electrical connections according to tagged leads or diagram attached to the driver. The driver must rotate counterclockwise when viewed from above. See arrow on pump name plate. If driver does not rotate counterclockwise, change driver rotation by interchanging any two leads, for three phase only. For single phase, see driver manufacturer's instructions.

D. Slip on driver coupling (SEE FIGURE 10-1). Apply a thin film of oil on gib key (730A) and install key. Key shall be a slide fit allowing adjustment of the drive shaft by means of the adjusting nut. Secure drive coupling, see that the drive coupling is properly seated. Install adjusting nut (604), but do not adjust impellers at this time.

10-6. PRELIMINARY ADJUSTMENTS OF IMPELLERS. Mechanical seals if used must be disengaged before impeller adjustment.

10-7. Pumps with setting over 200 feet, continue with paragraph 10-8.

A. With impellers touching bowl faces, turn adjusting nut (604) counterclockwise until face of the nut makes contact with motor coupling.

B. Align hole "A" in adjusting nut and hole "C" in motor coupling. (SEE FIGURE 10-2).

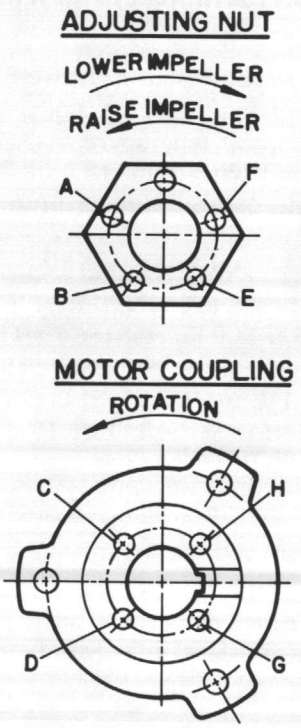


Figure 10-2 Impeller Adjustment

C. Insert capscrew in hole "B". Turn adjusting nut counterclockwise until holes "B" and "D" line up. This gives minimum adjustment 1/20 of one turn — (SEE TABLE 10-1 for vertical movement).

D. By turning adjusting nut still more and aligning holes "E" and "G" impellers are raised 2/20 turn. When holes "F" and "H" align, impellers are raised 3/20 turn and so on. SEE TABLE 10-1.

E. For open impellers, turn adjusting nut 3/20 turn for pumps up to 10 feet of column. Add 2/20 turn for each additional 10 feet of column.

F. For enclosed impellers, use two turns for the first 100 feet and one turn for each additional 50 feet of setting.

10-8. For pump settings over 200 feet adjustment procedures are as follows:

A. Turn adjusting nut counterclockwise until impellers reach the top of bowl (resistance is felt when impellers rub against the top of bowl). Lower impellers 30% of distance acquired in Section 4 paragraph 4-3 step B. SEE TABLE 10-1.

10-9. GROUTING THE BASE. If the pump is on a concrete foundation, it is recommended that the discharge head base be grouted to the foundation. If desired, this may be delayed until the pump installation has been tested. (SEE FIGURE 3-1). Pour the grout into the foundation and force it between the discharge head and the dammed-in area. Allow ample time for the grout to cure before starting the pump.

NOTE

USE ONLY NON-SHRINKING GROUTING MATERIAL.

TABLE 10-1
IMPELLER VERTICAL MOVEMENT

SHAFT SIZE	THREAD	VERTICAL MOVEMENT IN 1/20 TH TURN
3/4 INCH	3/4-16 LH	.003
1	1-12 LH	.004
1 3/16	1-12 LH	.004
1 1/2	1-10 LH	.005
1 11/16	1-10 LH	.005
1 15/16	1-10 LH	.005
2 3/16	1-10 LH	.005
2 7/16	1-10 LH	.005
2 11/16	1-8 LH	.006

SECTION 11
INSTALLING THE DRIVER (VSS)

11-1. INSTALLATION OF SOLID SHAFT DRIVER

11-2. The coupling shown between the driver shaft and pump shaft may be a non-spacer figure 11-1 type or a spacer type figure 11-2. The latter is used on pumps having a mechanical shaft seal, to permit replacing the seal without lifting the driver.

WARNING

DO NOT WORK UNDER A HEAVY SUSPENDED OBJECT UNLESS THERE IS A POSITIVE SUPPORT UNDER IT, WHICH WILL PROTECT PERSONNEL SHOULD A HOIST OR SLING FAIL.

11-3. In the case of a pump having a solid shaft driver proceed as follows:

A. Apply a thin film of oil on headshaft key (730C) and insert key into headshaft keyseat.

B. Gently lower pump hub (614) over headshaft.

C. Install adjusting plate (613) on headshaft.

D. If a driver support is furnished, inspect registers and install on the discharge head, securing it with capscrews.

E. Attach a sling to the lifting lugs of driver. Hoist driver, inspect the mounting surface, the register, and shaft extension, and clean these surfaces thoroughly. If any burrs are found, remove burrs with a smooth mill file, cleaning thoroughly afterward.

F. Apply a thin film of oil to driver key (730B) and insert it into the driver shaft keyseat. Place the driver hub (610) over the driver shaft and key, sliding it up the shaft until the groove near the end of shaft is exposed. Install split ring (722) in the groove, and slide the driver hub down over the split ring to capture it.

G. Orient the driver conduit box in the required position, and align the mounting holes with the mating tapped holes in the driver support. Lower the driver until the registers engage and driver rests firmly on the driver support. Secure driver with capscrews provided.

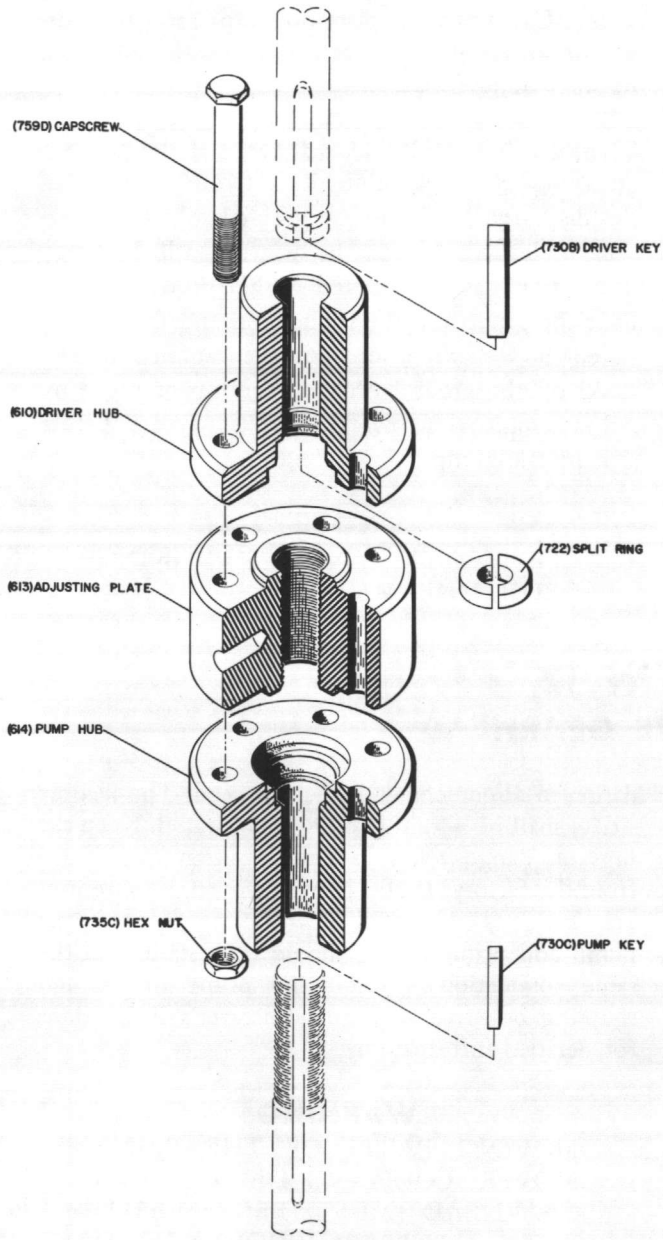


Figure 11-1 Flanged Adjustable Coupling

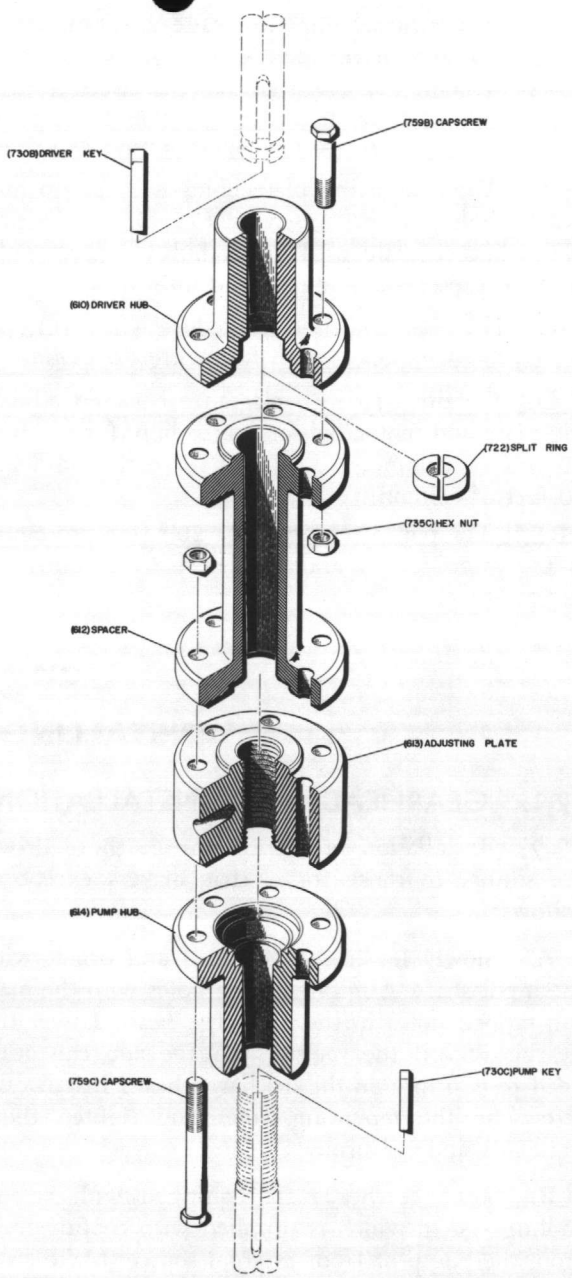


Figure 11-2 Flanged Adjustable Coupling with Spacer

H. Lubricate driver bearings in accordance with instructions given on the lubrication plate attached to the driver case.

WARNING

THE MOTOR MUST NOT BE TESTED FOR DIRECTION OF ROTATION WHEN COUPLED TO THE PUMP. IF PUMP SHOULD ROTATE IN THE WRONG DIRECTION, SERIOUS DAMAGE TO THE PUMP AND DRIVER AND SERIOUS INJURY TO NEARBY PERSONNEL COULD RESULT.

J. Make temporary electrical connections according to tagged leads or diagram attached to the driver. Driver must rotate counterclockwise when viewed from above. See arrow on pump name plate. If driver does not rotate counterclockwise, change driver rotation by interchanging any two leads, for three phase only. For single phase see driver manufacturer's instructions.

K. On drivers having a non-reverse ratchet, manually turn the driver shaft clockwise until the non-reverse ratchet fully engages.

11-4. PRELIMINARY ADJUSTMENTS OF IMPELLERS. Pumps with settings less than 200 feet proceed as follows:

A. For enclosed impellers raise adjusting plate (613) toward driver hub (610) or spacer hub (612). Obtain 3/16 inch clearance between adjusting plate, and driver hub or spacer hub 1/4 inch if setting exceeds 100 feet but less than 200 feet.

B. Align adjusting plate holes with pump hub (614) holes, insert capscrews (759D), and draw pump hub to mate with driver hub or spacer hub. Tighten capscrews gradually and uniformly.

C. For open impellers procedure is the same as for enclosed impellers with following exception:

D. Obtain .015 inch clearance between adjusting plate and motor hub or spacer hub, for the first 10 feet of column. Add 0.010 for each additional 10 feet of column.

11-5. For pump settings over 200 feet procedure is the same as in paragraph 11-4 with following exception:

A. Use adjusting plate and capscrews for raising or lowering impellers instead of the adjusting nut of a hollow shaft driver.

11-6. GROUTING THE BASE. If the pump is on a concrete foundation, it is recommended that the discharge head base be grouted to the foundation. If desired, this may be delayed until the pump installation has been tested. (SEE FIGURE 3-1). Pour the grout into the foundation and force it between the discharge head and the dammed-in area. Level off the grout flush with the top of the dam. Allow ample time for the grout to cure before starting the pump.

NOTE

USE ONLY NON - SHRINKING GROUTING MATERIAL.

SECTION 12
INSTALLING THE GEARHEAD

12-1. GEARHEAD DRIVE INSTALLATION

12-2. Installation procedures for gearhead drives are similar to those for electric drivers except as follows:

A. Slowly lower the gearhead and orient with the input shaft. Align mounting holes with the mating tapped holes in the discharge head. Lower the gearhead until the registers engage and the gearhead rests firmly on the discharge head. Install capscrews in the mounting holes and tighten them gradually and uniformly.

B. Some gearheads are equipped with an oil cooling system which is supplied with cooling fluid from the pump or from external source. Make cooling connections with tubing or rubber hose.

CAUTION

DO NOT USE RIGID PIPE FOR THIS PURPOSE. RIGID PIPE IS SUSCEPTIBLE TO LEAKING AT THE JOINTS, DUE TO VIBRATION.

If pump fluid is to be used, connect a length of tubing and a flow-regulating valve between the inlet on the gearhead and a pipe tap hole in the discharge head. Attach another tube or a rubber hose to the outlet on the gearhead. This may be used to conduct the fluid back to the sump or to any convenient drain.

C. Assemble the flexible shaft flanges on gearhead drive and engine. The prime mover (engine or steam turbine) must be mounted on a firm foundation in alignment with the gearhead. The flexible shafts shall be within two degrees parallel. Keep the lugs on flange yokes in same position as shipped from the factory. If slip joint is moved, be sure lugs are realigned. If a flexible coupling is used, the pump and prime mover should be installed on the same foundation. Consult the prime mover and coupling or drive shaft manufacturer's instructions for detailed information.

WARNING

MOVING PARTS OF THE PRIME MOVER, COUPLING DEVICE, AND GEARHEAD MUST BE COVERED WITH A SUITABLE RIGID GUARD IN COMPLIANCE WITH LOCAL REGULATIONS TO PREVENT INJURY TO PERSONNEL.

12-3. GROUTING THE BASE. If the pump is on a concrete foundation, it is recommended that the discharge head base be grouted to the foundation. If desired, this may be delayed until the pump installation has been tested. (See Figure 3-1). Pour the grout into the foundation and force it between the discharge head and the dammed-in area. Level off the grout flush with the top of the dam. Allow ample time for the grout to cure before starting the pump.

NOTE

USE ONLY NON - SHRINKING GROUTING MATERIAL.

SECTION 13
STARTUP AND FINAL IMPELLER ADJUSTMENT

13-1. PRE-START PROCEDURE. Before starting the pump check the following:

A. ALL PUMPS
1. Wiring of driver (IF APPLICABLE).
2. Driver must rotate counterclockwise when viewed from above.
3. Pressure flush system (IF APPLICABLE).
4. Lubrication to suction bowl (IF APPLICABLE).
5. Lubrication of driver.

B. OPEN LINE SHAFT PUMPS
1. Pumps exceeding 50 feet of setting prelubrication is necessary. (SEE SECTION 14, paragraph B).
2. All bearings are lubricated.
3. Grease to stuffing box (IF APPLICABLE).
4. Stuffing box bleed line connected (IF APPLICABLE).
5. All piping and gages.

C. ENCLOSED LINE SHAFT PUMPS
1. Oil lubrication piping connected (IF APPLICABLE).
2. Drip rate.

D. For most pumps, valve must be open. Some pumps can be started against a closed valve but only when designated for this application. Start the flow of lubricating fluid prior to starting the pump. Open line shaft pumps are self-lubricating and except for pumps longer than 50 feet require no external lubrication for the lineshaft bearings. Pumps longer than 50 feet require prelubrication before starting.

13-2. PUMP STARTUP

13-3. Multiply the setting by 0.1 to find the approximate number of seconds for fluid to reach discharge. Start the pump. IF PUMP DOES NOT DISCHARGE FLUID WITHIN 2 TIMES THE ESTIMATED TIME — SHUT OFF THE PUMP. Determine the cause and correct the problem before restarting. (SEE SECTION 15). Also, if DRIVER OVERHEATS OR THERE IS EXCESSIVE VIBRATION STOP THE PUMP, and correct the problem before restarting. (SEE SECTION 15).

13-4. On oil lube pumps in which the enclosing tube was tensioned by wrenching the tension tube nut, check for excessive leakage. If excessive leakage occurs, tube nut must be tightened.

13-5. With product lube pump in operation, there shall be some leakage at the stuffing box packing. The correct leakage is a rate which keeps the shaft and stuffing box cool (approximately 4 ounces per minute). Refer to SECTION 14 for packing adjustment.

13-6. FINAL ADJUSTMENT OF IMPELLERS

13-7. Final adjustment of impellers using an ammeter, proceed as follows:

A. ENCLOSED IMPELLERS

1. Connect ammeter to driver leads, start pump and record ammeter reading. Reading should be taken at maximum anticipated operating discharge head.

2. Stop pump and lower adjusting nut one-quarter turn. Start pump and record ammeter reading. Continue procedure until reading increases indicating that impeller is dragging on the bowl. Stop the pump and raise the adjusting nut one turn, impeller should clear the bowl. Start the pump and check ammeter. Ammeter should return to previous low reading. Impeller adjustment is complete.

B. OPEN IMPELLERS

1. Connect ammeter to driver leads, start pump and record ammeter reading. Reading should be taken at maximum anticipated operating discharge head.

2. Stop pump and lower adjusting nut one-quarter turn. Start pump and record reading. Ammeter reading should increase slightly. Continue procedure until reading increases sharply indicating that the impeller is dragging on the bowl. Stop the pump and raise the adjusting nut one-half turn. Impeller adjustment is complete.

13-8. Final impeller adjustment without ammeter: Lower adjusting nut until impeller bottoms on bowl. Repeat preliminary adjusting procedure outlined in SECTION 10 OR SECTION 11. This procedure is necessary as lateral often changes after first startup.

SECTION 14
MAINTENANCE

TABLE 14-1 PREVENTIVE MAINTENANCE PROCEDURES

PROCEDURE	TIME INTERVAL (HOURS)
Clean dirt, oil and grease from the driver and discharge head.	As required.
Driver ventilation passages shall be cleaned to prevent overheating.	As required.
Check oil level in reservoir. It should never be less than one-quarter full. Refill, check drip rate. See Table 9-2 for correct drip rate.	24
Pumps utilizing a high pressure flush system, the pressure shall be 10 psi higher than maximum, pump discharge pressure plus 2% of the maximum discharge pressure.	Periodically
Pumps equipped with a lubrication line to conduct grease, oil, or other fluid to tail bearing, replenish supply through lubrication fitting, usually located at the base of the discharge head.	100
Check the level in sight gage, for oil-drip lubrication.	Periodically
Open line shaft pumps. check stuffing box for correct leakage. see SECTION 14-4. If packing is supplied with grease add through filter on side of packing container.	100

14-1. PREVENTIVE MAINTENANCE

14-2. Preventive maintenance includes periodic inspection, adjustments, lubrication and tightening procedures presented in Table 14-1. Systematic inspection of the pump shall be made at regular intervals. The frequency required depends upon the operating conditions of the pump and its environment.

14-3. PACKING ADJUSTMENT AND REPLACEMENT

14-4. Pumps equipped with adjustable packing at top of shaft, shall be adjusted whenever the leakage rate exceeds 8 ounces per minute. Adjust the stuffing box as follows:

A. With the pump in operation, tighten the split gland nuts one-quarter turn for each adjustment. Allow packing to equalize against the increased pressure and leakage to gradually decrease to a steady rate, before making another adjustment.

CAUTION

DO NOT OVER-TIGHTEN THE STUFFING BOX. EXCESSIVE PRESSURE CAN WEAR OUT PACKING PREMATURELY AND SERIOUSLY DAMAGE THE SHAFT.

B. With the pump shut down and when packing has been compressed to the point that the split gland is about to contact the upper face of stuffing box, remove split gland, add one extra packing ring, and re-adjust. If this fails to reduce leakage to 4 ounces per minute remove all packing rings and replace with new rings.

C. If the replacement packing is in the form of a continuous coil or rope, it must be cut into rings before installing. Tightly wrap one end of the packing material around the top shaft like one coil of a coil spring, and mark the coil with a sharp knife. Rings must have a gap of 1/16 to 1/8 inch and the ends must be parallel. For repacking sequence refer to Section 8.

14-5. SEASONAL SHUTDOWN PROCEDURES

WARNING

MANUALLY ROTATE SHAFT SEVERAL TIMES PRIOR TO RESTARTING PUMP, WHICH HAS BEEN SHUT DOWN.

A. For oil lubricated pumps that are shut down for an extended period of time, it is suggested that the pump be operated for at least 15 minutes every two weeks with the oil feed wide open 2 hours before and during startup in order to maintain a film of oil on the shafting and shaft bearings. This practice is also desirable to restore a film of oil on driver bearings.

B. Bearings on water lubricated pumps are lubricated by the liquid being pumped. On water lubricated pumps over 50 feet of setting, prelubrication is necessary. Extensive damage may result from failure to prelubricate the bearings. A pipe for pre-

lubrication is installed on back of the discharge head and water injected into the pipe for at least 3 minutes to assure ample lubrication for pump settings up to 300 feet. For each additional 100 feet of setting, the prelubrication shall be increased one minute. If no other water supply is available a prelubrication tank is suggested. The prelubrication tank must always be kept full. If the pump is to be shut down for an extended period of time, operate it, for at least 15 minutes with adequate prelubrication every two weeks.

C. Before resuming normal operations oil should be changed on drivers, gearheads and lubricating oil system. After 15 minutes of operation adjust lateral. Refer to SECTION 13.

SECTION 15
TROUBLESHOOTING

TABLE 15-1 TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
No liquid delivered.	1. Discharge valve closed.	Check that discharge valve is in full open position.
	2. Wrong rotation.	Check for CCW rotation when viewed from above. Check engagement of motor coupling.
	3. Speed too low.	Check if driver is directly across the line and receiving full voltage.
	4. Driver with reduced voltage, or reduced current, starting does not come up to speed.	Consult factory.
	5. Improper lateral adjustment.	Reset lateral, see Section 13.
	6. Lack of prime or breaks suction.	Check standing and pumping water level, see Section 3.
	7. Standing water level is below 1ST stage or pumping water level is below suction.	Increase pump setting, by adding column.
	8. Tail pipe is used and suction lift is too high.	Check NPSH required by pumps against NPSH available. Increase pump setting by increasing column length, if insufficient NPSH available.
No liquid delivered.	9. Static lift too high.	Check distance from pumping water level to discharge, against design head of pump. If greater than pump rating, decrease static head above grade, or consult factory for adding bowl stage or increase impeller diameter.
	10. Suction below well perforations.	Raise pump until suction is approximately 10 feet above well perforations, recheck pumping water level.
	11. Viscosity, specific gravity or desolved gasses too high.	Consult factory after fluid analysis.
	12. Air leak in tail pipe only if pumping water level is below suction bowl.	Add column or pull pump, and reinstall tail pipe using thread sealer.
	13. Strainer, bowl, impeller plugged.	Pull pump and clean.
	14. Damaged bowl assembly; broken or disconnected shaft.	Pull pump and repair all damaged components.

(Continued next page)

TROUBLE	PROBABLE CAUSE	REMEDY
Not enough liquid delivered.	15. Same as steps 1 thru 6.	Same as Steps 1 thru 6.
	16. Field head requirement greater than design head.	Check system friction losses. Increase discharge piping. Lower head required. Consult factory for adding bowl stages or increase impeller diameter.
	17. Same as steps 8 thru 12.	Same as steps 8 thru 12.
Not enough pressure.	18. See not enough liquid delivered.	See — not enough liquid delivered.
Pump works for a while and quits.	19. See not enough liquid delivered.	See — not enough liquid delivered.
Excessive vibrations.	20. Bent shaft.	Replace or straighten shaft.
	21. Crooked well.	Survey the well and consult factory.

SECTION 16
PUMP DISASSEMBLY

16-1. PUMP DISASSEMBLY

16-2. Clear a large area adjacent to the pump as a storage space for pump parts as they are disassembled. If the pump has a long column made up of several sections, arrange parallel timbers on the ground to support the pump column and shaft sections horizontally.

WARNING

DO NOT ATTEMPT TO LIFT THE ENTIRE PUMP BY THE LIFTING LUGS OF THE DRIVER. THESE LUGS AND BOLTS CANNOT SUPPORT THE WEIGHT OF THE ENTIRE PUMP.

DO NOT ATTEMPT TO LIFT THE ENTIRE PUMP AND DRIVER BY SLINGING TO THE DISCHARGE HEAD. WITH THE DRIVER IN PLACE, THE CENTER OF GRAVITY MAY BE HIGHER THAN THE LIFTING POINTS. THE PUMP MAY TIP AS IT IS LIFTED, WHICH MAY RESULT IN SEVERE DAMAGE TO THE PUMP AND SURROUNDING STRUCTURE AND INJURY TO NEARBY PERSONNEL.

BEFORE OPENING THE CONDUIT BOX OF AN ELECTRICAL MOTOR, BE SURE THAT THE CURRENT TO THE MOTOR IS SHUT OFF. SEVERE INJURY TO PERSONNEL COULD RESULT IF CONTACT WITH LIVE MOTOR LEADS IS MADE.

16-3. In the following pump disassembly procedures references are made to assembly sections of this manual, these sections will aid in the disassembly of the pump.

A. Disconnect discharge and lubrication piping. Remove all external piping, and related hardware attached to the pump. Disengage mechanical seal if provided.

B. Uncouple driver from pump shaft. Refer to Section 10 hollow shaft driver, Section 11 solid shaft driver, and Section 12, gearhead driver.

C. Remove capscrews holding driver and hoist driver off discharge head or driver support and remove driver support, if provided.

D. Remove capscrews (758B) and slide stuffing box (616) off the driveshaft (606). Refer to Sections 8 and 9.

E. Take off bolts and nuts holding the discharge head to the subbase or to the foundation. Lift head, attach elevator clamp just below first column coupling and remove head. Refer to Section 7.

F. For removal of column sections, refer to Section 5 Product Lube Column, and Section 6 for Oil Lube Column.

G. For removal of bowl assembly, hoist the bowl assembly from the sump or well, using elevator clamps. Hoist in the same manner as for the column. Refer to Section 4. Proceed to disassemble the bowl assembly as follows.

16-4. BOWL DISASSEMBLY-PRODUCT LUBRICATION (SEE FIGURE 5-1).

A. Unscrew pump shaft coupling and remove capscrews from top bowl (669).

B. Slide discharge bowl (661) and top bowl off the pump shaft (660), impeller (673) is now exposed.

C. Pull shaft out as far as possible. Strike the impeller hub using a collet hammer or equivalent sliding on the shaft, to drive the hub off the taper collet (677).

D. After impeller has been freed, insert a screwdriver into the slot in the taper collet to spread it and remove it off the shaft. Slide impeller off the shaft. Use the same procedure until entire bowl assembly is completely disassembled.

E. Remove pump shaft from suction bowl (688).

NOTE

DO NOT REMOVE SAND COLLAR (692) UNLESS PUMP SHAFT IS REPLACED.

16-5. BOWL DISASSEMBLY-OIL LUBRICATION. (SEE FIGURE 6-1).

A. Unscrew pump shaft coupling and remove.

B. Remove adapter bearing (668).

C. Follow preceding steps, B, C, D, and E for complete disassembly of bowl assembly.

16-6. REASSEMBLY OF BOWLS ASSEMBLY. (SEE FIGURE 6-1).

A. If a pump shaft (660) is being replaced and a sand collar is provided, see Table 17-7 for positioning of sand collar (692). The sand collar is attached to the shaft by a shrink fit. Heat the collar until it can slip onto the shaft.

WARNING

WEAR PROTECTIVE GLOVES AND USE THE APPROPRIATE EYE PROTECTION TO PREVENT INJURY WHEN HANDLING HEATED PARTS.

B. Slide pump shaft into bearing (690) in suction bowl (688), until sand collar rests on the suction bowl bearing (690). If no collar is used, mark "X" dimension on shaft, see Table 17-7 and slide pump shaft into bearing (690) in suction bowl (688), until "X" dimension is flush with suction bowl hub.

C. Hold the shaft in place with a washer and capscrew. Insert capscrew through the threaded hole in suction bowl and thread into shaft. Slide the first impeller over the shaft until it seats on the bowl.

D. Insert a screwdriver into slot of taper collet (677), spread it and place over the shaft. Hold the impeller against the bowl, slide taper collet into hub.

E. Drive the taper collet in place with a collet hammer.

F. Slide intermediate bowl (670), over impellers and secure with capscrews.

G. Repeat the preceding procedures, checking that the bowl lateral is not being lost after each stage, until all stages are assembled.

NOTE

MARK BOWL FLANGES IN SEQUENCE OF DISASSEMBLY TO AID IN THE REASSEMBLY PROCEDURE.

CAUTION

IF THREADED COUPLING WILL NOT READILY UNSCREW, APPLY HEAT TO COUPLING (NOT TO SHAFT), FOR APPROXIMATELY 30 SECONDS, AT THE SAME TIME APPLYING TORQUE TO THE SHAFT.

SECTION 17
PUMP DATA

17-1. CALCULATING PUMP WEIGHT

17-2. The following tables contain approximate component weights, to be used in estimating the entire pump weight.

TABLE 17-1 BOWLS

SIZE	APPROX. WEIGHT PER STAGE
4 INCH	10 LB.
6	25
7	35
8	50
9	75
10	90
11	115
12	140
14	200
16	350
18	450

TABLE 17-2 COLUMN, SUCTION AND DISCHARGE PIPE

SIZE	WEIGHT/FOOT
2½ INCH	6 LB.
3	8
4	11
5	15
6	19
8	25
10	32
12	44
14	55

TABLE 17-3 DISCHARGE HEAD

SIZE	APPROX. WEIGHT
2½ INCH	40 LB.
4	160
6	300
8	430
10	540
12	900
14	1400

TABLE 17-4 ELECTRIC DRIVER (WPI)

HORSE POWER	APPROX. WEIGHT
3 H.P.	100 LB.
5	100
7½	200
10	200
15	250
20	350
25	350
30	400
40	500
50	550
60	650
75	700
100	1500
125	1500
150	1500
200	1700

TABLE 17-5 WEIGHT OF WATER IN PUMP COLUMN

NOM. PIPE SIZE	WT. OF WATER PER FT. OF PIPE
3 IN.	3.0 LB.
4	5.0
5	8.0
6	12.0
8	20.0
10	32.0
12	48.0
14	57.0
16	76.0
18	97.0
20	120.0
24	177.0

NOTE

For liquids other than water multiply the above by the specific gravity of the liquid.

TABLE 17-6 SHAFT

SHAFT SIZE	APPROX. WEIGHT PER FOOT
1 INCH	2.6
1 3/16	3.8
1 1/2	6.0
1 11/16	7.6
1 15/16	10.0
2 3/16	12.8
2 7/16	15.8
2 11/16	19.3
2 15/16	23.0
3 3/16	27.1

TABLE 17-7 SAND COLLAR LOCATION DIMENSION — BOWL SHAFT

PUMP SIZE	"X" DIMENSION
4D	2.75
6A	3.25
6J	2.75
6D	3.62
7A	3.25
8A	3.25
8S	3.63
8J	4.00
8D	4.37
9A	3.50
10A	4.50
10J	5.25
10D	6.38
10L	6.12
11A	5.44
12J	5.88
12D	6.87
14J	7.00
14H	7.50
14D	8.25
16D-BELL	7.25
16D-BOWL	8.75
18H	7.50

17-3. The following example is given to calculate approximately the entire pump weight.

1. BOWL WEIGHT = ESTIMATE WT. PER STAGE X NO. OF STAGES
2. COLUMN WEIGHT = SETTING X (COLUMN WT. + SHAFT[1])
3. HEAD WEIGHT
4. DRIVER WEIGHT

PUMP WEIGHT = TOTAL OF 1 + 2 + 3 + 4

LIFTING WEIGHT (PUMP MINUS DRIVER) = TOTAL OF 1 + 2 + 3

[1]) NOTE: For pumps with enclosing tubes; tube and shaft weight may be estimated by multiplying shaft weight by 3.

SECTION 18
RECOMMENDED LUBRICANTS

MANUFACTURER	GREASES FOR LINE SHAFTS, SUCTION BOWL BEARINGS AND SHAFT PACKINGS	TURBINE OILS FOR LINE SHAFT, SUCTION BOWL BEARINGS AND SIMILIAR APPLICATIONS		TURBINE OILS FOR GEAR DRIVES VERTICAL PUMPS	
	TEMPERATURE —32°F TO 120°F	TEMPERATURES BELOW 32°F	TEMPERATURE ABOVE 32°F	TEMPERATURE BELOW 32°F	TEMPERATURE ABOVE 32°F
American Oil Co.	Amoco Lithium Grease All-Weather	Rykon Industrial Oil No. 11	Rykon Industrial Oil No. 31	Rykon Industrial Oil No. 21	Rykon Industrial Oil No. 51
Atlantic Richfield Co.	Arco Multipurpose Grease	Duro S-150 LP	Duro S-150 or Duro S-150 LP	Duro AWS-315	Duro 600
Cato Oil & Grease	Mystik JT-6	2107 Water Well Turbine Oil or 1872 Antiwear Hyd./Ind. Oil A.5	2107 Water Well Turbine Oil or 1872 Antiwear Hyd./Oil A.5	1875 Antiwear Hyd./Ind Oil C or 1837 R & O Gearhead C	Mystik JT-7 SAE 80/90 Antiwear Ind. Oil F, or 1855 R & O Gearhead F
Cities Service Oil Co.	Citgo H-2	Citgo Pacemaker 15	Citgo Packemaker 15	Citgo Pace-maker 20	Citgo Pace-maker 60
Gulf Oil Co.	Gulfcrown Grease No. 2 or Gulf Supreme Grease No. 2	Paramount 39	Harmony 44	Paramount 45	Harmony 69
Humble Oil & Refining Co.	Lidok No. 2	Nuto 43 or Esstic 42	Teresstic 43 or Nuto 43	Nuto 43 or Esstic 42	Terresstic 65 or Nuto 63
Mobil Oil Corp.	Mobilux No. 2	DTE 23	DTE BB	DTE 23	DTE Extra Heavy or DTE AA
The Pennzoil Co.	Pennzoil 705 HDW	Pennbell No. 1	Pennbell No. 2	Pennbell No. 2	Pennbell No. 5
Shell Oil Co.	Alvania EP Grease 2 or Alvania EP Grease 1 (for prolonged ambient below 0°F.)	Tellus Oil 23	Tellus Oil 27	Tellus Oil 29	Tellus Oil 41
Texaco, Inc.	Novatex Grease No. 2	Regal Oil A (R & O)	Regal Oil A (R & O)	Regal Oil C (R & O)	Regal Oil F (R & O)
Fiske Bros. Refining Co.	Lubriplate 130AA (0° to 120°F)	Lubriplate 3V	Lubriplate 3V	Lubriplate APG 90	Lubriplate APG 90

SECTION 19
PARTS LIST

ITEM NO.	DESCRIPTION
600	HEAD—DISCHARGE
602	SUPPORT—DRIVER
604	NUT—ADJUSTING
606	DRIVESHAFT
608	HEADSHAFT
610	HUB-DRIVER COUPLING
612	SPACER—COUPLING
613	PLATE—ADJUSTING
614	HUB—PUMP COUPLING
616	BOX—STUFFING
617	BEARING—STUFFING BOX
618	GLAND—SPLIT PACKING
620A	PACKING—STUFFING BOX
620B	PACKING—TENSION PLATE
621	RING—LANTERN
623	NUT—TUBE TENSION
624	LINE—BYPASS
625	PLATE—TUBE TENSION
626	NUT—TUBE TENSION
627	BEARING—TUBE TENSION
628	BEARING—TUBE TENSION
629	NIPPLE—ENCLOSING TUBE
630*	RESERVOIR—OIL
631	NIPPLE—THREADED COLUMN
632*	BRACKET—OIL RESERVOIR
633*	VALVE—SIGHT FEED
634*	VALVE—SOLENOID
635*	LINE ASSEMBLY—LUBRICATION
639	RING—LOCK THREADED
641	COLUMN—TOP
642*	COLUMN—INTERMEDIATE
644	COLUMN—BOTTOM
645	COUPLING—THREADED COLUMN
646	LINESHAFT

ITEM NO.	DESCRIPTION
649	COUPLING—THREADED LINESHAFT
650*	RETAINER—KEYED LINESHAFT
652	RETAINER—OPEN LINESHAFT
653	BEARING—OPEN LINESHAFT
654	TUBE—SHAFT ENCLOSING
656	BEARING—ADAPTER
658	STABILIZER—TUBE
660	PUMPSHAFT—TURBINE
661	BOWL—DISCHARGE—OPEN LINE
662	BEARING—DISCHARGE BOWL
664	BEARING—THROTTLE
666	BOWL—DISCHARGE—ENCLOSED LINE
668	BEARING—ADAPTER
669	BOWL—TOP
665*	RING—SEAL
670	BOWL—INTERMEDIATE
672	BEARING—INTERMEDIATE BOWL
673	IMPELLER—TURBINE
677	COLLET—TAPER
688	BOWL—SUCTION
690	BEARING—SUCTION
692	COLLAR—SAND
697	PIPE—TAIL
698	STRAINER—SUCTION
735B	NUT—HEX GLAND STUD
739A	STUD—STUFFING BOX
747B	PIPE—PLUG DISCHARGE HEAD DRAIN
747E	PIPE PLUG—SUCTION
747N	PIPE PLUG—PRELUBE CONNECTION
747P	PIPE PLUG—DISCHARGE BLEED OFF CONNECTION
758B	CAPSCREW—STUFFING BOX
779A	GASKET—STUFFING BOX
789C	WASHER—PACKING

A pump is only as good as its parts.

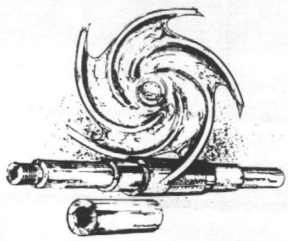
The Goulds pump featured in this instruction manual is made up of many different parts. All are engineered and precision manufactured to make the pump perform as intended. Therefore it's *most important* to make sure that you use only genuine Goulds replacement parts.

To assure that you can make no better choice than Goulds, we offer the best pump parts program in the industry. We call it "pump parts like never before" and very simply means unsurpassed *availability, service, quality* and *value.*

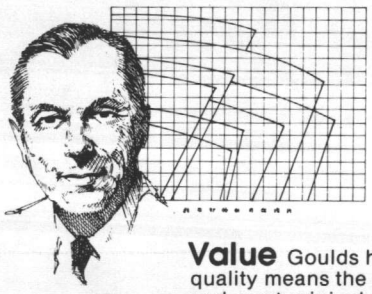
Availability A nationwide, computer-controlled distribution network backed by factory programs designed to get you the part you need — when you need it.

Service Our Certified Original Parts specialists are dedicated to serving your parts needs by:

- Helping minimize parts inventories
- Delivering parts
- Providing maintenance consultation service



Quality Goulds is committed to providing the highest *original* quality and sometimes *better* if design or material improvements have been made.



Value Goulds high standards of quality means the part will fit right and meet original standards of performance.

GOULDS PUMPS
PARTS
THE REAL ONES

For more information, call or write your nearest Goulds sales office or representative.

Branch Sales Offices

Alabama	Birmingham, AL	(205) 939-0533/34
Alabama	Mobile, AL	(205) 342-0658/59
Delaware	Newark, DE	(302) 737-8708
California	Covina, CA	(213) 967-2406
California	Walnut Creek, CA	(415) 934-5392
Colorado	Denver, CO	(303) 759-8569
Florida	Jacksonville, FL	(904) 396-3533
Florida	Lutz, FL	(813) 961-5085
***Georgia**	Atlanta, GA	(404) 455-4800
Georgia	Savannah, GA	(912) 355-1162
Illinois	Lisle, IL	(312) 960-3400
***Illinois**	Bedford Park, IL	(312) 563-1220
Louisiana	Baton Rouge, LA	(504) 927-3870
***Louisiana**	Monroe, LA	(318) 387-0854/55
***Maine**	Benton Station, ME	(207) 453-9794
Maryland	Hunt Vally, MD	(301) 666-7900
Massachusetts	Wellesley Hills, MA	(617) 235-3635
Michigan	Birmingham, MI	(313) 647-6450
Missouri	Kansas City, MO	(816) 942-4450
Missouri	St. Louis, MO	(314) 821-6050
North Carolina	Charlotte, NC	(704) 527-2177/78
***New Jersey**	Fairfield, NJ	(201) 575-6400
New York	Cheektowaga, NY	(716) 834-3114
Ohio	Cincinnati, OH	(513) 528-5770
Ohio	Parma, OH	(216) 842-7470
Oklahomá	Tulsa, OK	(918) 622-2400
***Oregon**	Tigard, OR	(503) 684-2520
Pennsylvania	Bala-Cynwyd, PA	(215) 667-6870
Pennsylvania	Pittsburgh, PA	(412) 922-9160
Tennessee	Memphis, TN	(901) 767-2380
Texas	Beaumont, TX	(713) 832-3447

Branch Sales Offices (cont'd.)

***Texas**	Houston, TX	(713) 789-7867
Texas	Richardson, TX	(214) 234-3967
Virginia	Richmond, VA	(804) 741-3280
Washington	Lynnwood, WA	(206) 774-1258
West Virginia	St. Albans, WV	(304) 722-4241

***Stocking Warehouse**

International Sales Offices

Middle East	Athens, 139, Greece (30-1) 722-8506 or 722-8568 (TLX 218464 GOUL GR)
Southeast Asia	Singapore, 0922, Republic of Singapore (65) 235-5715 or 235-6364 (TLX 26126 GOULDS RS)
Latin America	Ft. Lauderdale, FL (305) 486-3020 (TLX 522104 GPI FTLA)
Europe	The Hague, Netherlands (31-70) 64-3842 (TLX 31441 GOPUE NL)
Saudi Arabia	Dammam, Saudi Arabia (966-3) 826-0362 (TLX 602485 SUBAL SJ)

Pump Rebuild and Overhaul Shops

New Jersey	Fairfield, NJ (201) 575-6400 after 5:00 P.M. (201) 575-6991
Illinois	Bedford Park, IL (312) 563-1220
Louisiana	Denham Springs, LA (504) 665-3726
Texas	Houston, TX (713) 433-0055

Corporate Headquarters

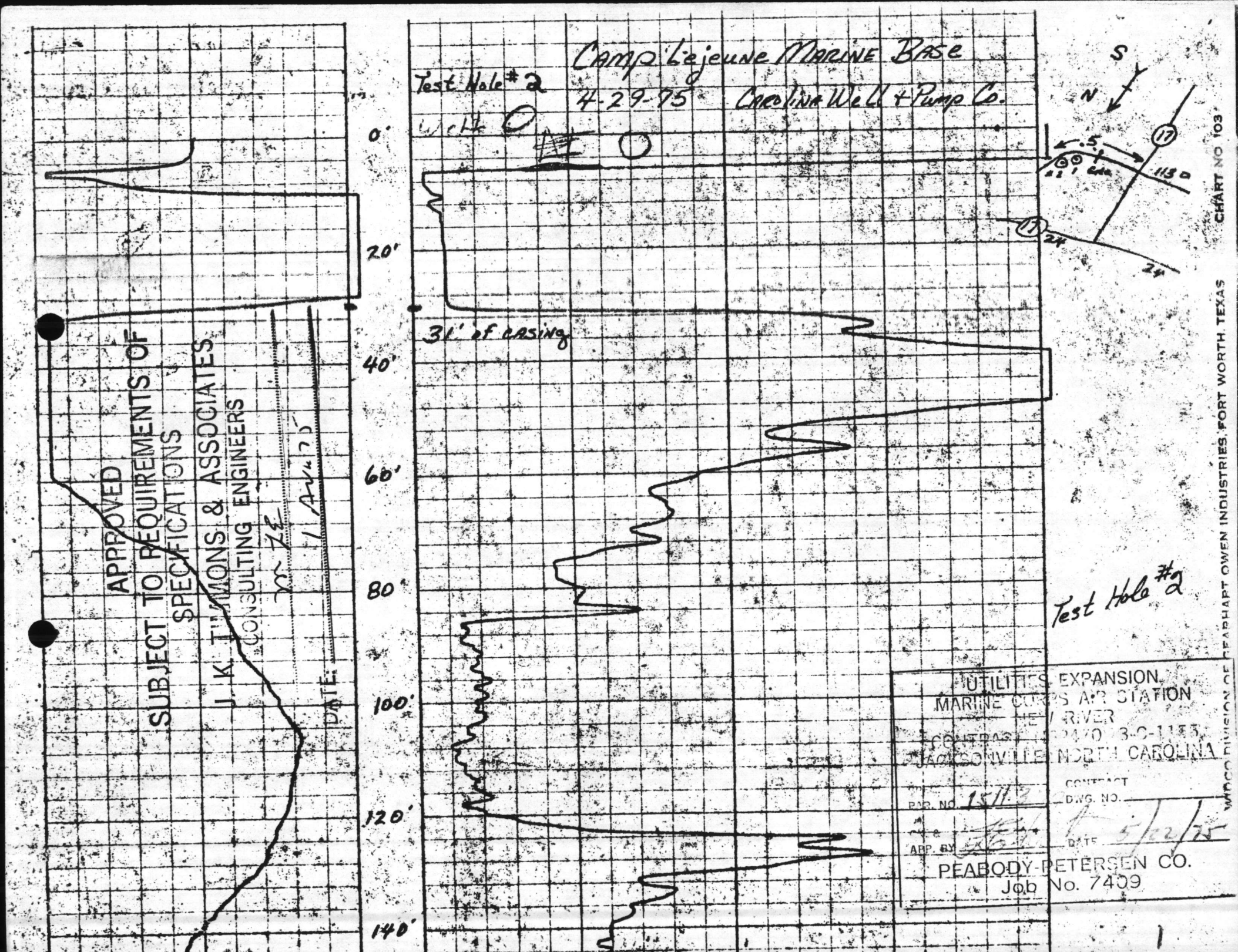
Goulds Pumps, Inc.	Seneca Falls, NY (315) 568-2811 (TLX 200807 GPSF UR) (TLX 93-7290 GOULDPUMP SEFS)

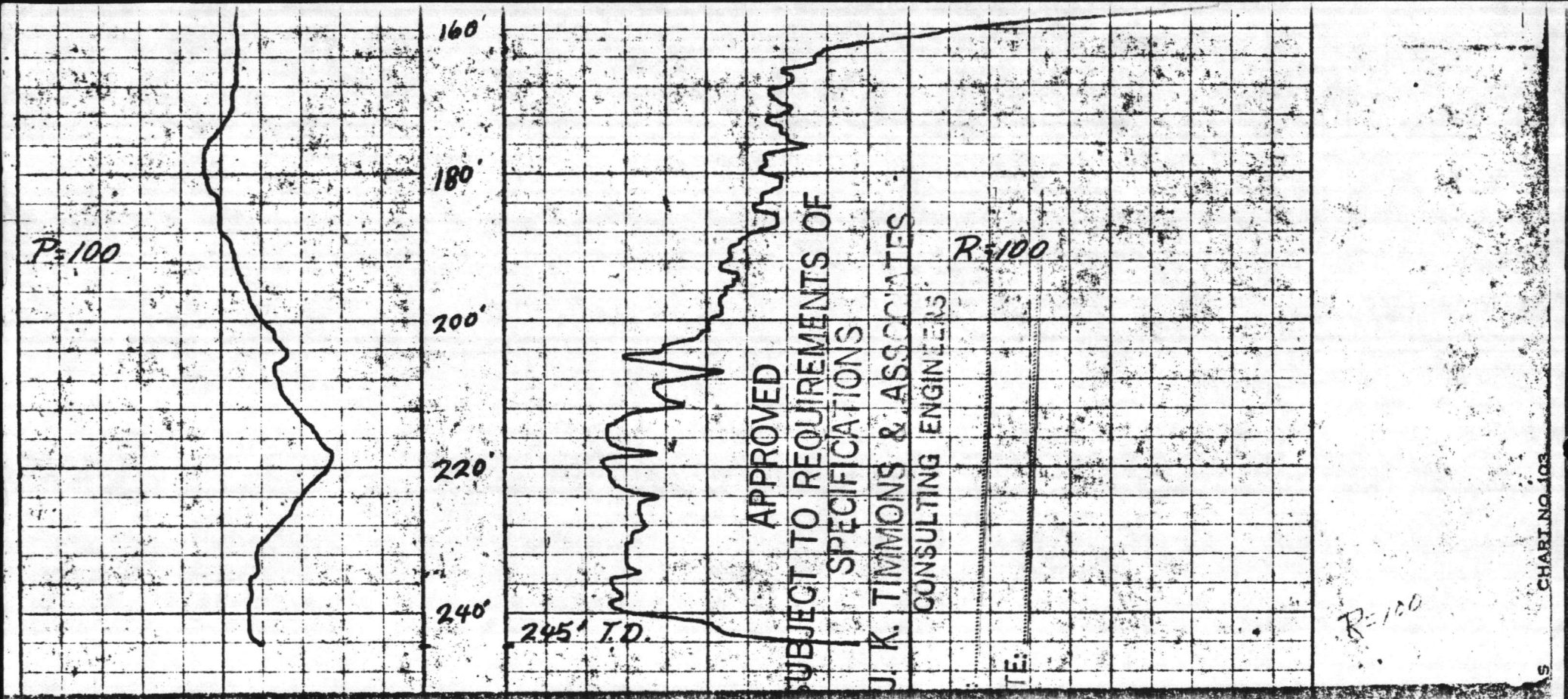
GOULDS PUMPS, INC.
SENECA FALLS, NEW YORK 13148

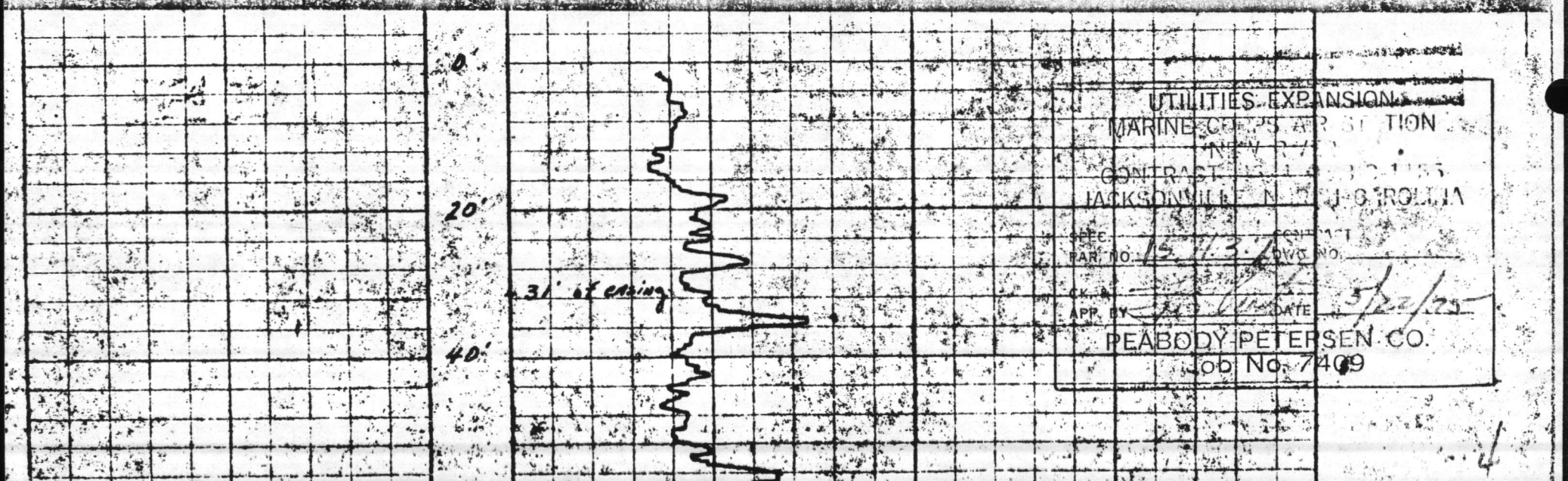
Form 9351-VP

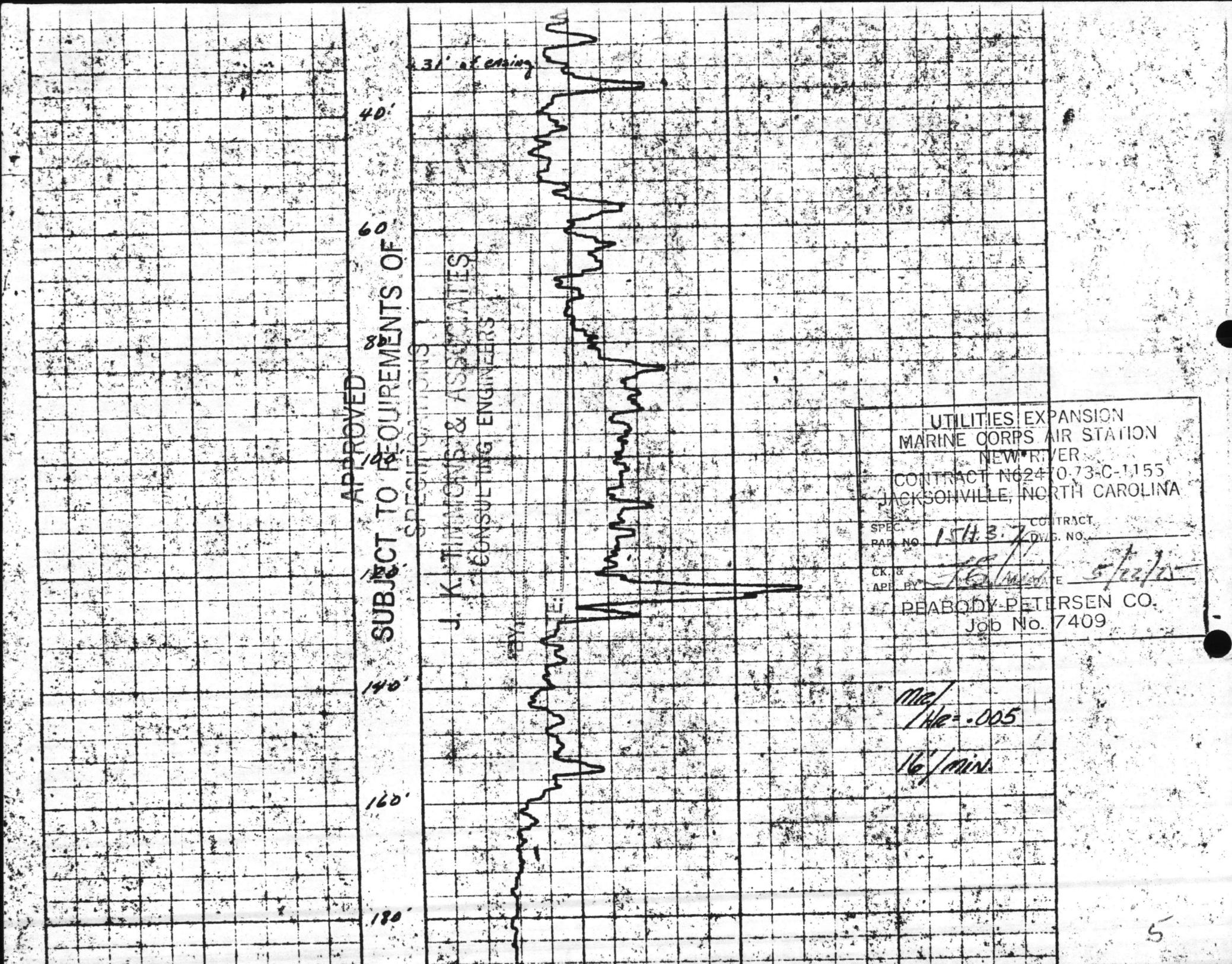
Printed in U.S.A.

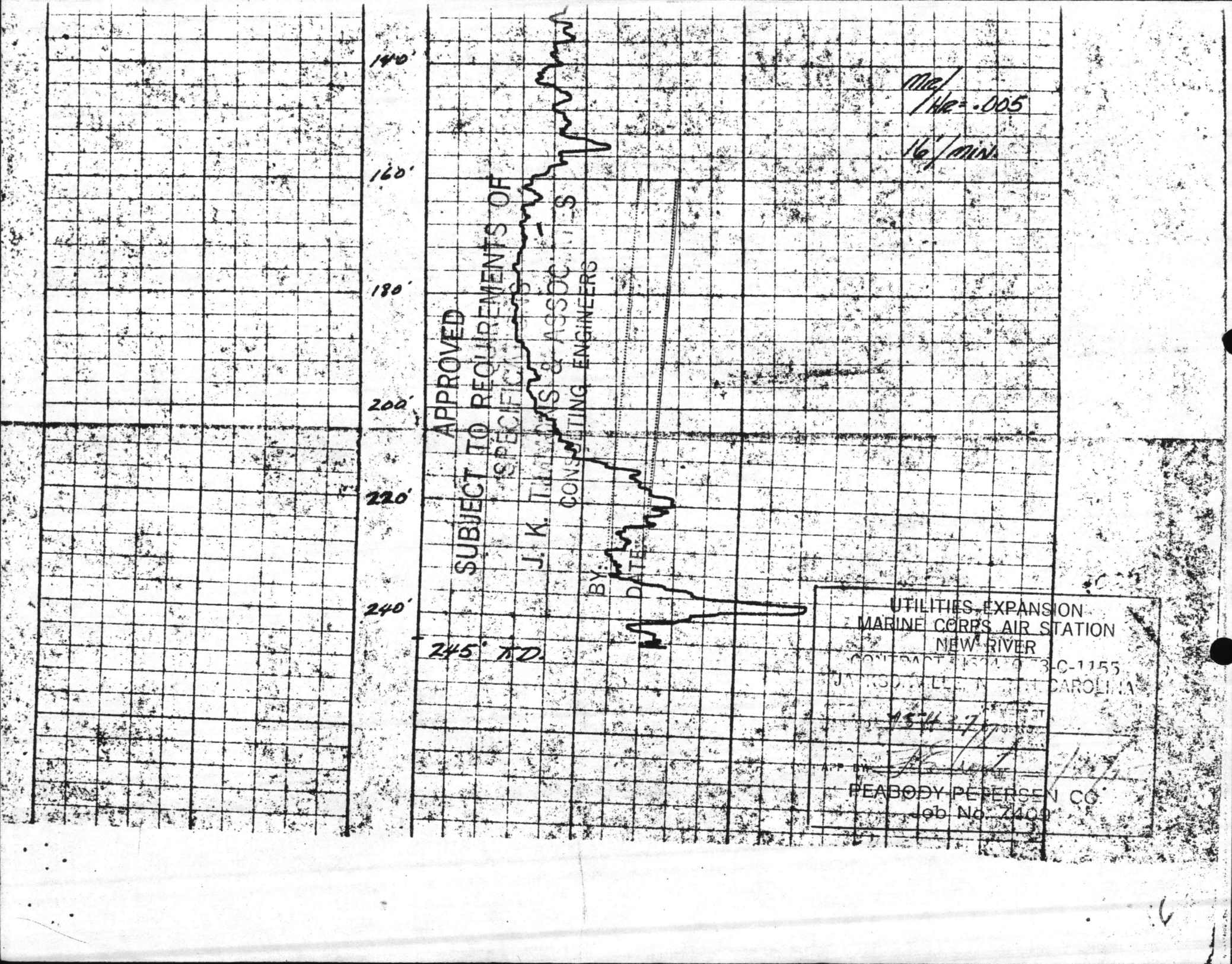
pump & well not producing
8-3-89 pulled pump broken shaft, pump worn out
static 25' depth 195'
8-7-89 Blew out well - no sand
8-8-89 water jet well added 8 LB of HTH
9-4-89 Add HTH 3 tablets
12-7-89 T.V. well, water jet well
2-11-89 T.V. well, & HTH with 10 tablets
2-22-90 started in stalling new pump. with 4" old column & bearings & new 1" shaft new pump Deroldo S/N 190266 model 8 KC, 4 stage, Rated 9-7-89, installed 90' today - removed old 6" gate & check valve & installed new 6' gate valve & 6" check valve 2-26-90
3-8-90 Completed Pump set @ 100 with 1" shaft installed 7.5 H.P. motor installed new 4" gate valve (1" shaft 10th) (motor shaft 14th) air line 95' 3/8" copper
3-12-90 installed flow meter line, cleaned well house
new GPM A/L 95 S/L 88 P/L 85 D/O 47 BST 20 GPM


Camp Lejeune Marine Base
Test Hole # 2
4-29-95
Carolina Well & Pump Co.
w/ 4" O
0'
20'
31' of casing
40'
60'
80'
100'
120'
140'
S
N
.5
113
17
24
Test Hole #2
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
DATE
UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT
JACKSONVILLE NORTH CAROLINA
CONTRACT
DWG. NO.
PAR. NO 15112
APP. BY
DATE 5/22/95
PEABODY-PETERSEN CO.
Job No. 7409
CHART NO 103
MFG. DIVISION OF TEARHART OWEN INDUSTRIES, FORT WORTH, TEXAS


160'
180'
200'
220'
240'
P=100
245' T.D.
R=100
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
R=100
CHART NO. 103


0'
20'
40'
31' of casing
UTILITIES EXPANSION
MARINE CORPS AIR STATION
CONTRACT
JACKSONVILLE, N. C.
SPEC. PAR. NO. 15 13 1
DWG. NO.
CK. BY
APP. BY
DATE 5/22/75
PEABODY PETERSEN CO.
Job No. 7409


431' of casing
40'
60'
80'
100'
120'
140'
160'
180'
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY:
UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
SPEC. PAR. NO. 15113.7
CONTRACT DWG. NO.
CK. & APP. BY
DATE 5/22/73
PEABODY-PETERSEN CO.
Job No. 7409
Mn/Hr = .005
16'/min.
5


140'
160'
180'
200'
220'
240'
245' T.D.
gal/Hr=.005
16/min.
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TILLOTSON & ASSOC., INC.
CONSULTING ENGINEERS
BY:
DATE:
UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT NO. N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
APP'D:
PEABODY-PEDERSEN CO.
Job No. 7409

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
CHEMICAL ANALYSIS OF WATER
Division of Health Services, Laboratory Section
P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJUENE

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: WORTH F. PICKARD

Address: BOX 1085

SANFORD, N.C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks: 42 - 57

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
[ ] 8-Private
[ ] 9-Other _____

Source of Water:
[ ] 1-Ground
[ ] 2-Surface
[ ] 3-Both
[ ] 4-Purchased

Source of Sample:
[ ] 1-Well tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
[ ] 1-Raw
[ ] 2-Treated

Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Desired:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY: _____
DATE: _____

ANALYSIS

Color	(000)	5	units	Ph	(00.0)	3.1

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	220	Fluoride	(0.00)	0.14
Total Hardness	(000)	322	Arsenic	(*0.00)	< 0.01
Iron	(*00.00)	0.15	Cadmium	(*0.00)	< 0.01
Manganese	(*00.00)	0.03	Chromium $^{+6}$	(*0.00)	< 0.05
Turbidity SiO_2	(000)	.75	Copper	(*00.00)	< 0.05
Acidity $CaCO_3$	(000)	4	Lead	(*0.00)	< 0.05
Chloride	(000)	14	Zinc	(*00.00)	0.15
Sodium	(000)	12	Calcium		124.0
Potassium	(00.0)	2.7	Magnesium		2.8

Date received May 7, 1975 Date reported May 23, 1975

Date analyzed _____ Reported by _____ Lab. No. 07445

Peabody S. E., Inc.
P. O. Drawer 7248
Jacksonville, N. C. 28540

PUMPING TEST DATA

Test conducted by: Carolina Well and Pump Company, Inc. By Ralph Harrison
Well Owner: Air Station - Camp Lejune Address: Jacksonville, North Carolina
Pumped Well No.: N Location: County: Onslow
Observation Well Locations:
Airline Lengths: Pumped Well Observation Wells
Remarks:

Pumping rate measured with: 3 X 4 Orifice Water levels measured with: Electric Tape

Pump Well Data

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
7-9-75							
9:55						25.0	
10:00		Pumping Test Started					
10:15	15	5	100			53.3	
10:30	30	5	100			55.10	
10:45	45	5	100			56.6	
11:00	60	5	100			57.1	
11:15	75	5	100			57.6	
11:30	90	5	100			57.6	
12:00	120	5	100			57.6	
12:30	150	5	100			57.6	
1:00	180	5	100			57.6	
1:30	210	5	100			57.6	
2:00	240	5	100			57.6	
2:30	270	5	100			57.6	
3:00	300	5	100			57.6	
3:30	330	5	100			57.6	
4:00	360	5	100			57.6	
4:30	390	5	100			57.6	
5:00	420	5	100			57.6	
5:30	450	5	100			57.6	
6:00	480	5	100			57.6	
6:30	510	5	100			57.6	
7:00	540	5	100			57.6	
7:30	570	5	100			57.6	
8:00	600	5	100			57.6	
8:30	630	5	100			57.6	
9:00	660	5	100			57.6	
9:30	690	5	100			57.6	
10:00	720	5	100			57.6	
10:30	750	5	100			57.6	
11:00	780	5	100			57.6	
11:30	810	5	100			57.6	
11:45	825	13	150			82.11	
12:00	840	13	150			83.3	
12:15	855	13	150			83.10	
12:30	870	13	150			84.6	
12:45	885	13	150			84.6	
1:00	900	13	150			84.8	
1:30	930	13	150			84.8	
2:00	960	13	150			84.8	
2:30	990	13	150			84.8	
3:00	1020	13	150			84.8	
3:30	1050	13	150			84.8	
4:00	1080	13	150			84.8	

PUMPING TEST DATA

Test conducted by: Carolina Well and Pump Company, Inc. By: Ralph Harrison
Well Owner: Air Station - Camp Lejune Address: Jacksonville, North Carolina
Pumped Well No.: N Location: County: Onslow
Observation Well Locations:
Airline Lengths: Pumped Well Observation Wells
Remarks:

Pumping rate measured with: 3 X 4 Orifice Water levels measured with: Electric Tape

Pump Well Data

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
4:30	1110	13	150			84.4	
5:00	1140	13	150			84.9	
5:30	1170	13	150			84.9	
6:00	1200	13	150			84.9	
6:30	1230	13	150			84.10	
7:00	1260	13	150			84.10	
7:30	1290	13	150			84.10	
8:00	1320	13	150			84.10	
8:30	1350	13	150			84.10	
9:00	1380	13	150			84.10	
9:30	1410	13	150			84.10	
10:00	1440	13	150			84.10	
10:30	1470	13	150			84.10	
11:00	1500	13	150			84.10	
11:30	1530	13	150			84.10	
12:00	1560	13	150			84.10	
12:30	1590	13	150			84.10	
1:00	1620	13	150			84.10	
1:15	1635	23	200			103.9	
1:30	1650	23	200			104.11	
1:45	1665	23	200			105.2	
2:00	1680	23	200			105.4	
2:30	1710	23	200			105.4	
3:00	1740	23	200			105.4	
3:30	1770	23	200			105.4	
4:00	1800	23	200			105.4	
4:30	1830	23	200			105.4	
5:00	1860	23	200			105.5	
5:30	1890	23	200			105.6	
6:00	1920	23	200			105.6	
6:30	1950	23	200			105.6	
7:00	1980	23	200			105.6	
7:30	2010	23	200			105.6	
8:00	2040	23	200			105.6	
8:30	2070	23	200			105.6	
9:00	2100	23	200			105.6	
9:30	2130	23	200			105.6	
10:00	2160	23	200			105.6	
10:30	2190	23	200			105.6	
11:00	2220	23	200			105.6	
11:30	2250	23	200			105.6	
12:00	2280	23	200			105.6	
12:30	2310	23	200			105.6	

Peabody S.E., Inc.
1930 Silver Star Ro[illegible] PO Box 7934 | Orlando, Florida 32804 | Telep[illegible]ne 305 299-3020

May 23, 1975

Officer in Charge of Construction
Building No. 1005
Marine Corps Base
Camp Lejeune, North Carolina 28542

Attn: LCDR. J. B. Gant

RE: M.C.A.S. (H) New River
Utilities Expansion
Specifications 15H.3.6 and 15H.3.7

Peabody S.E., Inc.

Dear Sir:

Enclosed you will find approved Well Drilling Data as required by paragraphs 15H.3.6 and 15H.3.7 of the referenced Specifications.

Well "N" was drilled to 204'. Three water samples were taken from the following depths and the analysis enclosed; 42' to 57' - 124' to 139' - 165' to 180'. An accurate Drillers Log was kept and soil samples obtained.

Well "O" was drilled to 250'. An accurate Drillers Log was kept and soil samples obtained. Water samples were taken from three stratus as follows: 124' - 129'; 168' - 172'; and 218' - 225' (analysis enclosed).

We recommend the following:

a. Well "N"
Set 60' of Pit Casing. Drill the hole to 200'. Set the Screens 124' to 134'; 154' to 164'; 182' to 192'. This Well should produce 200 GPM.

b. Well "O"
Set 60' of Pit Casing and drill the hole to 220'. The Screens would be set from 124' to 132'; 156' to 166'; 180' to 190'. This Well should produce 200 GPM.

Sincerely;

Felix E. Acosta
CQCR

FEA/slm

Enclosures

cc: C. Bauch, Field

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES

CHEMICAL ANALYSIS OF WATER

Division of Health Services, Laboratory Section

P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJUNE

Address: JACKSONVILLE, N.C.

Well No. N

County: ONSLOW

Report to: WORTH F. PICKARD

Address: BOX 1085

SANFORD, N.C. 27330

Collected by: RALPH HARRISON

Date Collected: 7/18/75 Time:

Remarks: ON PUMPING TEST
MARINE BASE

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
[ ] 8-Private
[ ] 9-Other

Source of Water:
[X] 1-Ground
[ ] 2-Surface
[ ] 3-Both
[ ] 4-Purchased

Source of Sample:
[X] 1-Well tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
[X] 1-Raw
[ ] 2-Treated

Type of Treatment:
[X] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Desired:
[X] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

ANALYSIS

Color	(000)	15	units	Ph	(00.0)	8.1

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	305	Fluoride	(0.00)	1.33
Total Hardness	(000)	66	Arsenic	(*0.00)	< 0.01
Iron	(*00.00)	0.25	Cadmium	(*0.00)	< 0.01
Manganese	(*00.00)	< 0.03	Chromium^{+6}	(*0.00)	< 0.05
Turbidity SiO_2	(000)	8.5	Copper	(*00.00)	0.05
Acidity $CaCO_3$	(000)	5	Lead	(*0.00)	< 0.05
Chloride	(000)	74	Zinc	(*00.00)	0.10
Sodium	(000)	160	Calcium		20.5
Potassium	(00.0)	11.5	Magnesium		3.7

Date received July 29, 1975 Date reported August 5, 1975 Lab. No. 09660

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
CHEMICAL ANALYSIS OF WATER
Division of Health Services, Laboratory Section
P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJUENE

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: NORTH F. PICKARD

Address: BOX 1065

SANFORD, N.C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks: 4-27-37

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
[ ] 8-Private
[ ] 9-Other _____

Source of Water:
[ ] 1-Ground
[ ] 2-Surface
[ ] 3-Both
[ ] 4-Purchased

Source of Sample:
[ ] 1-Well tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
[ ] 1-Raw
[ ] 2-Treated

APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY: _____
DATE: _____

Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Softened
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Filter Softener
[ ] 9-Other

Analysis Desired:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

ANALYSIS

Color (000)	5 units	Ph (00.0)	9.1

Results in Parts per Million

Alkalinity $CaCO_3$ (000)	220	Fluoride (0.00)	0.14
Total Hardness (000)	322	Arsenic (0.00)	< 0.01
Iron (00.00)	0.15	Cadmium (0.00)	< 0.01
Manganese (00.00)	0.03	Chromium ^{6} (0.00)	< 0.05
Turbidity SiO_2 (000)	.75	Copper (00.00)	< 0.05
Acidity $CaCO_3$ (000)	4	Lead (0.00)	< 0.05
Chloride (000)	14	Zinc (00.00)	0.15
Sodium (000)	12	Calcium	124.0
Potassium (00.0)	2.7	Magnesium	2.8

Date received: May 7, 1975 Date reported: May 13, 1975

Date analyzed: _____ Reported by: _____ Lab. No. 07445

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES

CHEMICAL ANALYSIS OF WATER

Division of Health Services. Laboratory Section
P. O. Box 28047. Raleigh. North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: [redacted]

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: WORTH F. PICKARD

Address: BOX 1085

SANFORD, N. C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks:

124 - 139

Type of Supply:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
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Source of Water:
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Source of Sample:
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[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
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Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Requested:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

APPROVED
SUBJECT TO [illegible] OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY: [illegible]

DATE: ANALYSIS 1 Dec 75

Color	(000)	10	units	Ph	(00.0)	8.2

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	320		Fluoride	(0.00)	1.15
Total Hardness	(000)	63		Arsenic	(0.00)	< 0.01
Iron	(00.00)	0.03		Cadmium	(0.00)	< 0.01
Manganese	(00.00)	< 0.03		Chromium	(0.00)	< 0.05
Turbidity SiO	(000)	4.5		Copper	(00.00)	< 0.05
Acidity $CaCO_3$	(000)	6		Lead	(0.00)	< 0.05
Chloride	(000)	68		Zinc	(0.00)	< 0.05
Sodium	(000)	155		Calcium		19.3
Potassium	(00.0)	10.5		Magnesium		3.7

Date received May 7, 1975 Date reported May 13, 1975

Date analyzed _____ Reported by _____ Lab. No. 07444

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
CHEMICAL ANALYSIS OF WATER
Division of Health Services, Laboratory Section
P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJEUNE

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: NORTH F. PICKARD

Address: BOX 1085

SANFORD, N. C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks:

165 - 180

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
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[ ] 2-Surface
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Source of Sample:
[ ] 1-Well tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
[ ] 1-Raw
[ ] 2-Treated

Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Flucridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Desired:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY: _____

DATE: ANALYSIS 5-12-75

Color	(000)	10 units	Ph	(00.0)	8.1

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	335	Fluoride	(0.00)	1.15
Total Hardness	(000)	60	Arsenic	(0.00)	< 0.01
Iron	(00.00)	0.10	Cadmium	(0.00)	< 0.01
Manganese	(00.00)	0.03	Chromium 6	(0.00)	< 0.05
Turbidity SiO_2	(000)	.25	Copper	(00.00)	< 0.05
Acidity $CaCO_3$	(000)	4	Lead	(0.00)	< 0.05
Chloride	(000)	95	Zinc	(00.00)	0.05
Sodium	(000)	175	Calcium		18.0
Potassium	(00.0)	12.0	Magnesium		3.7

Date received May 7, 1975 Date reported May 13, 1975

Date analyzed _____ Reported by _____ Lab. No. 07443

WELL NUMBER 1256		BY THOMAS / BROWN			DATE 7-15-86	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
76'	27	66	42	15	108	

REMARKS Lead head pressure 46 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

PUMPING TEST DATA

Test conducted by: Carolina Well and Pump Company, Inc. By: Ralph Harrison
Well Owner: Air Station - Camp Lejune Address: Jacksonville, North Carolina
Pumped Well No.: N Location: County: Onslow
Observation Well Locations:
Airline Lengths: Pumped Well Observation Wells
Remarks:

Pumping rate measured with: 3 X 4 Orifice Water levels measured with: Electric Tape

Pump Well Data

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
2:00	2400	23	200			105.6	
2:30	2430	23	200			105.6	
3:00	2460	23	200			105.6	
3:30	2490	23	200			105.6	
4:00	2520	23	200			105.6	
4:30	2550	23	200			105.6	
5:00	2580	23	200			105.6	
5:30	2610	23	200			105.6	
6:00	2640	23	200			105.6	
6:30	2670	23	200			105.6	
7:00	2700	23	200			105.6	
7:30	2730	23	200			105.6	
8:00	2760	23	200			105.6	
8:30	2790	23	200			105.6	
9:00	2820	23	200			105.6	
9:30	2850	23	200			105.6	
10:00	2880	23	200			105.6	
10:30	2910	23	200			105.6	
11:00	2940	23	200			105.6	
11:30	2970	23	200			105.6	
12:00	3000	23	200			105.6	
12:30	3030	23	200			105.6	
1:00	3060	23	200			105.6	
1:30	3090	23	200			105.6	
2:00	3120	23	200			105.6	
		Recovery Time					
2:05						34.7	
2:10						31.2	
2:15						30.3	
2:20						29.5½	
2:25						29.2	
2:30						28.9	
2:35						28.7	
2:40						28.5	
2:45						28.3	
2:50						28.1	
2:55						28.0	
3:00						27.11	
3:15						27.7	
3:30						27.5	
3:45						27.3	
						27.2	

CRANE | DEMING PUMPS

TELEPHONE - (216) 337-8741
TELEX NO. - 098-6445

CRANE CO. • 884 SOUTH BROADWAY • SALEM, OHIO 44460

Environmental Products, Inc.
P.O. Drawer 2385
Hickory, North Carolina 28601

DATA TRANSMITTAL

DATE: 4-11-75

Attention: Mr. Bob Darnell

Subject: Purchase Order 2188
Deming Order 6109 S/N T-74760
Project:

Gentlemen:

Attached is data as listed below:

QTY:	DESCRIPTION:	NUMBER & REMARKS:
11	DIMENSION DRAWING	DATED Johnson Right Angle Gear Drive
	PERFORMANCE CURVE	
	BULLETIN	
	INSTRUCTION MANUAL WITH PARTS LIST	

(xxxx) Above submittal is for APPROVAL and we are withholding the order from entry for production awaiting receipt of approved data at this office along with full information to enable us to proceed. See note * below.

( ) Above submittal is for record and file. We are proceeding with production in accordance with same. Please note that any changes after this date may result in delays and possible additional charges.

( ) Above for record and file.

REMARKS:

David E. Snyder Turbine Dept.

Application Engineering Dept.

* NOTE: When for approval, attached copy of this letter returned with your release will facilitate identification and handling.

APPROVED FOR PRODUCTION: .....
(date)

FILE

For .....

JOHNSON RIGHT ANGLE GEAR DRIVE

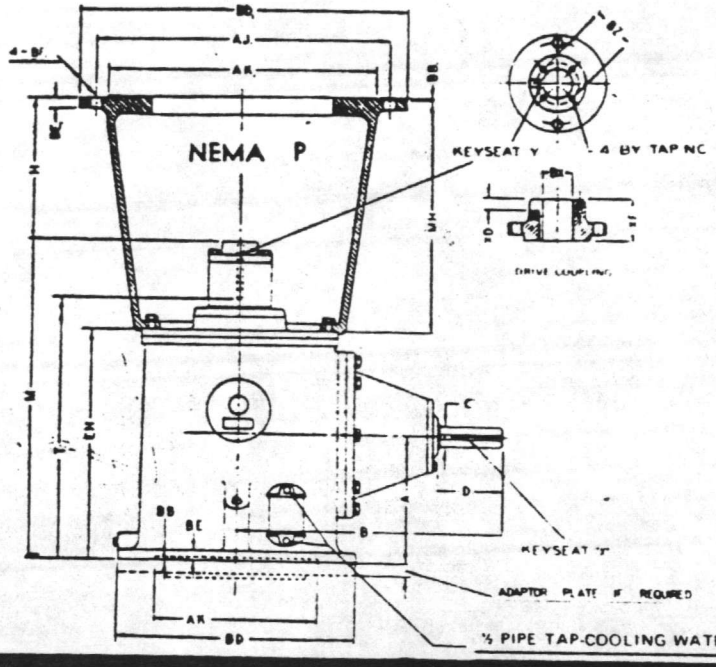
DIVISION OF ARROW GEAR COMPANY

Customer Crane Co. Order No. 404539

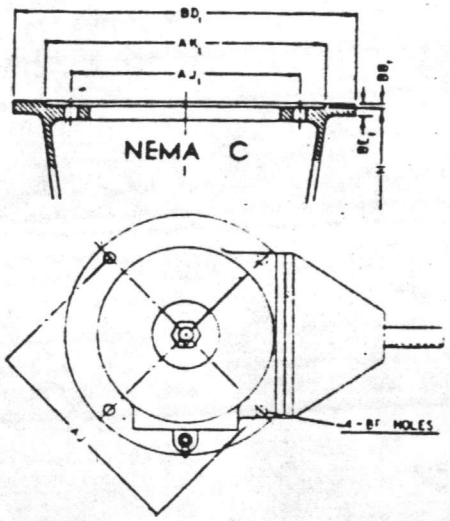
Customer's Reference

Serial No. 49841 Model HA 15 Ratio 1:1 Rotation Fig. 1

Approved by DS Date 4/8/75 Drive Coupling "BX" 3/4" Type NR



NEMA P MOTOR STAND



DIMENSIONS OF JOHNSON COMBINATION RIGHT ANGLE GEAR DRIVES TABLE 2

Model	A	B	C	D	EH	H	M	BE	BD	AJ	AK	BB	BF	Keyseat X
HA15	6⅜	13	1⅛	2¾	10⅜	3 1/8	16	⅝	10	9⅛	8¼	3/16	7/16	¼ x ⅛ x 2½
HB40(12)	9	16	1½	3½	15¼		22¼	¾	13	9½	8½	¾	¾	⅜ x ⅜ x 3
HB40	9	16	1½	3½	15¼		22¼	¾	16½	14¾	13½	3/16	11/16	⅜ x 3/16 x 3
HC60	9	16	1½	3½	15¼		22¼	¾	16½	14¾	13½	3/16	11/16	⅜ x 3/16 x 3
HD90	11⅜	17½	2	3½	19⅝		26¾	1	16½	14¾	13½	3/16	11/16	½ x ¼ x 3
HE150	13¼	20½	2 3/16	4¾	23⅛		31¾	1	20	14¾	13½	3/16	11/16	⅜ x 3/16 x 4
HF200	15	24	2¾	5½	26⅜		36	1⅛	20	14¾	13½	3/16	11/16	⅝ x 5/16 x 5
HG250	16½	29	2¾	5½	29⅞		40¼	1¼	24½	*22	13½	⅜	*15/16	⅝ x 5/16 x 5
HH350	16½	30	3	5¾	29⅞		41¾	1¼	24½	*22	13½	⅜	*15/16	¾ x ⅜ x 5
HH425	16½	31	3½	6¾	29⅞		41¾	1¼	24½	*22	13½	⅜	*15/16	⅞ x 3/16 x 5¾
HI500	16½	33	3¾	7½	31⅞		45⅜	1¼	24½	*22	13½	⅜	*15/16	⅞ x 3/16 x 5¾
HJ600	19	36	4	7½	37		48¾	1½	30½	26	22	⅜	15/16	1 x ½ x 7

*Also 5/8-11 Tap on 14¾ AJ 1" Deep

MAX. DRIVE COUPLING AND KEYSEAT

Model	XF	XD	BX Fig. 1 & 4	BX Fig. 2 & 3	BY	BZ	T	Y
HA15	1⅜	5/16	¾	⅞	10-32	1⅜	12¼	⅜ x 3/32 x 5¼
HB40	2⅛	5/16	1½	1¼	¼-20	2⅛	17¾	⅜ x 3/16 x 6½
HC60	2⅛	5/16	1½	1¼	¼-20	2⅛	17¾	⅜ x 3/16 x 6½
HD90	2⅛	5/16	1½	1½	¼-20	2⅛	22⅛	⅜ x 3/16 x 6½
HE150	2⅜	5/16	1 15/16	1¾	¼-20	2½	26½	½ x ¼ x 7
HF200	2⅝	11/16	2	2	¼-20	2½	30	½ x ¼ x 8
HG250	3	11/16	2 3/16	2 3/16	⅜-16	3¼	34	½ x ¼ x 9
HH350	3¼	13/16	2 3/16	2 3/16	⅜-16	3¼	34	⅝ x 5/16 x 10
HH425	3¼	13/16	2 3/16	2 3/16	⅜-16	3¼	35	⅝ x 5/16 x 11
HI500	4	13/16	2 11/16	2 11/16	⅜-16	3¾	39½	⅝ x 5/16 x 12
HJ600	4	1	3 3/16	3 3/16	⅜-16	4¼	39½	¾ x ⅜ x 12

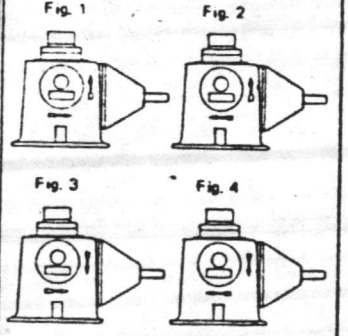
MOTOR STAND

MH	8 1/2
BD1	10
AJ1	9 1/8
AK1	8 1/4
BB1	1/8
BF1	3/8-16
BE1	1/2

SPEC. DRIVE COUPLING

BX	
Y	
BY	
BZ	
XD	

ROTATION DIAGRAM



Tolerances: Drive Shaft "C" plus .000 minus .001; Base Rabbet "AK" plus .002 plus .005; Coupling Bore "BX" plus .0005 plus .0015; Motor Stand Rabbet "AK1" plus .000 minus .005 — Unfinished cast surfaces subject to normal variation.

921 PARKER ST. • BERKELEY, CALIF. 94710 • AREA (415) 845-7377

TELEX 336-435

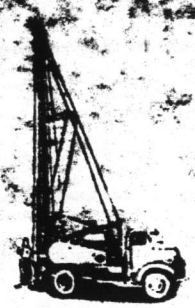
CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330

N.W.W.A.
N.C.W.W.A.



Drillers Log
Camp Lejune
New River

1	- 4	Sand topsoil
4	- 7	Red clay and sand
7	- 25	Gray clay
25	- 30	Gray clay and sand
30	- 59	Soft rock
59	- 78	Gray clay and sand
78	- 124	Gray clay and sand
124	- 127	Rock
127	- 128	White clay and rock
128	- 155	White clay and sand
155	- 159	White rock and clay
159	- 162	Rock
162	- 169	Rock clay - gray
169	- 172	Gray clay
172	- 174	Rock
174	- 180	Gray clay and rock
180	- 204	Rock

APPROVED
SUBJECT TO REQUIREMENTS OF SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY: MJZ
DATE: 1 AUG 75

MCAS
1256

UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
SPEC. PAR. NO. 15H.37 CONTRACT DWG. NO.
CK. & APP. DATE 5/22/75
PEABODY-PETERSEN CO.
Job No. 7409

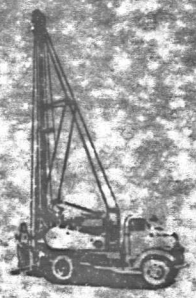
CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330

N.W.W.A.
N.C.W.W.A.



Re: Well N
Camp Lejune, North Carolina
New River Job

We drilled this hole down to 204'. We took three water samples from this well. (Analysis enclosed). 42' to 57'; 124' to 139'; 165' to 180'.

Our recommendation would be to set 60' of pit casing. Drill the hole down to 200'. Set screens at 124' to 134'; 154' to 164'; 182' to 192'. We feel this well would produce 200 GPM.

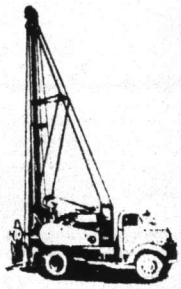
"N"

CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330



AGC CAROLINAS BRANCH ASSOCIATE MEMBER

N.W.W.A.
N.C.W.W.A.

Re: Well N
Camp Lejune, North Carolina
New River Job

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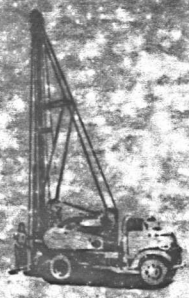
CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330

N.W.W.A.
N.C.W.W.A.



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Camp Lejune, North Carolina
New River Job

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NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES

CHEMICAL ANALYSIS OF WATER

Division of Health Services, Laboratory Section
P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJEUNE

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: WORTH F. PICKARD

Address: BOX 1085

SANFORD, N. C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks:

124 - 139

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
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Source of Water:
[ ] 1-Ground
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[ ] 3-Both
[ ] 4-Purchased

Source of Sample:
[ ] Well tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
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[ ] 2-Treated

Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Desired:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

APPROVED
SUBJECT TO REQUIREMENT OF SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY:
DATE:

ANALYSIS

Color	(000)	10	units	Ph	(00.0)	3.2

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	320	Fluoride	(0.00)	1.15
Total Hardness	(000)	63	Arsenic	(*0.00)	< 0.01
Iron	(*00.00)	0.03	Cadmium	(*0.00)	< 0.01
Manganese	(*00.00)	< 0.03	Chromium $^{+6}$	(*0.00)	< 0.05
Turbidity SiO_2	(000)	4.5	Copper	(*00.00)	< 0.05
Acidity $CaCO_3$	(000)	6	Lead	(*0.00)	< 0.05
Chloride	(000)	68	Zinc	(*00.00)	< 0.05
Sodium	(000)	155	Calcium		19.3
Potassium	(00.0)	10.5	Magnesium		3.7

Date received May 7, 1975 Date reported May 13, 1975

Date analyzed _____ Reported by _____ Lab. No. 07444

Peabody S. E., Inc.
P. O. Drawer 7248
Jacksonville, N. C. 28540

REC'D MAY 21 1975

UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
SPEC. PAR. NO. 15-4.5.7 CONTRACT DWG. NO.
CK. & APP. BY [signature] DATE 5/22/75
PEABODY-PETERSEN CO.
Job No. 7409

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES

CHEMICAL ANALYSIS OF WATER

Division of Health Services, Laboratory Section
P. O. Box 28047, Raleigh, North Carolina 27611

Complete all items above Heavy Line
(see instructions on reverse side)

Name of Owner or Supply: CAMP LEJEUN

Address: JACKSONVILLE, N. C.

Well No. N

County: ONSLOW

Report to: WORTH F. PICKARD

Address: BOX 1085

SANFORD, N. C. 27330

Collected by: RALPH HARRISON

Date Collected: _____ Time: _____

Remarks:

165 - 180

Type of Supplier:
[ ] 1-Municipal
[ ] 2-Sanitary District
[ ] 3-Mobile Home Park
[ ] 4-Community
[ ] 5-Association
[ ] 6-Industrial
[ ] 7-Institution
[ ] 8-Private
[ ] 9-Other

Source of Water:
[ ] 1-Ground
[ ] 2-Surface
[ ] 3-Both
[ ] 4-Purchased

Source of Sample:
[ ] 1-Well Tap
[ ] 2-House Tap
[ ] 3-Distribution Tap

Type of Sample:
[ ] 1-Raw
[ ] 2-Treated

Type of Treatment:
[ ] 0-None
[ ] 1-Chlorinated
[ ] 2-Fluoridated
[ ] 3-Filtered
[ ] 4-Alum
[ ] 5-Lime
[ ] 6-Soda Ash
[ ] 7-Polyphosphate
[ ] 8-Water Softener
[ ] 9-Other

Analysis Desired:
[ ] 1-Complete analysis (18 tests)
[ ] 2-Partial analysis (9 tests)

APPROVED
SUBJECT TO REQU[illegible]ENTS OF
SPECIFICA[illegible]
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY:
DATE:

ANALYSIS

Color	(000)	10	units	Ph	(00.0)	3.1

Results in Parts per Million

Alkalinity $CaCO_3$	(000)	335	Fluoride	(0.00)	1.15
Total Hardness	(000)	60	Arsenic	(*0.00)	< 0.01
Iron	(*00.00)	0.10	Cadmium	(*0.00)	< 0.01
Manganese	(*00.00)	< 0.03	Chromium^{+6}	(*0.00)	< 0.05
Turbidity SiO_2	(000)	.25	Copper	(*00.00)	< 0.05
Acidity $CaCO_3$	(000)	4	Lead	(*0.00)	< 0.05
Chloride	(000)	85	Zinc	(*00.00)	0.05
Sodium	(000)	175	Calcium		18.0
Potassium	(00.0)	12.0	Magnesium		3.7

Date received May 7, 1975 Date reported May 13, 1975

Date analyzed _____ Reported by _____ Lab. No. 07443

Peabody S. E., Inc.
P. O. Drawer 7248
Jacksonville, N. C. 28540

REC'D MAY 21 1975

UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA

SPEC. PAR. NO. 15H3.7 CONTRACT DWG. NO.

CK. & APP. BY F.B. Smith DATE 5/22/75

PEABODY-PETERSEN CO.
Job No. 7409

ELECTRIC LOG BY

CAROLINA WELL & PUMP CO. INC.

JOHNSON-KECK™ DR-61 ELECTRICAL LOGGING SYSTEM

Well *New River Jgb N* Owner *Camp Lejeune*

Location ______ Date *4/23/75*

Borehole depth ___ ft. dia. ___ in. Casing depth *28-10* ft. dia. *8* in.

Mud resistivity ______ temperature ______ F

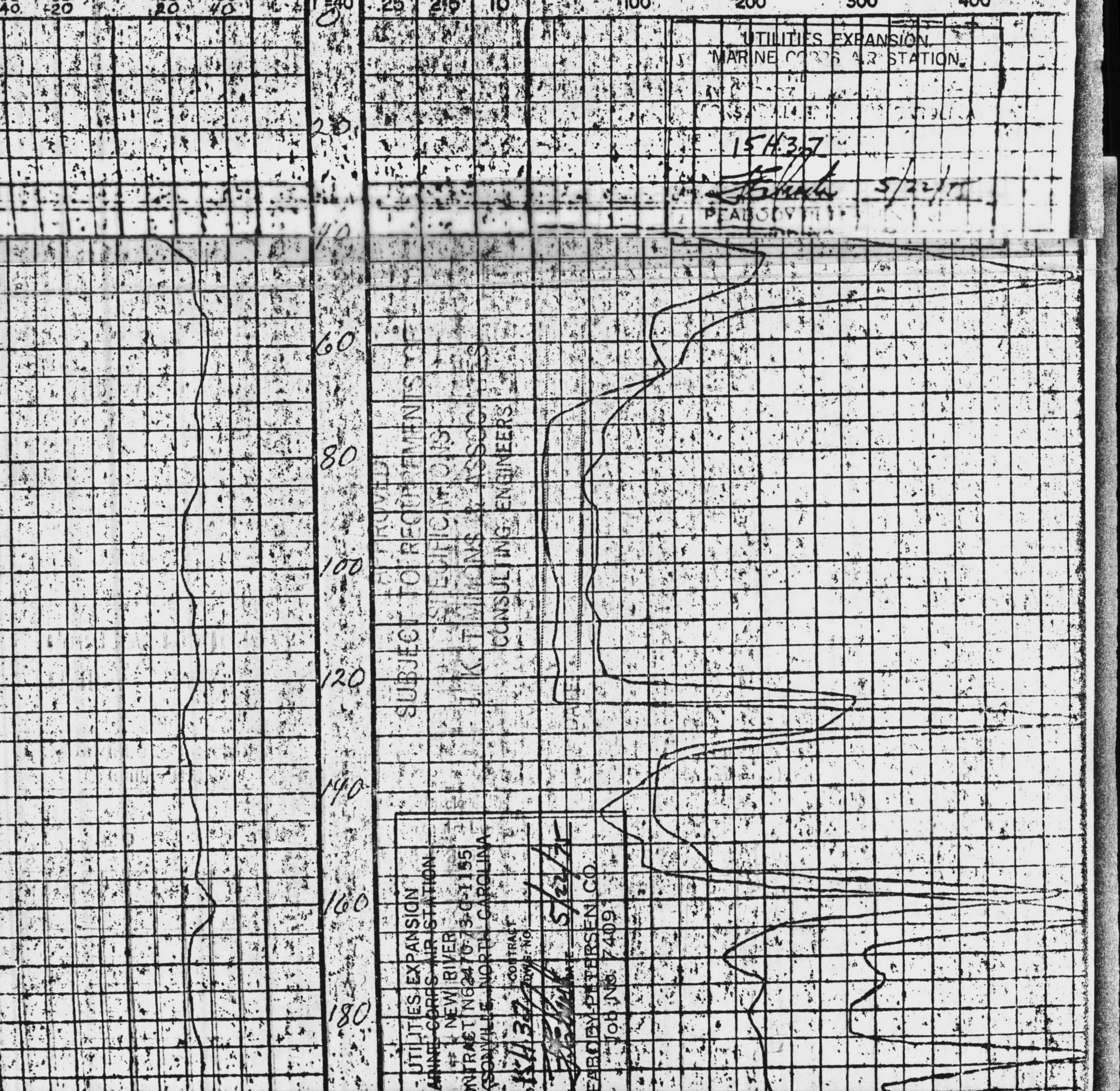
viscosity ___ sec weight ___ lb/gal type ______

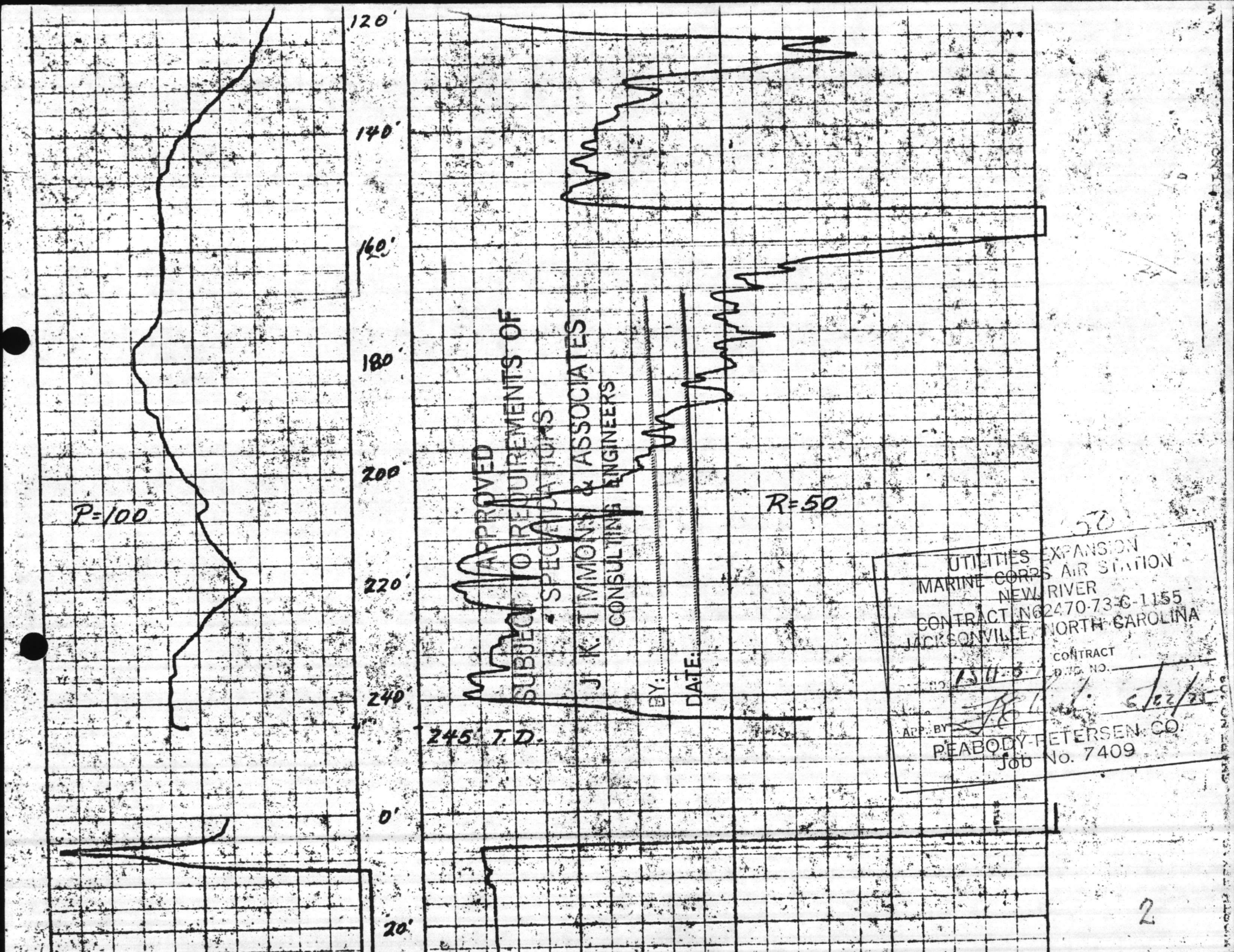
Measuring point *0* ft. above/below ground level

Fluid level in hole *6* ft. Other logs ______

Driller *Ralph Harrison* E-log operator *Dan Caton*

Spontaneous Potential (millivolts)	Depth (ft)	Resistivity (ohm-ft)
-40 -20 0 20 40 SR	1"=10' 1"=20' 1"=40'	(Circle one) Normal - Lateral .25 2.5' 10 0 100 200 300 400




120'
140'
160'
180'
200'
220'
240'
245' T.D.
0'
20'
P=100
R=50
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY:
DATE:
UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
CONTRACT
DWG NO.
APP. BY
PEABODY-PETERSEN CO.
Job No. 7409
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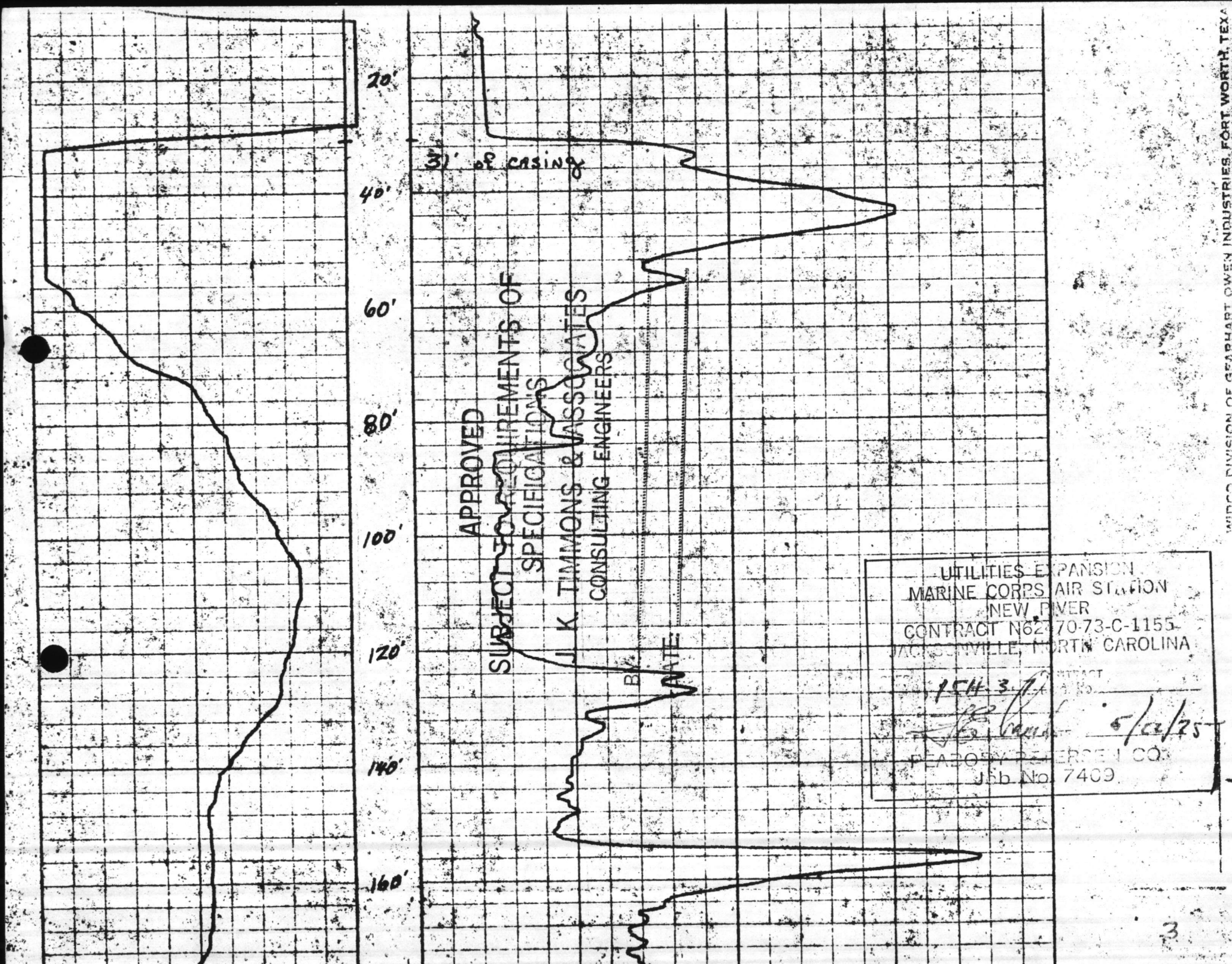
20'
31' of casing
40'
60'
80'
100'
120'
140'
160'
APPROVED
SUBJECT TO REQUIREMENTS OF
SPECIFICATIONS
J. K. TIMMONS & ASSOCIATES
CONSULTING ENGINEERS
BY
DATE:
UTILITIES EXPANSION
MARINE CORPS AIR STATION
NEW RIVER
CONTRACT N62470-73-C-1155
JACKSONVILLE, NORTH CAROLINA
CONTRACT NO.
5/22/75
PEABODY BARNES INC.
Job No. 7409
WIDCO DIVISION OF GEARHART OWEN INDUSTRIES, FORT WORTH, TEXAS
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