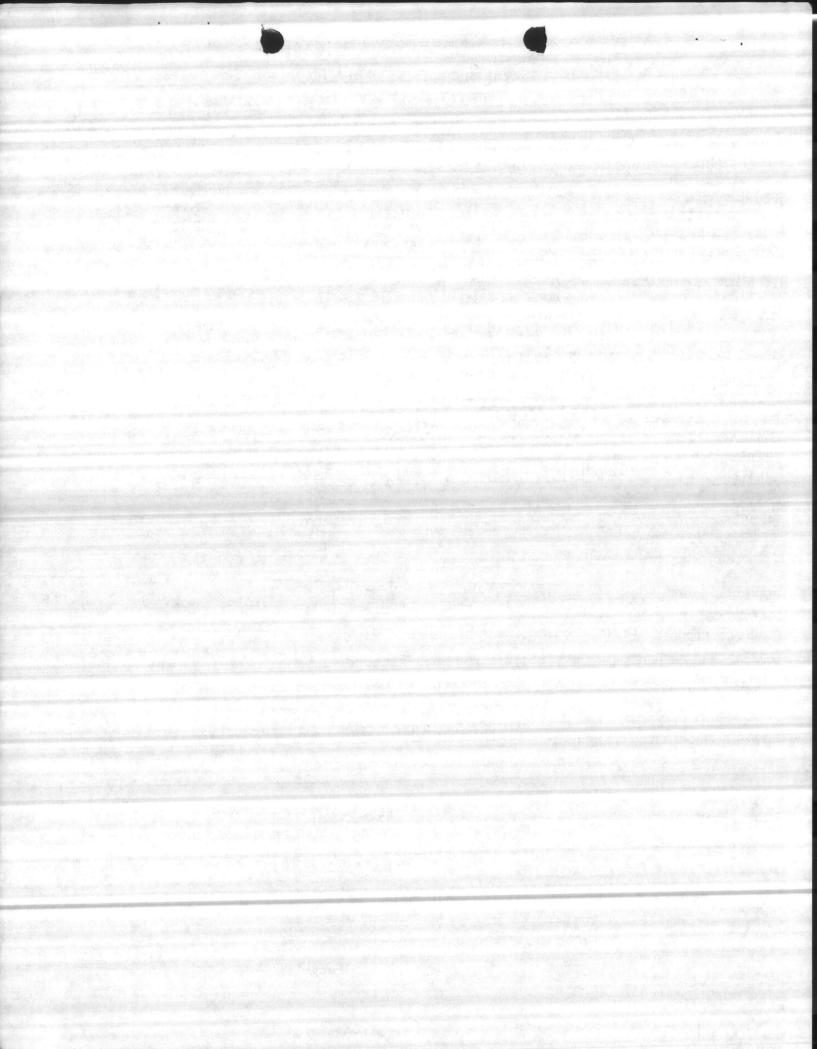
Proposed sketch of Well #9 300G.P.M ToTAl Depth 199' Well 24 PIPE CEMENTED INTO PLACE 125'+ OF BLANK chn DER DREAMED Hole 100GPM 10'OF SCREEN 5'OF BLANK 1506 PM 15 OF SCROEN -25 TO 30 TONS OF GRAVE! 34 OF BLANK PACK 5' SCREEN 50 ypm 5' BLANK



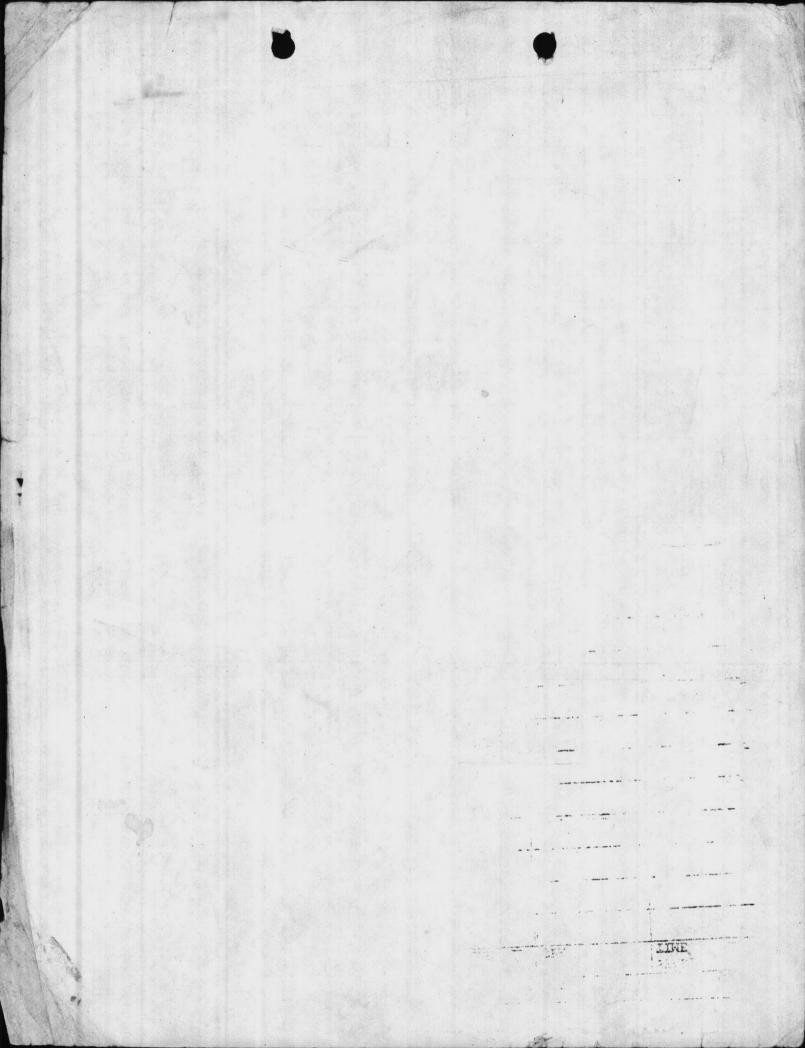
SOURCE INFORMATION

	SOURCE INFORMATION GROUND WATER	Date Form Completed M M D D Y Y 6 1 2595
Owner Assigned Well Name (If purchase,	name of system)	Code G=Ground
651 HADNOTIPOL	WH 651	W=Purchase/G Y=G w/direct influence Z=W w/direct influence
If Purchase, seller ID# Source Begin Date	Source exempt— Direct Influence Date	Availability P=Permanent
	SWIK: YN III	E=Emergency I=Interim
Location of well within the system (If purchas	e, location of master meter)	T/B ABANDONED
QUD PINEY GREE	N POAD I	BPS Data No. of Sats. Locked on
Latitude (N) Longitude (W)	Sc G=GPS -	Q# or
3 4 4 1 4 1 0 7 7 1 9 .	M=Map S=Surveyed	DOP#
(If purchase, use seller's primary source lat/lo	ng) MMDDY	Y
Vulnerable (VOCs) YN	Assessment Date	
ENTRY POINT INFORMAT	ION Use Code	Availability P=Year-round S=Seasonal
Owner Assigned	C C=Ground/Permanent D=Ground/non-permanent	E-Emergency I-Interim O=Other
Entry Point Code Entry Point Name		
MINES IT		
Well Site: Owned or controlled?(Y,N)	AND THE RESERVE TO THE PERSON NAMED IN COLUMN TO THE PERSON NAMED	
, T	No. of the second control of the con	yes, bact. samples collected?(Y,N)
Adequate slope?(Y,N) Flooding? _		CONTROL AND THE CONTROL OF THE CONTR
Well House: Free of stored materials?(Y,N) Properly drained?(Y,N) Lock	ed?(Y,N)
Condition of house:	Type of freeze protection:	
WILD SC	PISOUS Yield (gpm): 342 Properly sealed!(Y,N
Properly vented?(Y,N) Casing depth	5 of ft. (If unknown, Well depth:	99 Meter available (Y,N
Concrete slab adequate?(Y,N) It no,	explain: Sample tap: Before treatment?	(Y N) After treatment?(Y,N
Size of blow-off:	Sample tap: Before treatment:	26 Auxiliary Power? Y (Y.N
Pumps: Capacity: GPM: 300 I	Pump intake depth:	(() ()
Type pump: VARTICAL TURB	Height above flo	
Storage at well site: Elev:	Try are -	Ground: A
If hydroautomatic, air volume control?	_(Y,N) Safety valves?(Y,N) Code	ha Auxiliary Power?(Y,N
High service pumps: 1gpmh	p 2 gpm hp 3 gpm .	The Assessment of the Control of the
Is the water treated at this well? N If ye	s, complete back of form.	. LP. 20 PLANT
If other wells are treated here, which ones?	If treated elsev	where, where?
If purchase, retreat? Y If yes, complete	back of form.	



WELL NUMBER	651	BYThoma		Rown	DATE 10-29 - 84			
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START 0800		
125	40	60	20	90	104	0810		
· · · · · · · · · · · · · · · · · · ·		65	25	86	115	0820		
		68	28	83	122	0830		
A y a market		71	31	80	130	0840		
		45	35	77	143	0850		
		78	38	74	151	0900		
		84	44	71	159	0910		
	· · · · · · · · · · · · · · · · · · ·	85	45	68	175	0920		
		89	49	65	185	0930		
		98	58	62	214	0940		
		100	60	58	221	0950		
REMARKS		102	62	55	236	1000		
left set	at >	109	69	52	242	1011		
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	MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE
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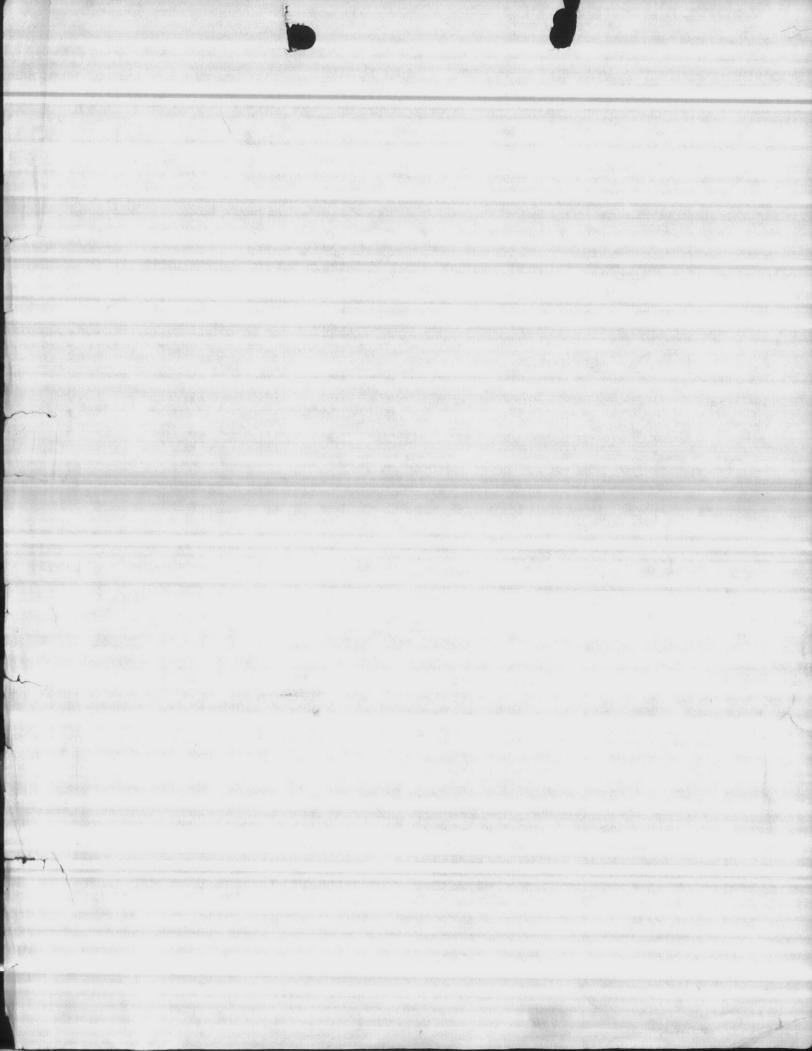
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		42.	
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WELL NUMBER	651	BY THON	1A5/ &	AVNOR	DATE 9-14	4-83
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1030
125	48	90	42	75	164	1042
		99	51	70	190	1044
785		104	56	65	203	1105
egg Allacin and all	and the second s	111	63	61	221	1116
		117	69	56	239	1133
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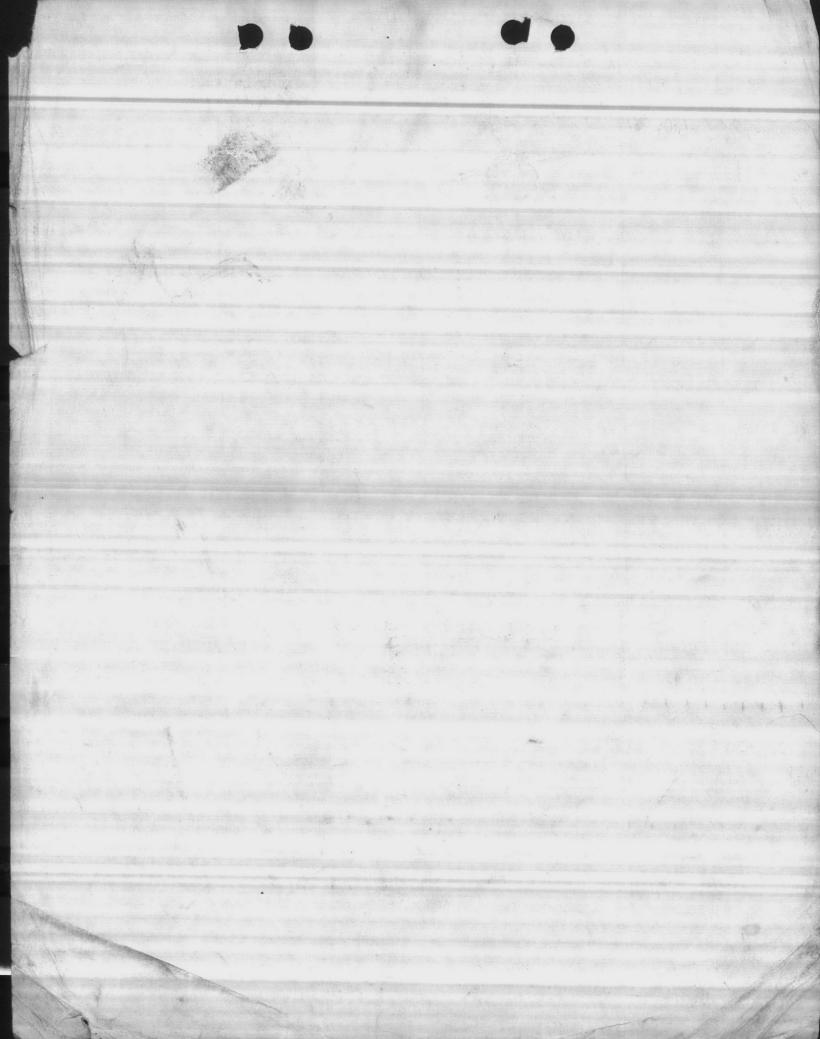
REMARKS

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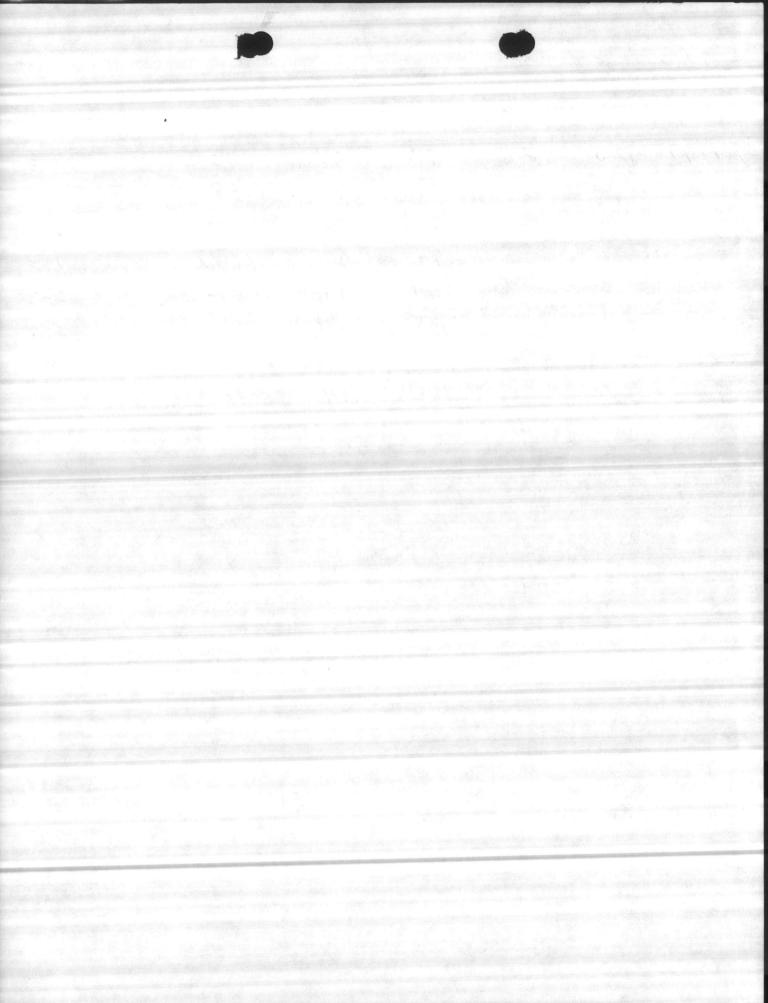
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602 DATE MOV. 34,8/	LENGTH OF AIR LINE	STATIC LEVEL.	PUMPTING LEVEL,	DRAW DOWN	DISCHARGE PRESSURE	CAP . PE	TOYAL CAR.	MS
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WELL #				Vois salata			
651							
DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	TOTAL CAP.
3/3//77	125	21	92	7/	70	A CONTRACTOR OF THE PROPERTY O	159
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		and material services (All provides the prov	105	84	55		228
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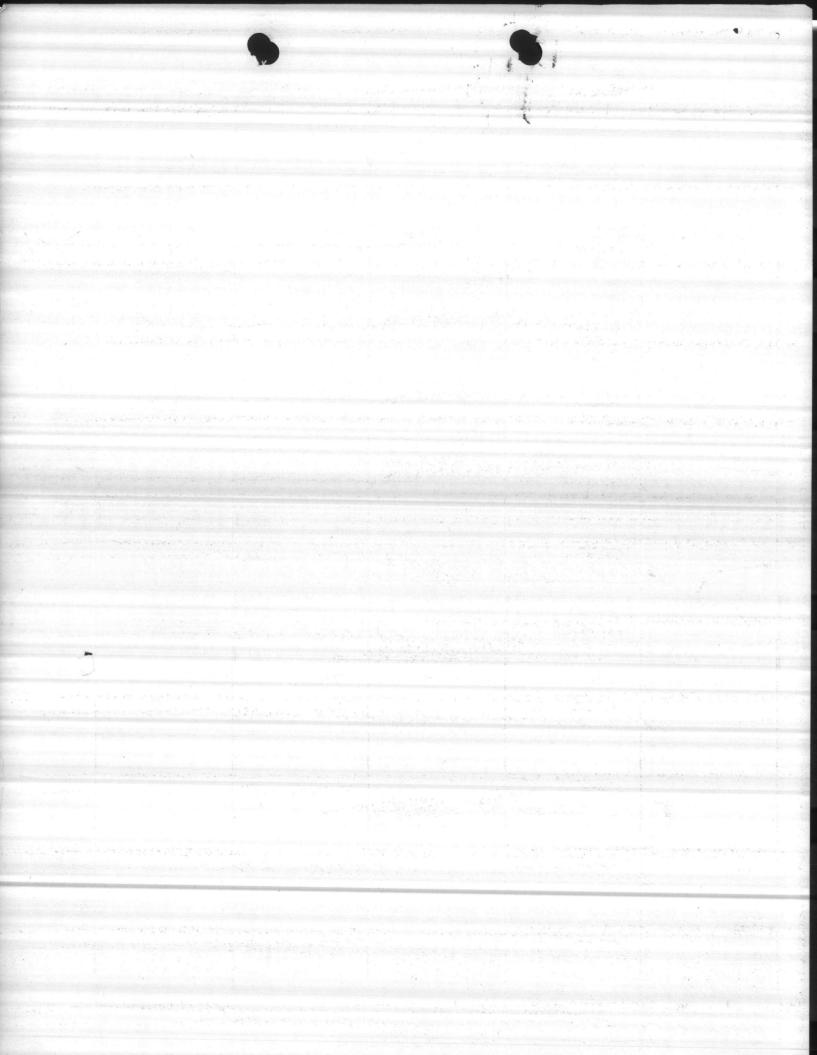


CORBIN CONSTRUCTION COMPANY Camp LeJeune, North Carolina Pumping Test, Well No. 9 December 30, 1971

Static Level 21' 0"

DISCHARGE PRESS

TIME (GPM	PUMPING LEVEL	•	TIME *	GPM	PUMPING LEV
9:45	150	21'		8:00	300	93'
	150	50 '		8:30	300	93'
	150	51'		9:00	300	93'
	150	53'		10:00	300	93'
	150	54'		11:00	300	93'
	150	54'		12:00	300	93'
	150	58'		1:00	300	93'
	150	59 '		2:00	300	93'
	150	59'		- Herrita	300	93'
		.59'	09	3:00		93'
	150			4:00	300	93'
	150	59'	66	5:00	300	93'
	150	59'	3.3	6:00	300	
	200	68'		7:00	300	93'
	200	68'		8:00	300	93'
	200	\ \ 65'		9:00	300	93'
	200	65'		10:00	300	93'
	200	66'				
	200	66'			January	6, 1972
	200	66'				
	200	66'	111	4:00	335	114' 5'
	200	66' DD	45	5:00	335	115
	250	78'		6:00	335	115'
	250	78'		7:00	335	115'
3:30	250	80'		8:00	335	115'
3:45	250	801		9:00	335	115'
4:00	250	80'		10:00	335	115' -
4:15	250	80'		11:00	335	115'
4:30	250	80'		12:00	335	115'
4:45	300	93'		1:00	335	115'
5:00	300	93'		2:00	335	115
	300	93'		3:00	335	115'
	300	93'		4:00	335	115'
	300	93'		5:00	335	115'
	300	93'		6:00	335	115'
	300	93'		7:00	335	115'
	300	93'		8:00	335	115'
	300	93'		9:00	340	115'
	300	93'		10:00	325	115'
	300	93'		11:00	340	115'
	300	93'		12:00	335	115'
		and the second of the second		1:00	349	115'
EPTH OF	= W/F	-11 1991		2:00	345	115'
EPINON	1112		and the second second	3:00	340	115'
UMP SETT	146	110		4:00	340	115'
P.M.		200		4.00	540	11)
D.H.		226		т	Coroon T	ino 125 foot
20.77	-VI	66'		10p OI	screen L	ine 125 feet
RAW DOW	EVEL	45	A SECTION AND A SECTION AND ASSESSMENT OF THE SECTION AND ASSESSMENT OF THE SECTION ASSESSMENT O			
KAW DOW	- PARE	40			4 4	



ASSOCIATED WITH LAYNE & BOWLER, INC. P. O. BOX 7095 . NORFOLK, VIRGINIA 23509

WELL WATER SYSTEMS

PUMPING EQUIPMENT

WATER CONDITIONING EQUIPMENT

FORMATION SAMPLES LOG

CORBIN CONSTRUCTION CO.

Camp Lejeune, N.C.

Well #9

November 10, 1971

FACTORY AND GENERAL OFFICE
MEMPHIS, TENN.
SALES OFFICES
ALBANY, GA.
GLEN BURNIE, MD.
NORFOLK, VA.
OPLANDO, FLA.
SAVANNAH, GA.

JOB #40936

0 - 10	bana and old
10 - 20'	Sand and clay
20 - 30'	Sand and clay
30 - 40'	Sand
40 - 50'	Sand
50 - 60'	Sand and limestone
60 - 70°	Sand and limestone
70 - 80'	Sand and limestone
80 - 90'	Limestone
90 - 100'	Limestone
100 - 110'	Sand and limestone
110 - 120'	Sand and limestone
120 - 130'	Sand and limestone
130 - 140'	Sand and limestone
140 - 150'	Sand and limestone
150 - 160'	Sand and limestone
160 - 170'	Sand and limestone
170 - 180'	Sand and limestone
180 - 190'	Sand and limestone
190 - 200'	Sand and limestone
200 - 210'	Sand and limestone
210 - 2201	Sand
220 - 230'	Sand and clay
230 - 240'	Clay
240 - 250°	Sand and clay
250 - 260°	Sand and limestone
260 - 270°	Sand
270 - 280'	Sand
280 - 290'	Sand
290 - 300°	Sand
300 - 310'	Sand

0 - 10' Sand and clay



"Hello Analysis, Goodbye Worry"

WATER ANALYSIS LABORATORY

BO2 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA

(803) 479-4639

ONSULTANTS FOR INDUSTRIALITIES HOME OWERS DEC 8 1971 PRINCIPALITIES OF THE PRINCIPALITIE

December 4, 1971

Report To: Layne-Atlantic Co.

Norfolk, Va.

Date Analyzed: 12/4/71 65/
Sample Number: Camp Lejuene, #9

170'-190', Sample #2

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.2	Carbon Dioxide (CO ₂)	25
Iron (Fe)	0.15	Total Acidity (CaCO ₃)	43
Nitrate (NO ₃)	Trace	Calcium Hardness (CaCO ₃)	181
Fluoride (F)	0.3	Magnesium Hardness (CaCO ₃))	23
Manganese (Mn)	0	Carbonate Hardness (CaOO3)	204
Total Hardness (CaCO ₃)	204	Noncarbonate Hardness (CaCO3)	0
Chlorides (CI)	8	Alkalinity (Phenolphthalein) (CaCO3).	0
Sulfate (SO ₄)	5.6	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)	0.7	Bicarbonate Alkalinity (CaCO3)	208
Magnesium (Mg)	5.5	Total Alkalinity (CaCO3)	208
Calcium (Ca)	72	Total Dissolved Solids	234
Carbonate (CO ₃)	0	Specific Conductance (micromhos at 25%)	360_
Bicarbonate (HCO ₃)	254	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed Not Obj	ectionable
			100

Water Analysis Laboratory 802 Hamlet Highway

SIGNED:

Bennettsville, South Carolina 29512

TO THE PROPERTY OF THE PROPERT Se of Comete, 1601-1601

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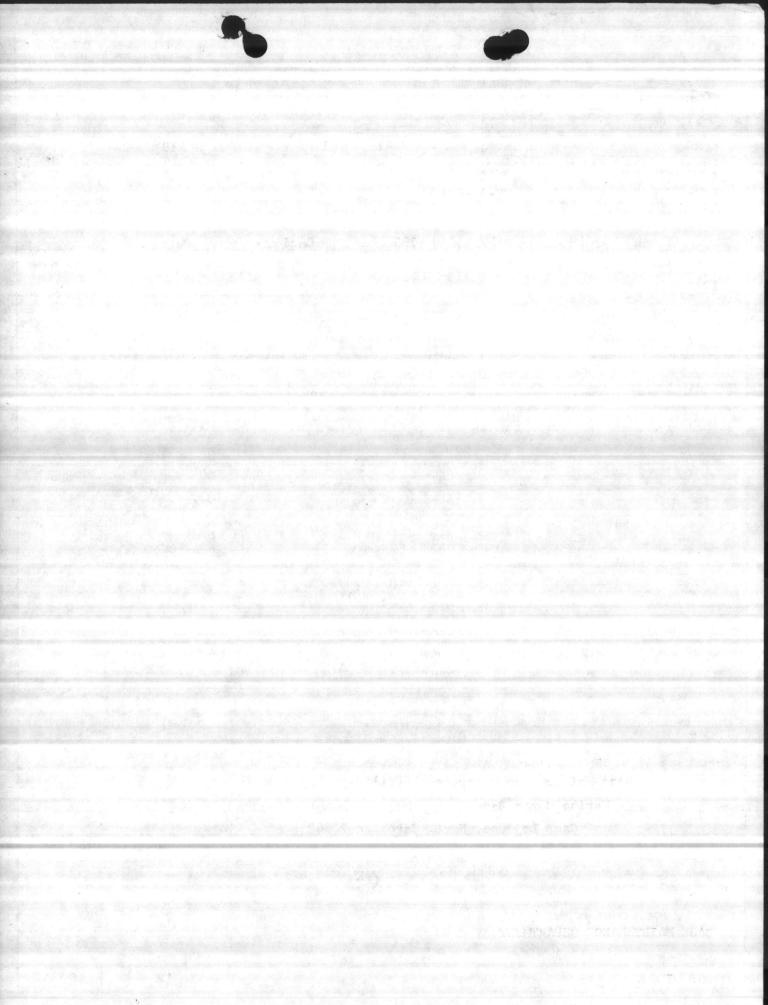
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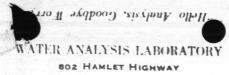
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FORM A-4 (MAY '70)	OFFIC INVENTOR	OVED. Bureau No. 42-R1485 val Expires June 30, 1976			
1. AGENCY CODE MC	2. TYPE 3. LATITUDE 4. LONGITUDE Q 34 41 41 77 1				9 26
6. AGENCY STATION NO.	7. STATION	NAME			
HP-651	HP-20-	651			
8. DRAINAGE BASIN CODE	9. STATE CO	The second secon	CODE 11, COUR	NTY NAME	
No. Letter	32	133	Onsi	lon	
12. PERIOD OF RECORD Began Discontinued 1972	Y In	ontinuous terruption ceeds 1 Year	13	1	4.
15. SITE □101 Stream		□104 Reserve	oir		7 Well
□102 Canal		□105 Estuarii	ne zone		8 Drain
□103 Lake		□106 Spring		□10	9 Other
16. TYPES OF DATA AVAILABLE A cter to indicate frequency of 1 Continuous 2 Seasonal Physical 311 Temperature 312 Specific conductance 313 Turbidity 314 Color 315 Odor 315 Odor 316 p. (field) 317 8 p. (lab) 318 Eh 319 Suspended solids 320 Other	3 Daily 4 Weekly Che 331 332 333 334 335 336 337 338 339 340 341 342 343 344 ABLE FOR S	emical Dissolved solids Chloride Nutrients (nitros Nutrients (phosp Common ions Hardness Radiochemical Dissolved oxyge Other gases Minor elements Pesticides (insecherbicides, e Detergents - MB Biochemical ox Carbon (total, o	telemetered, 6 5 Monthly 6 Quarterly gen) shorus) n eticides, tc.) 8 ygen demand lissolved, etc.)	7 Annua 8 Other Biologic 361 — Coliform 362 — Other mi organi 363 — Other Sediment 371 — Concents 372 — Particle 373 — Particle 374 — Other	Periodic Periodic is icro-organisms (Benthic sm, phytoplankton, etc.) ration (suspended) size (suspended) size (bed load material)
421 Surface water station 422 Ground water station		Water stage or l Water discharge		☐ 425 Time of trave ☐ 426 Drainage area	
18. STORAGE OF DATA ☐ 501 Published ☐ 502 Not published					305 Other
19, INQUIRIES ABOUT DATA SHOU			Adam Dini		
Office Base Mainten		rtment, Utili	ities Divis) LUII	
Street No. Marine Co City, State, Zip Camp		North Carolin	na 28542		City Code 0735
20. DATA ARE AVAILABLE TO PUR	LIC ON REC	DUEST	Yes Yes	☐ No	
21. OFFICE COMPLETING FORM BASE MAINTENANCE DEPAR	IMENT				
22. COMPILER'S NAME				23	DATE Month





(803) 479-4639

ATER ANALYSIS LABORATORY

802 HAMLET HIGHWAY

BENNETTSVILLE, SOUTH CAROLINA
29512

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

December 4, 1971

Report	To:_	Layne-Atlantic	Co.	
		Norfolk, Va.		

Date Analyzed: 12/4/71

Sample Number: Camp Lejuene, #9

125'-160', Sample #1

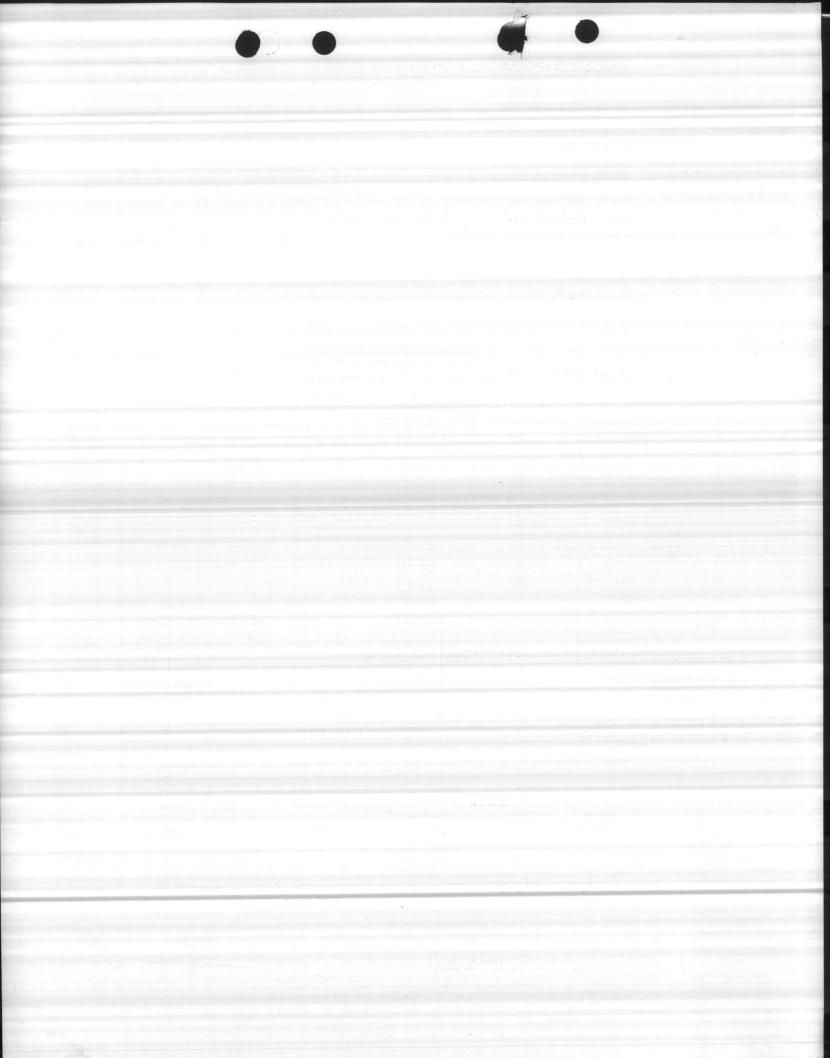
Analysis Results--Parts Per Million

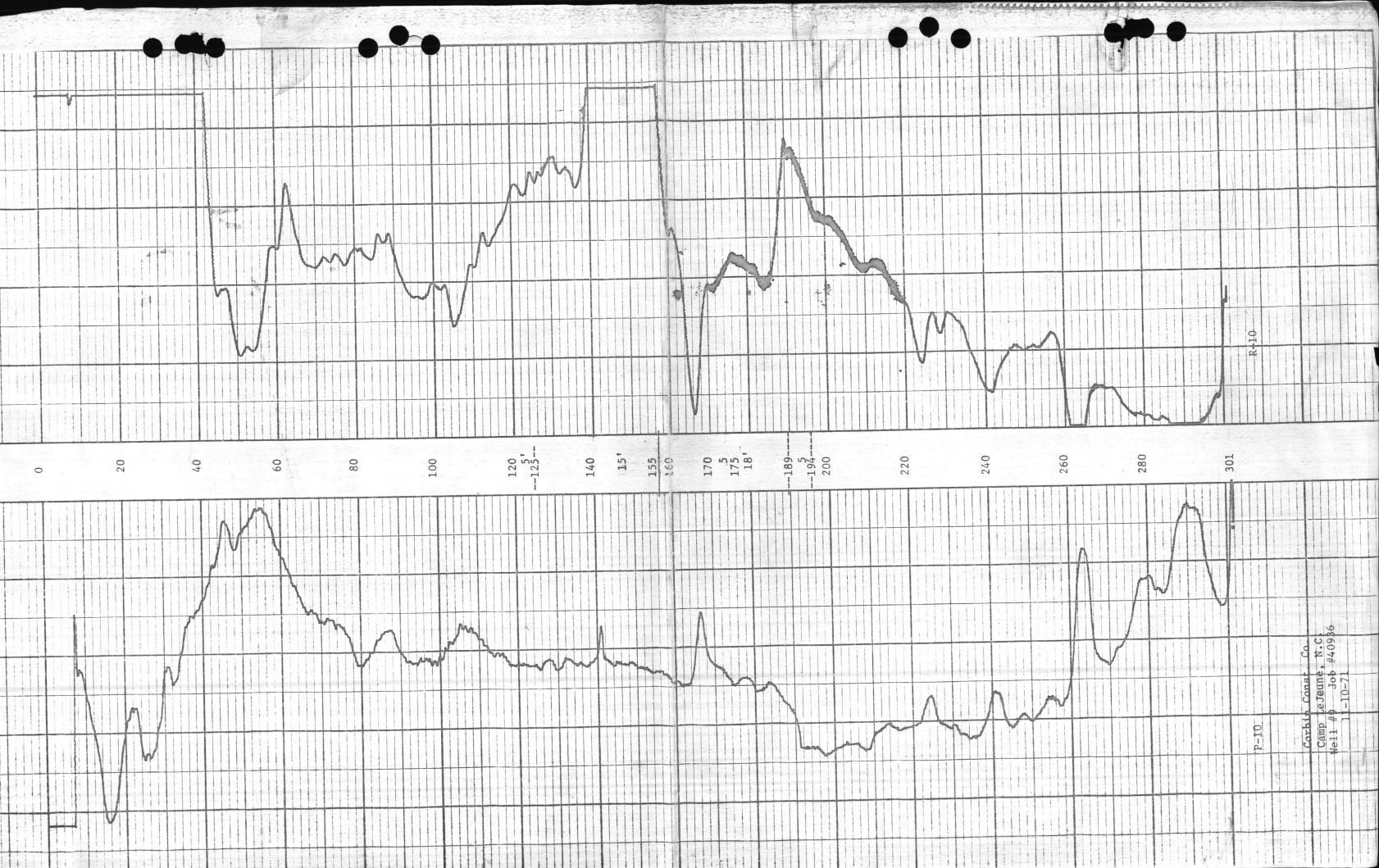
Determination		Determination	
pH	7.1	Carbon Dioxide (CO ₂)	_ 25_
Iron (Fe)	0.1	Total Acidity (CaCO3)	36
Nitrate (NO ₃)	0	Calcium Hardness (CaCO ₃)	152
Fluoride (F)	0.2	Magnesium Hardness (CaOO3))	20
Manganese (Mn)	0	Carbonate Hardness (CaO)3)	172
Total Hardness (CaCO ₃)	172	Noncarbonate Hardness (CaOO3)	0
Chlorides (C1)	_7	Alkalinity (Phenolphthalein) (CaCO3)	0
Sulfate (SO ₄)	4.3	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)	0.5	Bicarbonate Alkalinity (CaCO3)	176
Magnesium (Mg)	4.8	Total Alkalinity (CaCO ₃)	176
Calcium (Ca)	61	Total Dissolved Solids	208
Carbonate (CO ₃)	0	Specific Conductance (micromhos at 25%)	320
Bicarbonate (HCO ₃)	215	Appearance When Analyzed	Clear
Hydroxide (OH)		Odor When Analyzed Not Obj	ectionable
	Cu	Water Analysis Laboratory 802 Hamlet Highway	

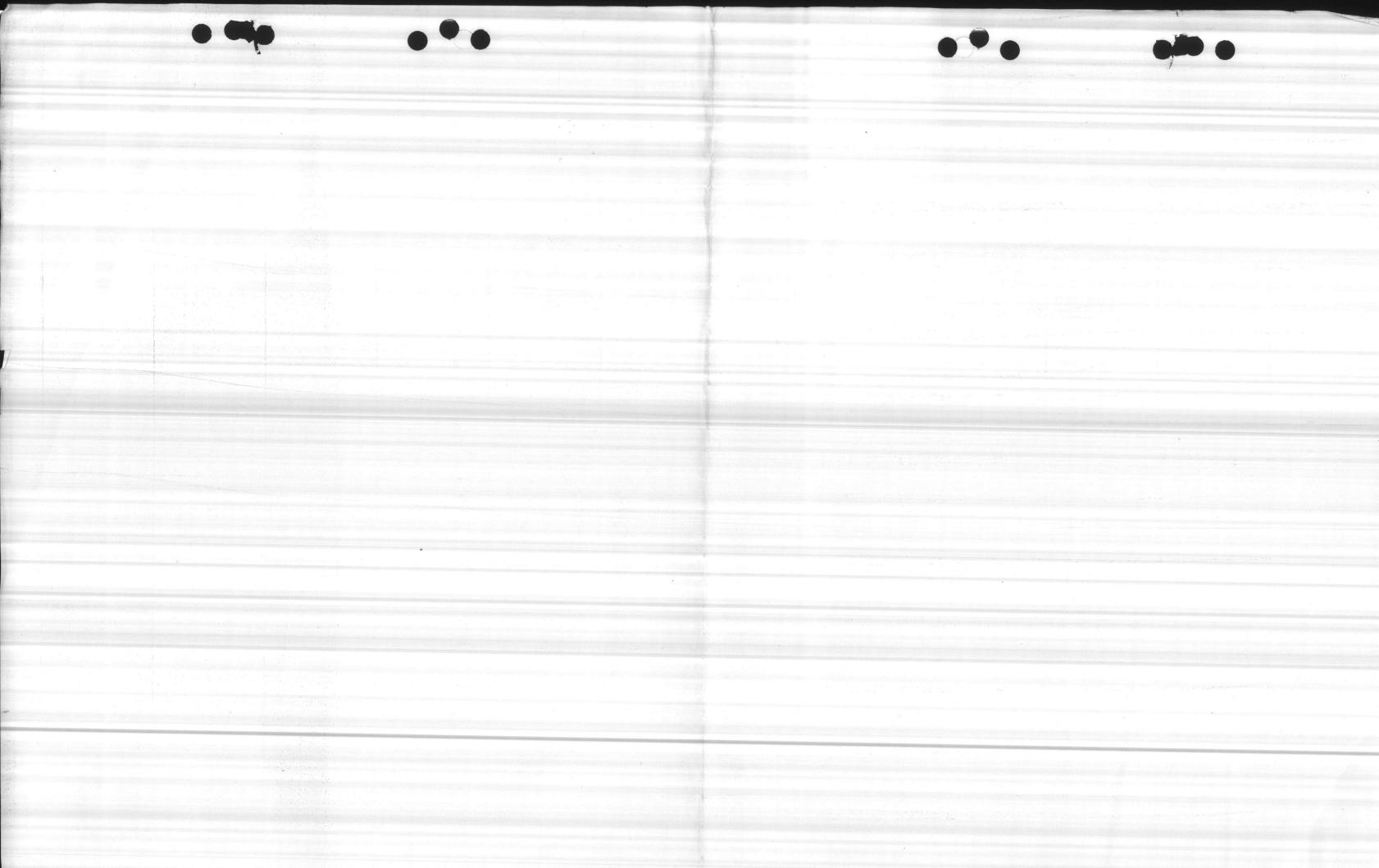
SIGNED:

LAB BETTURE TENEUR South Carolina 29512

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.







"Hello Analysis, Goodbye Worry"

WATER ANALYSIS LABORATORY 802 HAMLET HIGHWAY BENNETTSVILLE SOUTH CAROLINA

BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
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December 4, 1971

Report To: Layne-Atlantic Co.

Norfolk, Va.

Date Analyzed: 12/4/71

Sample Number: Camp Lejuene, #9

125'-160', Sample #1

Analysis Results--Parts Per Million

Determination		Determination	
рН	7.1	Carbon Dioxide (CO ₂)	25
Iron (Fe)	0.1	Total Acidity (CaCO ₃)	36
Nitrate (NO ₃)	0	Calcium Hardness (CaCO ₃)	152
Fluoride (F)	0.2	Magnesium Hardness (CaOO3))	20
Manganese (Mn)	0	Carbonate Hardness (CaOO ₂)	172
Total Hardness (CaCO ₃)	172	Noncarbonate Hardness (CaCO3)	0
Chlorides (CI)	7	Alkalinity (Phenolphthalein) (CaCO ₂)	0
Sulfate (SO ₄)	4.3	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)	0.5	Bicarbonate Alkalinity (CaCO ₃)	176
Magnesium (Mg)	4.8	Total Alkalinity (CaCO3)	176
Calcium (Ca)	61	Total Dissolved Solids	208
Carbonate (CO ₃)	0	Specific Conductance (micromhos at 25%)	320
Bicarbonate (HCO3)	215	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed Not Obj	ectionable
		A Company of the Comp	

Water Analysis Laboratory
802 Hamlet Highway

SIGNED:

LAB RETURE US VILLE South Carolina 29512

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

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PUMP RECORD

PUMP No.

71192

For Camp LeJeune,

North Carolina

Date 3/9/72



Norfolk,

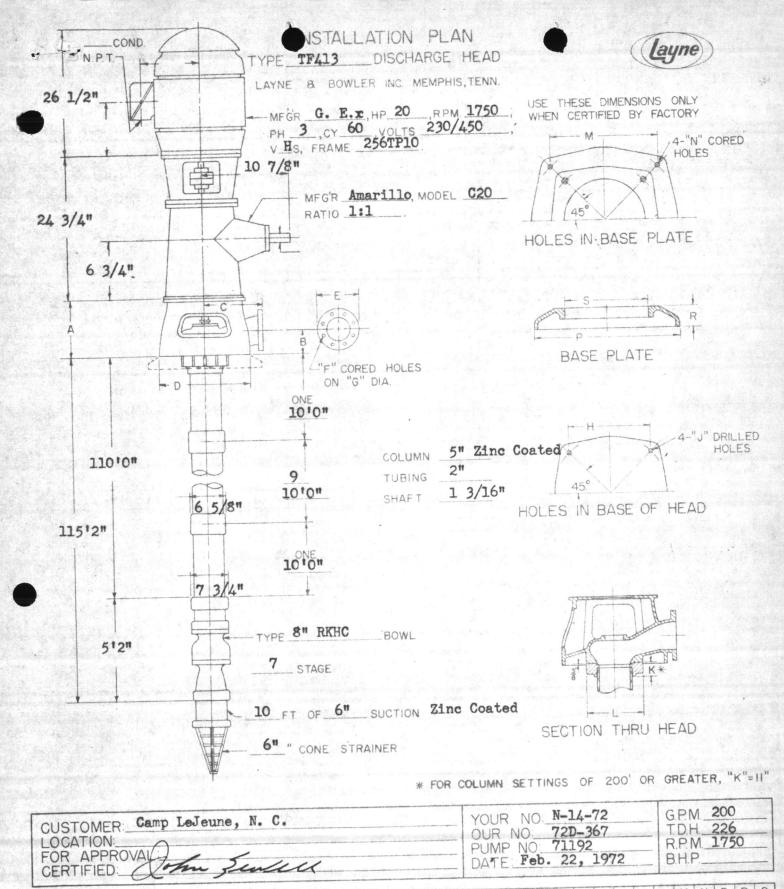
Virginia

Manufactured By:

SINGER

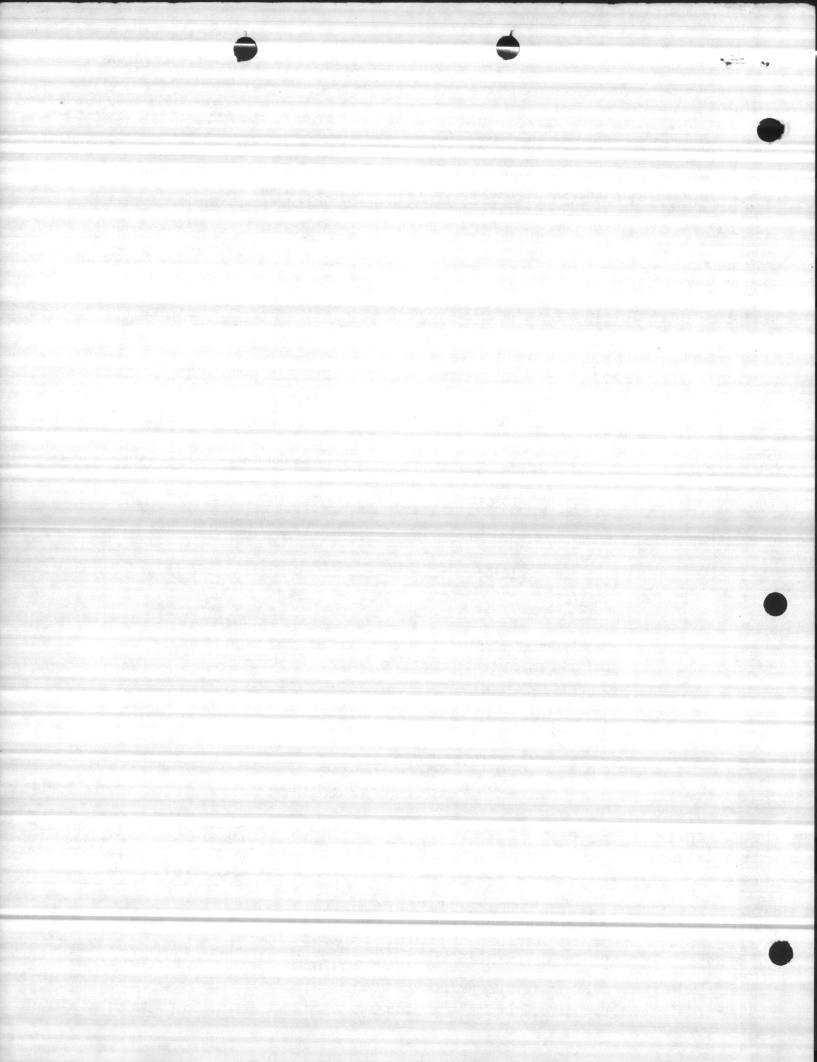
LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A.





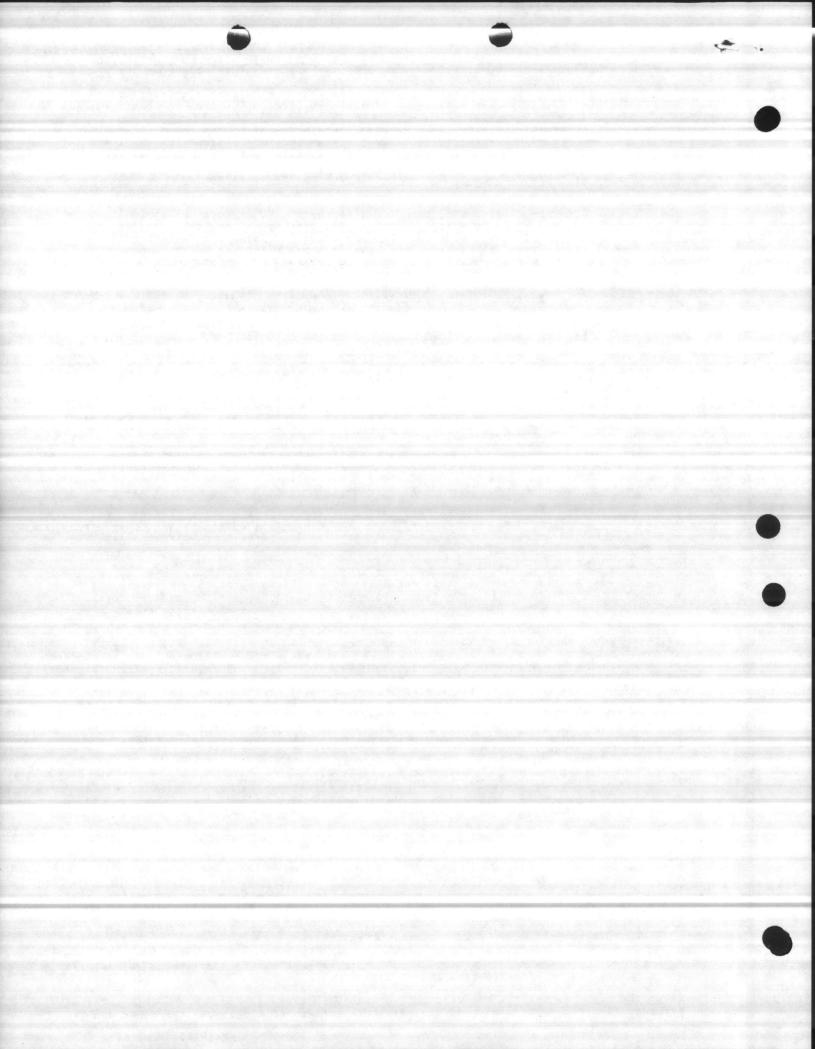
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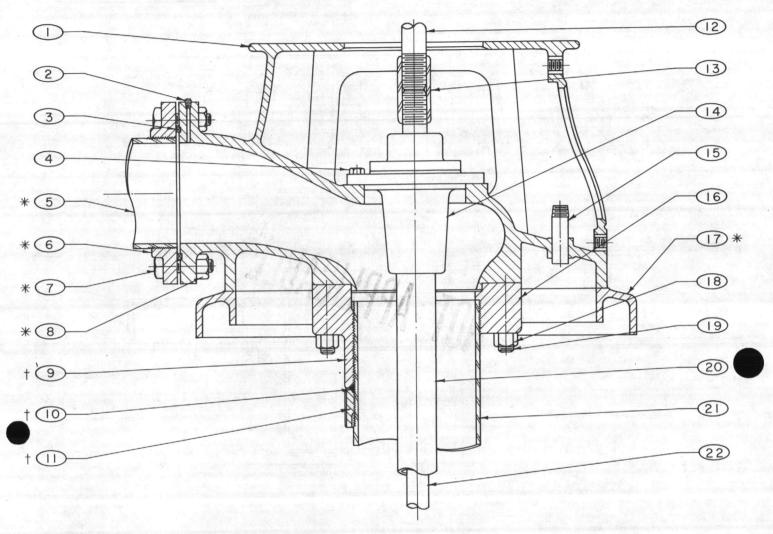
VERTICAL CENTRIFUGAL PUMP-INSTALLATION OF PUMP HEADS WITH STYLE 60 STUFFING BOX BUTT-JOINT TOP COLUMN FLANGE HOLLOW SHAFT-MOTOR DRIVEN DISASSEMBLE AND CLEAN Before installation, the pump head should be disassembled and all parts thoroughly cleaned with kerosene. Remove the stuffing box from the discharge ell. MOUNT DISCHARGE ELL With the style 60 packing box a butt-joint, top-column flange is used. Therefore, no adjustment is necessary. Clean the face of the top flange and the bottom flange of the discharge ell and coat with Layncote. Note condition of top of the projecting tubing and remove with a file any burrs or sharp edges that might cut the O ring when it is installed. Bolt discharge ell and column together. PACKING BOX Clean the tension bearing and stuffing box thoroughly before continuing with installation. Insert the stuffing box first, having the "O" ring in place (a light coat of oil should be given the "O" ring). The tension bearing can now be installed, the threaded portion being coated with Layncote. Slip bearing over shaft and screw into tubing until the bearing flange butts the stuffing box. (This should be a hand tight snug fit). The bearing is now ready to take the tension. TENSION The amount of tension should be based on 1/8" tube travel per 100 ft. of setting, this is put in terms of No. of turns of the tension bearing in the table below: SIZE NUMBER NUMBER OF TURNS PER 100 TUBING THREADS FEET OF SETTING 1/4" 16 1/2" 1/2 12 10 1 1/4 1/2", 8 1/2" 1 OLD STD. 1/2", 3" 3 1/2" 10 1/4 NEW STD 1/4 & UP ALIGNMENT The pump shaft MUST now be in the exact center of the pump head and exactly perpendicular to the machined surface of the discharge ell. This can be checked with a stright edge, square, and pair of calipers. The discharge ell can be shaifted slightly on the concrete foundation or tilted with shims until the shaft is properly aligned. MOTOR MOUNT Lower the hollow shaft motor over the drive shaft, taking care not to disturb the alignment. To insure proper operation of the pump it is necessary that the motor be centered exactly, so great care should be taken in this operation. Bolt motor to discharge ell or motor stand with cap screws. When a hollow shaft motor is used the drive shaft is keyed to a removable motor coupling. Screw on and tighten the drive shaft nut, lifting the shaft until the impellers are drawn against the top of the pump bowl. In this position the shaft cannot be rotated. The nut should then be loosened 1/4 to 1/2 turn or until the shaft turns freely. A gib key is then inserted to prevent the drive shaft nut from working loose. $\frac{\text{GROUT}}{\text{to disturb}} \, \frac{\text{BASE}}{\text{the}} \, \frac{\text{AND}}{\text{alignment}} \, \frac{\text{CONNECT}}{\text{of the pump head.}} \, \frac{\text{Bischarge ell in position, being careful not}}{\text{alignment of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump head.}} \, \frac{\text{Connect of the pump head.}}{\text{Connect of the pump$ ed to a water main, a Dresser Coupling should be used. The main should be placed as nearly as possible in line with the discharge nipple. The Dresser Coupling prevents throwing any strain on the pump head if the discharge nipple and main are not exactly in line. LUBRICATING SYSTEM Connect the hand oil pump, drip feed lubricator or automatic solenoid lubricator to the oil connection in the tension bushing. When first connected allow about one cup full oil to enter the tubing. Then adjust the drip cup or automatic lubricator to allow the following quantity of oil to enter the tubing: For setting up to 50 feet - 5 drops per minute For setting up to 100 feet - 10 drops per minute For setting up to 150 feet - 15 drops per minute For setting up to 200 feet - 20 drops per minute For setting up to 250 feet - 25 drops per minute For setting up to 300 feet - 30 drops per minute When using a force feed oil pump inject about one cup full of oil for each 24 hours of operation. The oil should be of a good grade of mineral oil free from grit or foreign matter, with a viscosity rating of approximately S.A.E. 10 and having a relatively low cold pour point. STARTING PUMP CHECK DIRECTION OF MOTOR ROTATION very carefully before applying power. The pump must operate in a left hand or counter clock-wise direction. Open pet cock located adjacent to packing box to release air from discharge column, and close as soon as water discharges from pet cock. After the pump has been in operation a few hours, shut down and check the adjustment of the pump runners. The pump shaft may have been screwed up tighter by the power applied and thereby shortened.

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HEAD TYPE TF DISCHARGE ENCLOSED LINE SHAFT





* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER + USED FOR SETTINGS GREATER THAN 200 FT.

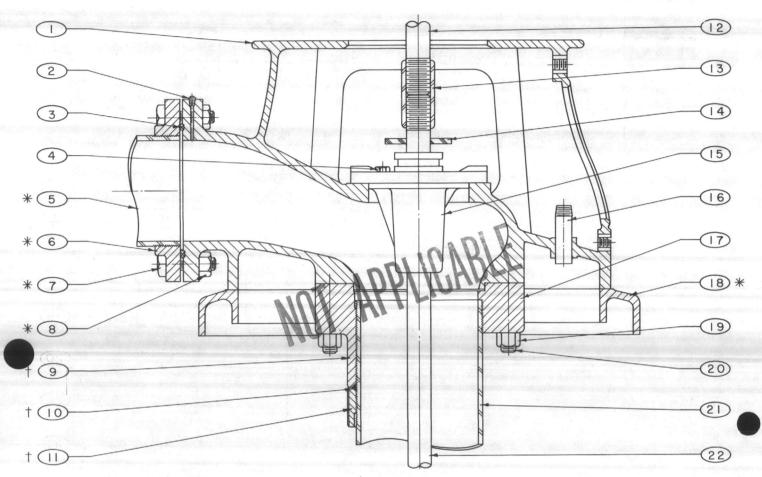
NO.	DESCRIPTION
	DISCHARGE HEAD .
2	PIPE PLUG, PRESSURE GAUGE
3	PACKING, COMPANION FLANGE
4	CAPSCREW (STUFFING BOX)
5	DISCHARGE PIPE
6	COMPANION FLANGE
7	MACHINE BOLT, COMPANION FLG.
8	HEX NUT, COMPANION FLANGE
9	ADJ. TOP COLUMN FLANGE
10	PACKING
I I I was	PACKING RING

NO.	DESCRIPTION
12	MOTOR DRIVE SHAFT
13	HEAD COUPLING
14	STUFFING BOX (ASSEMBLY)
15	PIPE NIPPLE (AUXILIARY OPN'G)
16	TOP COLUMN FLANGE
17	BASE PLATE
18	HEX NUT
19	STUD
20	TUBING
21	TOP COLUMN PIPE
22	LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

TYPE TF DISCHARGE HEAD OPEN LINE SHAFT





*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

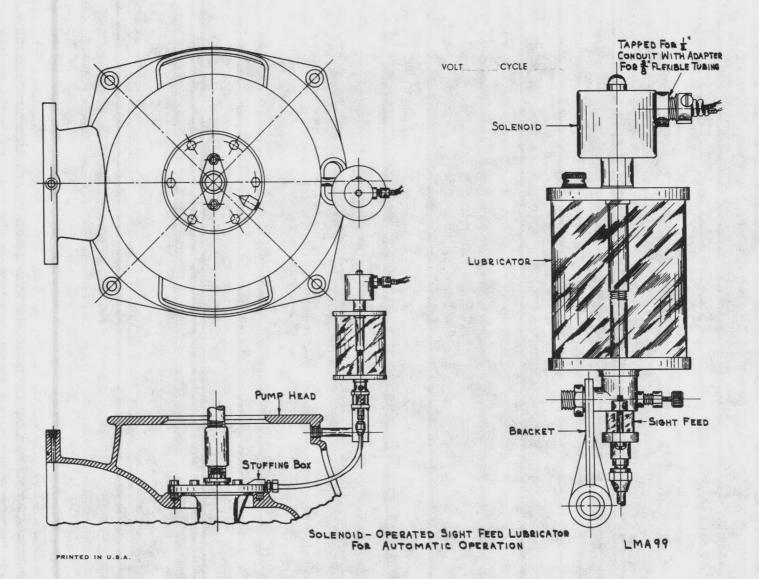
NO.	DESCRIPTION
edie I version version	DISCHARGE HEAD
2	PIPE PLUG, PRESSURE GAUGE
3	PACKING, COMPANION FLANGE
4	CAPSCREW (STUFFING BOX)
5	DISCHARGE PIPE
6	COMPANION FLANGE
7	MACHINE BOLT, COMPANION FLG
8	HEX NUT, COMPANION FLANGE
9	ADJ. TOP COLUMN FLANGE
10	PACKING
11	PACKING RING

† USED FOR SETTINGS GREATER THAN 200 FT.

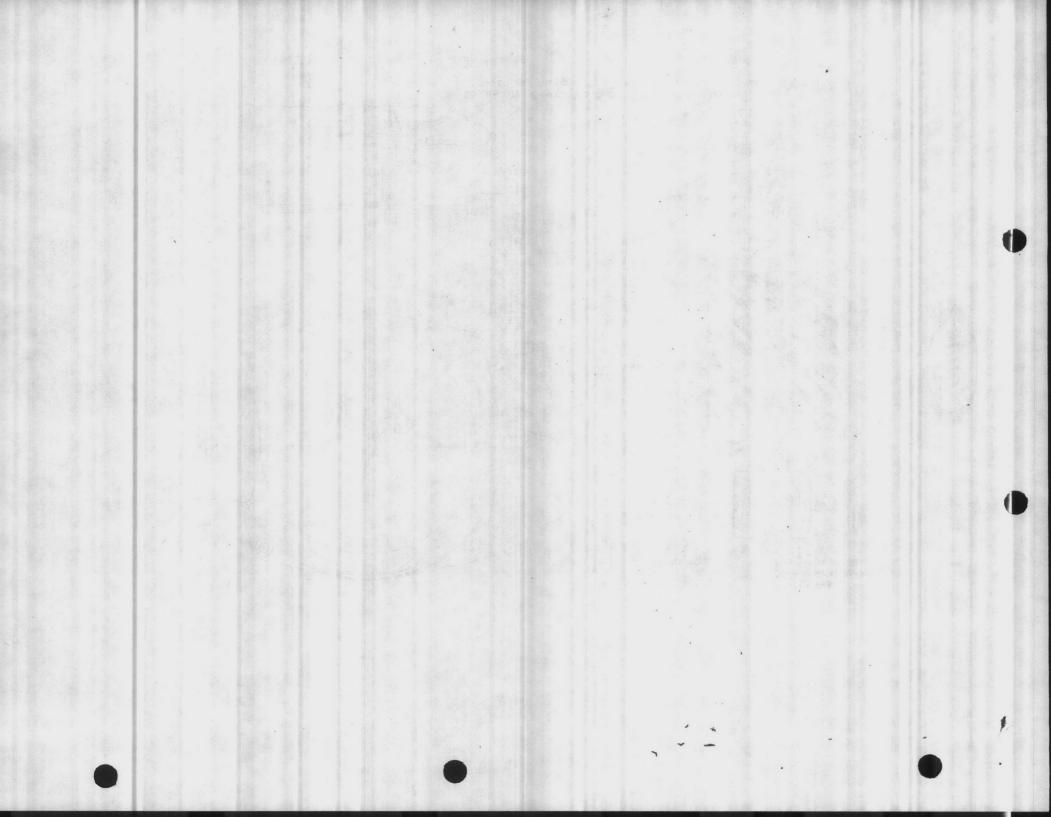
NO.	DESCRIPTION
12	MOTOR DRIVE SHAFT
13	HEAD COUPLING
14	WATER SLINGER
15	STUFFING BOX (ASSEMBLY)
16	PIPE NIPPLE (AUXILIARY OPN'G)
17	TOP COLUMN FLANGE
18	BASE PLATE
19	HEX NUT
20	STUD
21	TOP COLUMN PIPE
22	LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

REVISED-10-1-67 SUPERSEDES ORIGINAL PRICE BOOK ISSUE



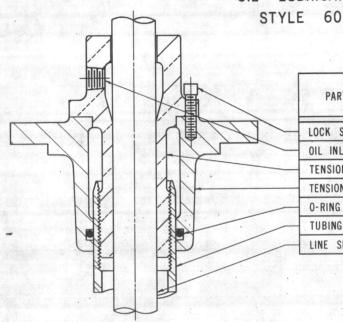






STUFFING BOX ASSEMBLY

OIL LUBRICATION



DADE WANT	MATERIAL					
PART NAME	STANDARD	SPECIAL				
LOCK SCREW	STEEL					
OIL INLET		400				
TENSION BEARING	BRONZE	mer and a graph of				
TENSION BOX	CAST IRON					
O-RING	BUNA-N					
TUBING	C.SSCH. 80 PIPE					
LINE SHAFT	C-1045 CAR. STL.					

IN ORDERING REPLACEMENT PARTS, SPECIFY PARTS DESCRIPTION AND PUMP SERIAL NO.

INSTALLATION AND OPERATING INSTRUCTIONS

- REMOVE THE LOCK SCREW AND THE O-RING AND THOROUGHLY CLEAN THE TENSION BOX INCLUDING THE O-RING GROOVE. REMOVE ANY NICKS OR BURRS FROM THE UPPER AND LOWER MOUNTING FACES AND MALE REGISTER WITH A FINE FLAT FILE. RE-INSTALL AND LIGHTLY OIL THE EXPOSED SURFACE OF THE O-RING.
- ELEAST THE SURFACE OF THE HEAD THAT RECEIVES THE TENSION BOX AND REMOVE ANY NICKS OR BURRS WITH A FINE FLAT FILE.
- CAREFULLY INSTALL THE TENSION BOX, ALIGN THE MOUNTING HOLES WITH THE TAPS IN THE HEAD AND SEAT THE BOX TO THE HEAD. INSTALL AND EVENLY TIGHTEN THE MOUNTING CAPSCREWS.
- 4. CLEAN THE TENSION BEARING THOROUGHLY AND REMOVE ANY NICKS OR BURPS FROM THE MOUNTING FACE AND REGISTER WITH A FINE FLAT FILE. REMOVE ANY NICKS OR BURRS FROM THE THREADS WITH A THREE CORNERED FILE.
- OIL THE THREADS AND THE BORE AND CAREFULLY PLACE THE TENSION BEARING OVER THE SHAFT AND THREAD (RIGHT HAND) INTO THE TUBING. CONTINUE THREADING UNTIL THE LOWER FLANGE FACE FIRMLY CONTACTS THE TENSION BOX FACE.
- FOR THE PROPER AMOUNT OF TUBE TENSION, REFER TO INSTRUCTIONS PBI 100
 PAGE 1 OR 2. FOR SETTINGS LESS THAN 100 FEET, TIGHTEN TO THE NEAREST
 LOCKING POSITION.

CHART 1 BELOW GIVES THE AMOUNT OF PULL-UP FOR EACH COMPLETE TURN. OF THE TENSION BEARING.

CHART 1

SIZE TUBING	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4." & UP
NO. THD'S/IN	16	12	10	10		8	10
"A"	.063"	.083"	.100"	.100"		.125"	.100"

"A" = AMOUNT OF PULL-UP FOR EACH COMPLETE TURN OF THE TENSION BEARING.
THE TOTAL NUMBER OF TURNS REQUIRED CAN BE CALCULATED BY DIVIDING THE
FIGURE ABOVE INTO THE TENSION FIGURE FROM PBI 100.

EXAMPLE: 500 FEET OF 10" (.279" WALL) \times 1 11/16" \times 2 1/2": FROM PBI 100, THE PROPER TENSION OR PULL-UP IS FOUND TO BE 0.529" AND FROM CHART 1, THE PULL-UP PER COMPLETE TURN IS 0.100" FOR 2 1/2" 10 THD. TUBING.

TOTAL NO. OF TURNS = $\frac{0.529}{0.100}$ = 5.29 OR APPROXIMATELY 5 1/4.

IF AFTER ADJUSTING THE TENSION BEARING THE PROPER NUMBER OF TURNS, NO SLOT ALIGNS WITH THE LOCK SCREW TAP IN THE BOX, IT IS RECOMMENDED THAT THE BEARING BE BACKED OFF TO THE NEAREST ALIGNMENT POSITION IE IT TAKES MORE THAN AN EIGHTH TURN FORWARD TO ACHIEVE ALIGNMENT.

- 7. INSTALL AND TIGHTEN THE LOCK SCREW.
- 8. CONNECT THE LUBRICATOR TO THE OIL CONNECTION IN THE TENSION BEARING.

FILL THE LUBRICATOR WITH A GOOD GRADE MINERAL OIL HAVING A VISCOSITY RATING OF APPROXIMATELY S.A.E. 10 AND HAVING A RELATIVELY LOW COLD POUR POINT.

CONTINUED ON PAGE 2



STYLE 60 INSTALLATION AND OPERATING INSTRUCTIONS

(CONTINUED)

IMPORTANT:

PRIOR TO INITIAL START-UP AND AFTER A SHUT DOWN OF 150 HOURS OR LONGER, THE LUBRICATOR SHOULD BE ADJUSTED FOR THE RECOMMENDED NUMBER OF DROPS PER MINUTE AS OUTLINED IN CHART 2 AND ALLOWED TO OPERATE AT THIS RATE FOR 20 MINUTES FOR EACH 100 FEET OF SETTING.

FOR NORMAL OPERATION, THE LUBRICATOR SHOULD BE ADJUSTED IN ACCORDANCE WITH CHART 2.

CHART 2

SHAFT SIZE	"A" LUBRICATOR SETTING IN DROPS PER MIN.	"B" DROPS PER MIN.PER EACH 100 FT, SETTING
7/8 - 1 3/16	5	2
1 1/2 - 1 11/16	7	3
1 15/16 - 2 7/16	10	4
2 11/16	12	5

TOTAL DROPS/MIN. = "A" + $(\frac{\text{SETTING}}{100} \times \text{"B"})$

EXAMPLE: 500 FEET OF 1 11/16" x 2 1/2"

TOTAL DROPS/MIN. = $7 \times (\frac{500}{100} \times 3) = 7 + (5 \times 3) = 7 + 15 = 22$

9. THE LUBRICATOR SHOULD BE CHECKED PERIODICALLY AND RESET IF REQUIRED TO MAINTAIN THE PROPER FLOW.

THE APPROXIMATE NUMBER OF HOURS OF CONTINUOUS OPERATION AT VARIOUS FLOW RATES CAN BE FOUND IN CHART 3. IT IS GENERACLY RECOMMENDED THAT THE LUBRICATION BE RE-FILLED WHEN IT IS NO LESS THAN ONE QUARTER FULL.

CHART 3

	NUMBER OF HOURS	OF CONTINUOUS OPE	RATION
FLOW RATE		LUBRICATOR CAPACIT	Υ
DROPS/MIN.	1 QUART	2 QUART	3 QUART
5	110	220	440
10	55	110	220
15	38	75	150
20	28	55	110
25	22	.45	90
30	19	38	75
40	14	28	55
50	11	22	45



TUBE TENSION ADJUSTMENT CHART

COLUMN	SHAFT AND		TUBE TENSION IN INCHES									
SIZE	TUBING SIZE					T	IN FEET	_	10000			
78 865	1.10 10	100	200	300	400	500	600	700	800	900	100	
3" MC*	1 1/4 x 7/8	0.025	0.103	0,233	0,415	0.649						
(.187)	1 1/2 x 1	0.028	0.115	0.261	0.465	0.726						
	1 1/4 x 7/8	0,020	0.083	0.186	0.333	0.520	0.750	1.021	1.334	1.688	2.08	
(.237)	1 1/2 x 1	0.022	0.090	0.202	0,361	0.564	0.813	1.107	1.447	1.831	2.26	
SCH. 40S	2 x 1 3/16	0.025	0.103	0.233	0.416	0,650	0.936	1.275	1.666	2.108	2.60	
5" *	1 1/4 x 7/8	0.018	0.075	0.171	0.305	0,476	0.686	0.934	1.220	1.544	1.90	
(.258)	1 1/2 x 1	0.020	0.081	0.182	0.325	0.508	0.733	0.998	1.303	1.650	2.03	
SCH. 40S	2 x 1 3/16	0.022	0.091	0.205	0.366	0.571	0.824	1.121	1.465	1.854	2.28	
	1 1/4 x 7/8	0.017	0.071	0.160	0.286	0.447	0.644	0.878	1.146	1.451	1.79	
6" *	1 1/2 x 1	0.018	0.075	0.169	0.302	0.472	0,681	0.927	1.211	1.532	1.89	
(.280)	2 x 1 3/16	0.020	0.083	0.187	0.333	0.521	0.751	1.022	1.335	1.690	2.08	
SCH 40S	2 1/2 x 1 1/2	0.024	0.098	0.220	0.393	0.613	0.884	1.204	1.572	1.990	2.45	
	2 1/2 x 1 11/16	0.025	0.102	0.231	0.412	0.643	0.927	1.263	1.649	2.088	2.577	
	3 x 1 15/16	0.029	0.119	0.269	0.480	0.750	1.080	1.471	1.922	2.432	3.003	
	1 1/2 x 1	0.017	0.071	0.161	0.287	0.449	0.647	0.881	1.151	1.457	1.798	
	2 x 1 3/16	0.019	0.077	0.175	0.313	0.488	0.704	0.958	1.252	1.584	1.956	
7" *	2 1/2 x 1 1/2	0.022	0.089	0.202	0.360	0.563	0.811	1.105	1.443	1.827	2.255	
(.300)	2 1/2 x 1 11/16	0.023	0.093	0.211	0.376	0.587	0.846	1.153	1.506	1.906	2.353	
	3 x 1 15/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.726	2.184	2.696	
	3 1/2 x 2 3/16	0.030	0.121	0.272	0.485	0.757	1.092	1.486	1.941	2.457	3.034	
	3 1/2 x 2 7/16	0.031	0.127	0.287	0.512	0.800	1.153	1.570	2.050	2.595	3.204	
	2 x 1 3/16	0.019	0.076	0.173	0.308	0.481	0.694	0.945	1.234	1.562	1.928	
8" *	2 1/2 x 1 1/2	0.022	0.088	0.198	0.354	0.552	. 0:796	1.084	1.416	1.793	2.213	
(.277)	2 1/2 x 1 11/16	0.022	0.091	0.206	0.368	0.575	0.829	1.129	1.475	1.867	2.306	
SCH 30	3 x 1 15/16	0.026	0.105	0.236	0.421	0.657	0.947	1.290	1.634	2.132	2.632	
	3 1/2 x 2 3/16	0.029	0.117	0.265	0.472	0.737	1.062	1.447	1.890	2.392	2.953	
	3 1/2 x 2 7/16	0.031	0.124	0.279	0.498	0.778	1.121	1.526	1.993	2.522	3.114	
	2 x 1 3/16	0.018	0.074	0.166	0.297	0.464	0.668	0.910	1.189	1.505	1.858	
8"	2 1/2 x 1 1/2	0.020	0.083	0.188	0.336	0.525	0.757	1.031	1.347	1.704	2.104	
(.322)	2 1/2 x 1 11/16	0.021	0.087	0.196	0.349	0.545	0.786	1.070	1.398	1.769	2.184	
SCH. 40S	3 x 1 15/16	0.024	0.098	0.221	0.394	0.616	0.887	1.208	1.579	1.998	2.467	
	3 1/2 x 2 3/16	0.027	0.109	0.246	0.439	0.685	0.987	1.344	1.756	2.223	2.744	
	3 1/2 x 2 7/16	0.028	0.115	0.259	0.461	0.720	1.038	1.413	1.846	2.336	2.884	
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.455	0.655	0.892	1.166	1.476	1.822	
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.511	0.737	1.003	1.311	1.659	2.048	
9" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.339	0.530	0.763	1.040	1.358	1.719	2.122	
(.312)	3 x 1 15/16	0.023	0.095	0.213	0.381	0.595	0.857	1.167	1.524	1.929	2.382	
	3 1/2 x 2 3/16	0.026	0.105	0.236	0.422	0.658	0.949	1.292	1.688	2.136	2.637	
	3 1/2 x 2 7/16	0.027	0.110	0.248	0.442	0.690	0.995	1.355	1.770	2.240	2.766	
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.454	0.655	0.891	1.164	1.474	1.819	
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.510	0.736	1.002	1.309	1.656	2.045	
10" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.338	0,529	0.762	1.038	1.355	1.716	2.118	
(,279)	3 x 1 15/16	0.023	0.094	0.213	0.380	0.593	0.855	1.164	1.521	1.925	2.377	
	3 1/2 x 2 3/16	0.026	0.104	0.236	0.420	0.657	0.946	1.289	1,683	2.131	2,630	
3.0	3 1/2 x 2 7/16	0.027	0.110	0.247	0.441	0.689	0.992	1.351	1.765	2.234	2.758	
	4 x 2 11/16	0.030	0.122	0.276	0.492	0.769	1.108	1.509	1.971	2.494	3.079	
	2 x 1 3/16	0.017	0.071	0.159	0.285	0.445	0,641	0.873	1.141	1.444	1.783	
	2 1/2 x 1 1/2	0.019	0.079	0.178	0.318	0.496	0.715	0.974	1.272	1.610	1.988	
10"	2 1/2 x 1 11/16	0.020	0.081	0.184	0.328	0,513	0.739	1.007	1.315	1.664	2.055	
(.307)	3 x 1 15/16	0.022	0.091	0.205	0.366	0.572	0.824	1.122	1.466	1.855	2,290	
SCH. 30	3 1/2 x 2 3/16	0.025	0.100	0.226	0.403	0,629	0.907	1.235	1.614	2.042	2,521	
	3 1/2 x 2 7/16	0.026	0.105	0.236	0.422	0.659	0.949	1.292	1.688	2.137	2,638	
	4 x 2 11/16	0.029	0.116	0.263	0,469	0,732	1.055	1.436	1.876	2.374	2,931	

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD



TUBE TENSION ADJUSTMENT CHART

COLUMN	SHAFT AND		cielici des		TUB	ETENSION	IN INCHES			CONTINUES.	
and the second second				franchist.		SETTING II	N FEET		-		
SIZE	TUBING SIZE	100	200	300	400	500	600	700	800	900	1000
	2 x 1 3/16	0.017	0,068	0.154	0.276	0.430	0.620	0.845	1.104	1.397	1.725
	2 1/2 x 1 1/2	0.018	0.075	0.170	0.303	0.474	0.683	0.930	1.215	1.538	1.899
10"	2 1/2 x 1 11/16	0.019	0.077	0,175	0.312	0.488	0.703	0.958	1.251	1.583	1.955
(,365)	3 x 1 15/16	0,021	0.085	0.193	0.344	0.538	0.775	1.055	1.378	1.745	2.154
405	3 1/2 x 2 3/16	0,023	0.093	0.210	0.376	0.586	0.845	1.151	1.504	1.903	2.349
	3 1/2 x 2 7/16	0.024	0.097	0.219	0.391	0.611	0.881	1.199	1.567	1.983	2.448
	4 x 2 11/16	0.026	0.107	0.242	0.431	0,673	0.970	1.321	1.725	2.183	2.695
	2 1/2 x 1 1/2	0.018	0.074	0,166	0,297	0.464	0,670	0.912	1.191	1.508	1.861
12" *	2 1/2 x 1 11/16	0.019	0.076	0.171	0.306	0,477	0.688	0.937	1.225	1.550	1.913
(.330)	3 x 1 15/16	0.020	0.083	0.188	0,335	0.524	0.755	1.028	1.342	1.699	2.098
SCH. 30	3 1/2 x 2 3/16	0.022	0,090	0.204	0.364	0.569	0.820	1.116	1.458	1.846	2.278
	3 1/2 x 2 7/16	0,023	0.094	0.212	0.379	0.592	0.853	1.161	1.517	1.919	2,370
	4 x 2 11/16	0.025	0.103	0.233	0.415	0.649	0.935	1.273	1.663	2.105	2.599
100000000	2 1/2 x 1 1/2	0.018	0.072	0.162	0.289	0.451	0.650	0.886	1.157	1.464	1.808
12"	2 1/2 x 1 11/16	0.018	0.073	0.166	0.296	0.463	0.667	0.908	1.187	1.502	1.854
(.375)	3 x 1 15/16	0.020	0.080	0.181	0.322	0.503	0.726	0.988	1.291	1.634	2.017
"Z"	3 1/2 x 2 3/16	0.021	0.086	0.195	0.348	0,543	0.783	1.066	1.393	1.763	2.177
	3 1/2 x 2 7/16	0.022	0.090	0,202	0.361	0.563	0,812	1.106	1.444	1.828	2.257
	4 x 2 11/16	0.024	0.098	0.220	0.393	0.614	0.885	1.205	1.574	1.992	2.459
	2 1/2 x 1 1/2	0.017	0.070	0.158	0.283	0.442	0.637	0.868	1.133	1.435	1.771
14" .	2 1/2 x 1 11/16	0.018	0.072	0.162	0,290	0.452	0.652	0.888	1.160	1.468	813
(.375)	3 x 1 15/16	0.019	0.078	0.175	0.313	0.489	0.705	0.961	1.255	1.588	1.961
SCH. 30S	3 1/2 x 2 3/16	0.021	0.084	0.189	0.337	0.526	0.758	1.032	1.348	1.706	2.106
	3 1/2 x 2 7/16	0.021	0.086	0.195	0.348	0.544	0.784	1.067	1.394	1.765	2.179
	4 x 2 11/16	0.023	0.094	0.212	0.378	0.590	0.850	1.157	1.512	1.914	2.362
16" "	3 x 1 15/16	0.018	0.075	0.169	0.302	0.472					
(.375)	3 1/2 x 2 3/16	0.020	0.080	0.180	0.322	0.503					
SCH. 30S	3 1/2 x 2 7/16	0.020	0.082	0.186	0.332	0.519					
	4 x 2 11/16	0.022	0.089	0.201	0.358	0,559	Navi e sendon		Salman Coverage	Birth March	Contract of the Contract

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD.



VERTICAL CENTRIFUGAL PUMP

Installation of Pump Bowls and Golumn

Butt Joint Column

Enclosed Line Shaft

Derrick Installation of a Layne Pump requires a derrick 30 to 40 feet in height and a hand winch or power hoist of sufficient size to handle the total weight.

Foundation The concrete foundation for the pump base should be built in accordance with foundation plans furnished by the factory. Where a separate pump base plate is used it should be set in position in the concrete foundation before the pump bowls and column are installed but not grouted into position until the installation is completed.

of Well

Dimensions Check the inside diameter of the well and the outside diameter of the pump bowls and column flanges or couplings to be sure that the pump and column will go in the well with

ample clearance. The well casing must be straight and without obstructions that might bend the line shaft. Measure the static level of the water in the well to determine if the pump has been furnished with the proper depth of setting. The pump bowls should be submerged when the pump is operating and we do not recommend or guarantee satisfactory operation with a suction lift.

Check Material

Check all parts of the pump against the packing list to find out whether all parts have been received. If any parts are missing claim should be made at once to the railroad company.

Joints

Clean All All threads and flanged couplings of the discharge pipe and protective tubing should be carefully cleaned and at the time of installation coated with LAYNCOTE. Care should be

taken that there be absolutely no sand or grit between flanges or couplings when making up the joints.

If a basket suction is used it should be lowered into the well first and held by pipe clamps. The suction pipe is picked up and screwed into the coupling at top of basket suction. The basket suction and suction pipe are then lowered into the well until about 18 inches of suction pipe extend above the well casing. The suction pipe is clamped in this position with pipe clamps. When the suction pipe has only threads at the top end care should be taken to place the clamps under the small lug welded on the pipe.

Pump Bowls The pump bowls should be carefully inspected before placing in the well. Rotate impeller shaft several times by hand to be sure that it does not bind at any point. The impeller shaft should have about 14-inch or more end play. DO NOT STRAIN SHAFT IN ANY WAY THAT MIGHT BEND IT AND DO NOT LIFT PUMP BOWLS BY THE SHAFT. The pump bowls can best be handled by a pair of pipe clamps. The bowls should be lifted into position and screwed or bolted to the suction pipe. The clamps on the suction pipe are then removed and the bowls and suction pipe lowered into the well until the top of the discharge nozzle is about 18 inches above the well casing or top of foundation. The bowls are then supported at this point by pipe clamps.

Discharge

Check the enclosed chart to determine the correct spacing of the spiders in the dis-Column Pipe charge column. If the discharge pipe screws into the pump bowl be sure to have the cou-

pling at the top end of the first section either with the spider or without the spider as shown on the chart. If the lower section of discharge pipe has a special flange to connect to the pump bowls be sure to arrange the pipe with this flange at the lower end.

Tubing and Shaft

Protective The shaft and protective tubing are shipped assembled in 20-ft. or 10-ft. lengths and packed with sufficient lubricant to prevent rusting. A 20-it. length or 10-ft. length of shaft and tubing is required for each 20-ft. or 10-ft. length of pipe.

Remove the protecting cap only from the top end of the tubing, which is the end fitted with the bronze shaft bearing and tubing coupling. Slide the assembled tubing and shafting into the discharge column pipe, making sure that the bronze bearing end of the assembly will be on top.

Installing Dis-

Pull the tubing about six inches below the lower end of the discharge pipe and tie charge Column them together in this position with a piece of rope by taking several half

hitches around the pipe and then the tubing.

Raise the assembled section of pipe, tubing and shafting until it is hanging vertically in the derrick with the lower end of the tubing about one inch above a board placed on the foundation. Remove the lower plug from the tubing to release the shaft. Raise the discharge pipe about six inches and take several half hitches around the shaft. This method avoids straining the shaft as the column is swung under the derrick. Swing the discharge pipe into position over the pump bowls and screw the shaft into the shaft coupling until it butts aginst the impeller shaft.

THE THREADS AND THE ENDS OF THE SHAFTING AND THE SHAFT COUPLINGS MUST BE PERFECTLY CLEAN.

Lower the discharge pipe and tubing and screw the tubing onto the main bearing box about 3 or 4 threads Then coat the threads on the bronze box with L A Y N C O T E and screw the tubing on the box until it butts. The discharge pipe is then bolted or screwed to the pump bowls.

Remove the clamps from the pump bowls and lower the pump bowls with the section of discharge column until the column extends about 18 inches above the well casing or foundation. Clamp the discharge column in this position.

Remove the bronze shaft bearing and tubing coupling and pour about one pint of oil into the tubing. The oil used should be a good grade of mineral oil free from grit and foreign matter, with a viscosity rating approximately SAE 10 and having a relatively low cold pour point.

When the next section of discharge column is in position in the derrick replace the bronze bearing, screwing it into the tubing about 3 or 4 threads. After the spider and spider bushing or aligning ring have been installed (as described below) and the shaft connection is made, lower the discharge pipe and tubing and screw the tubing onto the bronze bearing about 3 or 4 threads. Then coat the threads of the bearing with LAYNCOTE and screw the tubing on the hearing until the ends butt tightly together. IT IS VERY IMPORTANT THAT EVERY TUBING JOINT BE TIGHT AND to form a seal the ends of the tubing must be smooth and square. While handling and installing the tubing use care to keep from scoring or damaging the ends in any way.

When flanged column is used, slip a bronze spider or aligning ring over the top of the tubing and fit it into the recess in the flange. (Refer to spider spacing chart to determine whether a flange or aligning ring should be used at the joint in question). When screw coupled column is used the spider is cast integral with the coupling. The rubber spider bushings are installed in the spiders before shipment from the factory.

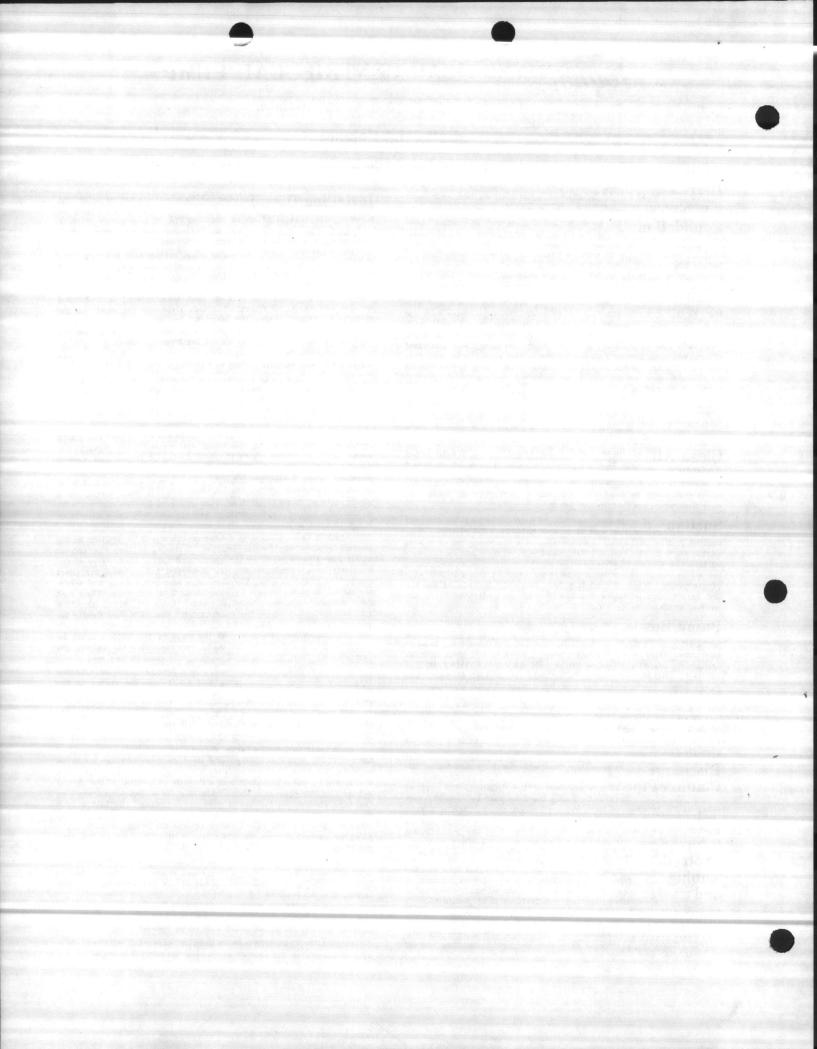
Each section of discharge column is installed as described above. When screw couplings are used care should be taken in starting the pipe in the coupling. The pipe should start by hand and screw by hand to within 5 or 6 threads of butting. If the thread appears tighter than this check carefully for a damaged thread as the pipe should not be forced into the coupling. The last 5 or 6 threads should be made up with a chain tong, making sure that the joint is tight with the pipe butting against the shoulder in the coupling or against the end of the pipe in the coupling as the case might be.

When the hue shaft connects to the motor drive shaft below the tension assembly, the motor drive shaft should be attached to the line shaft in the top section of tubing before the top length of discharge column is installed.

The top length of discharge pipe will usually have a special flange or special threads to connect to the bottom of the discharge ell and the top length of shaft will be of special length.

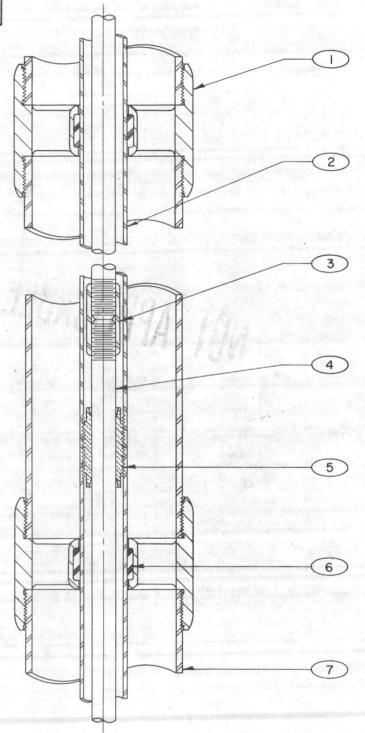
in case the discharge column does not check out within reasonable limits notify the factory to furnish the correct lengths.

PRINTED IN U.S.A



SINGER LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A.

DISCHARGE COLUMN ASSEMBLY SCREWED TYPE - ENCLOSED LINE SHAFT



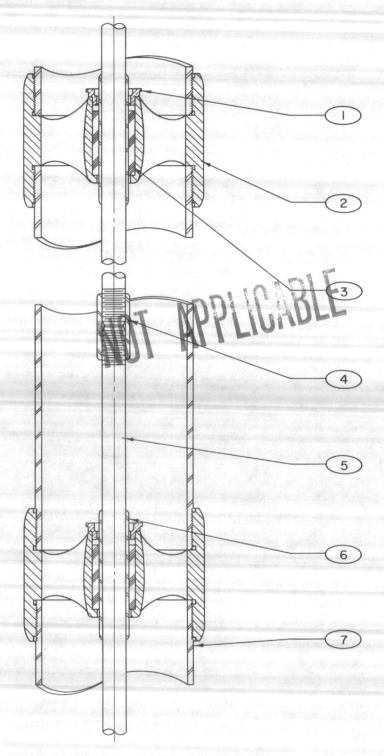
NO.	DESCRIPTION
	COMBINATION COUPLING
2	SHAFT TUBING
3	SHAFT COUPLING
4	LINE SHAFT

NO.	DESCRIPTION
5	SHAFT BOX
6	RUBBER BEARING
7	COLUMN PIPE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.



DISCHARGE COLUMN ASSEMBLY SCREWED COUPLED - OPEN LINE SHAFT



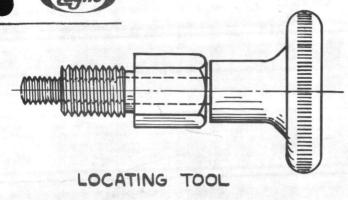
ITEM NO.	DESCRIPTION
1	LOCK RING
2	COMBINATION COUPLING
3	RUBBER BEARING
4	SHAFT COUPLING

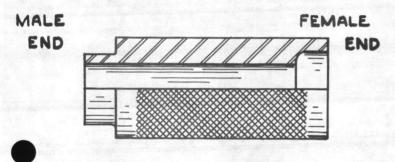
NO.	DESCRIPTION
5	LINE SHAFT
6	MONEL SLEEVE
7	COLUMN PIPE

SINGER LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A.

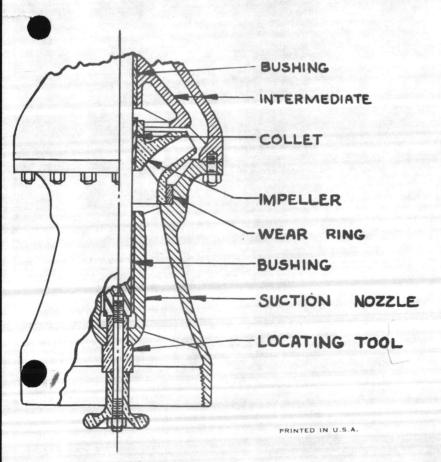
INSTRUCTIONS FOR ASSEMBLYING







COLLET DRIVER

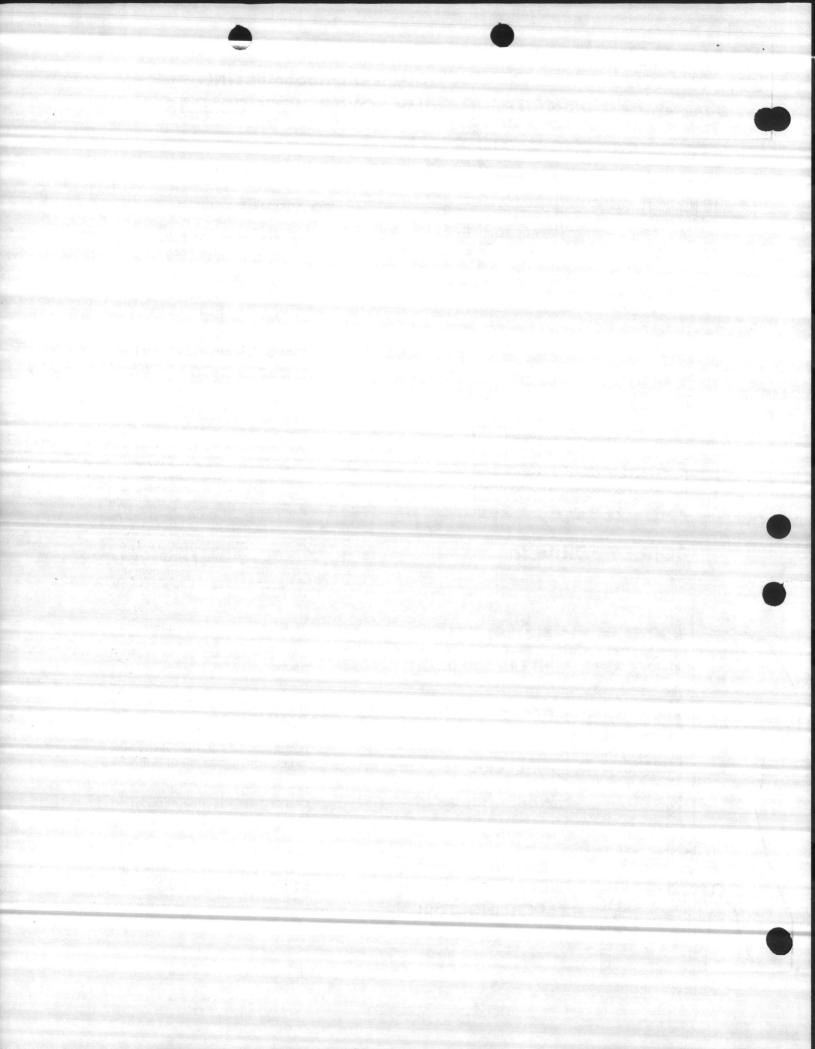


TO ASSEMBLE BOWL

- Remove cap screw from the bottom of the suction nozzle.
- Screw locating tool into bottom end of suction nozzle hub.
- Insert impeller shaft into suction nozzle bearing and turn handwheel of locating tool until impeller shaft is pulled down tight against the shoulder of the tool.
- 4. Place the impeller over the shaft. Slip the collet over the shaft with the small end first. (A screw driver can be used to spread collet for ease in slipping over shaft). Hold the impeller firmly into the wear ring recess and drive the collet into place with the male end of the collet driver.
- 5. Remove collet driver and assemble first intermediate stage. Place the next impeller over the shaft and continue to assemble as explained above.
- When the bowl is completely assembled remove locating tool and replace cap screw in suction nozzle.

TO DISMANTLE BOWL

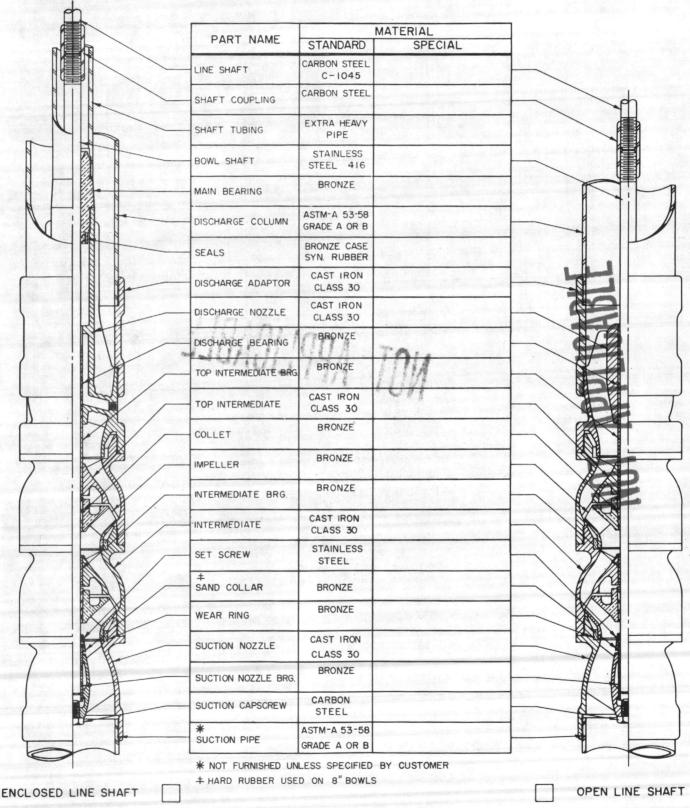
- Remove discharge nozzle. Place collet driver over shaft with the female end first and while holding the impeller out of the wear ring recess, drive the impeller off of the collet. Remove the collet and impeller.
- Remove the intermediate shell and drive the impeller off of the next collet. Continue to dismantle in like manner.





VERTICAL TURBINE PUMP

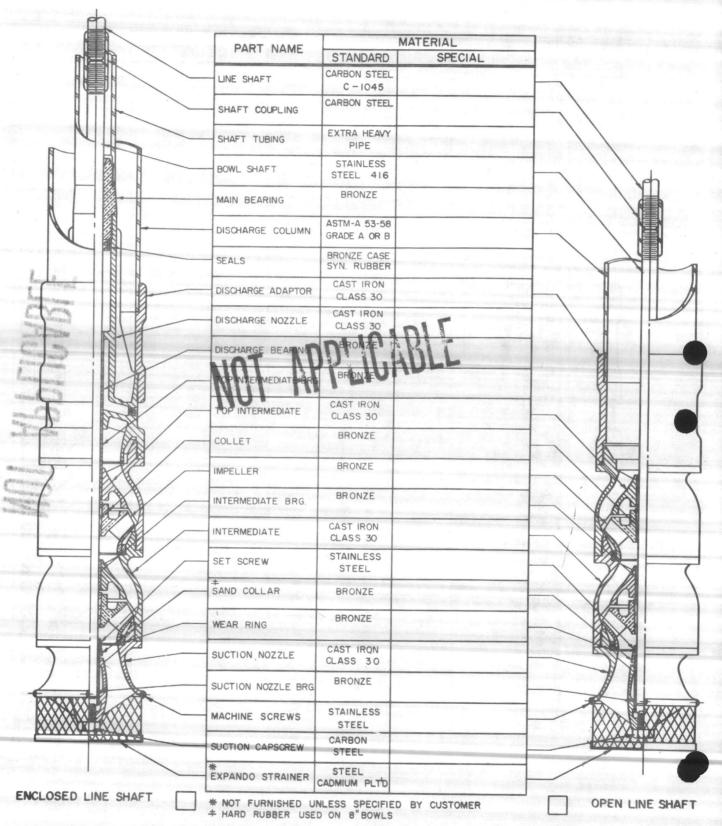
8"B, DR, PR, RK, T, UR - 10" RK, T, U - 12" T, UR



VERTICAL TURBINE PUMP SHORT COUPLED

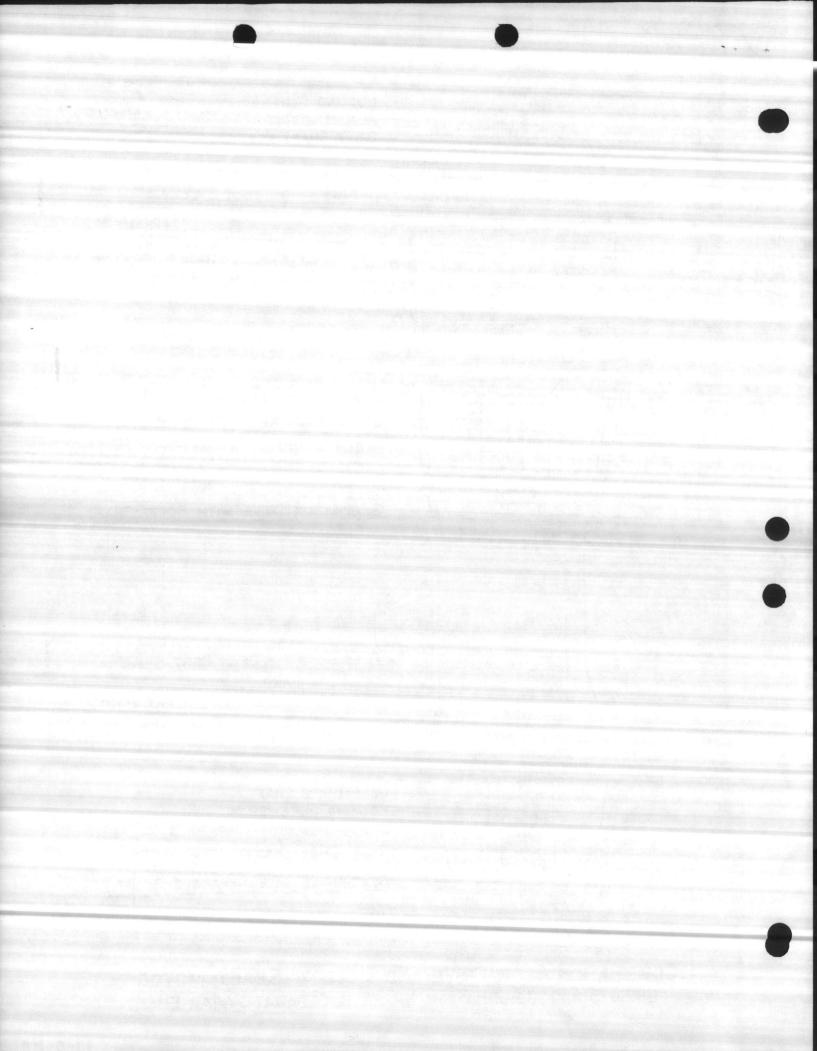
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

8" B, DR, PR, RK, T, UR-10" RK, T, U-12" T, UR



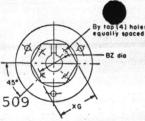
LOCKING SCREWS ADJUSTING NUT DRIVE SHAFT KEY
MAKEFRAME NO
COMBINATION DRIVE SHAFT ORIVE SHAFT KEY MOTOR STAND COMBINATION DRIVE WITH SOLID SHAFT
GEAR DRIVE MAKE TYPEFRAME NO
GEAR DRIVE SHAFT LOCKING SCREWS ADJUSTING NUT DRIVE SHAFT KEY GEAR DRIVE WITH SEPARATE SHAFT

COMBINATION GEAR DRIVE AND HOLLOW SHAFT MOTOR
USING SOLID COMBINATION SHAFT & SEPARATE GEAR SHAFT



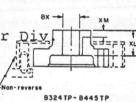
COUPLING DIMENSIONS

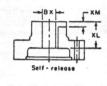
5 - Singer Layne Atlantic Box 7095 Norfolk, Va. 2350



FRAMES 254TP - 286TP UPPER BRG - MRC 210SFF or Equiv. LOWER BRG-MRC 7310P or Equiv.

5 - Singer Layne & Bowler Div Box-8097 Memphis, Tenn 38108 Non-reverse





L	1	T	4	,	
_	Jį.	1	L		
			_	=	-
	reve	reverse	- Teverse	- Teverse	

8324TP- 8445TP					213TP-8286TP						
			DIMENSI	ONS OF COL	PLINGS IN IN	CHES				alam Ali	
	Cat	. No.	BX	Bore			1	Total Control	(+)	KEY	WAY
Frame No.	Self-release or Bolted	Nonreverse	Nominal	Actual	BY	BZ	XG	XL	XM	Width	Dept
213TP 215TP B254TP	148X420G7 148X420G8 148X420G6	148X421G2 148X421G3 148X421G1	3/4 7/4	0.751 .876 1.001	10-32 10-32 10-32	1 3/a 1 3/a 1 3/a	2 ¼ 2 ¼ 2 ¼ 2 ¼	1 3/16 1 3/16 1 3/16	7/16 7/16	3/16 1/4 1/4	3/32 1/8 1/8
25ATP 256TP	148 (250G) 6 148 (250G) 7 148 (250G) 17 148 (250G) 14	148X251G3 148X251G5 148X251G1	3/4 1/6	.751 876 1.001	10-32 10-32 10-32	1 3/6 1 3/6 1 3/6	2 1/4 2 1/4 2 1/4	1 1/2	11/32 7/16	3/16 1/4	3/32 1/6
B286TP	148X250G14 148X250G16 148X250G29	148X251G4 148X251G7	11/4	1.188 1.251 1.251	1/4-20 1/4-20 1/4-20	1 3/4 1 3/4 1 3/4	2 ¼ 2 ¼ 2 ¼	11/2	7/16 9/16	1/4 1/4 3/6	1/a 1/a 3/10
B324TP B326TP	148X399G3 148X399G2 148X399G6 148X399G5 148X399G7 148X399G1	148X400G1 Use with Self- release Coupling	1 1 3/16 1 1/4 1 1/4 1 7/16 1 1/2	1.001 1.188 1.251 1.251 1.438 1.501	10-32 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20	1 3/4 1 3/4 1 3/4 1 3/4 2 1/8 2 1/8	2 5/4 2 5/4 2 5/4 2 5/6 2 5/6 2 5/6	1 13/16 1 13/16 1 13/16 1 13/16 1 13/16	7/16 7/16 7/16 9/16 9/16	1/4 1/4 1/4 1/6 1/6 1/6	% % % % 3/14
B364TP 8365TP	148X403G5 148X403G6 148X403G9 148X403G2 148X403G10 148X403G4 148X403G8 148X403G1	148X404G1 Use with Self- release Coupling	1 3/16 1 1/4 1 1/6 1 1/16 1 1/16 1 1/16 1 3/4	1.001 1.188 1.251 1.376 1.438 1.501 1.688 1.751	10-32 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20	1 3/4 1 3/4 1 3/4 2 1/6 2 1/6 2 1/6 2 1/6 2 1/2	3 ¼ 3 ¼ 2 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	%16 %16 %16 %16 %16 %16 %16	7/4 7/4 7/6 7/6 7/6 7/6 7/8 7/8	1/6 1/6 2/16 2/16 2/16 2/16 2/16
B404TP B405TP	148X455G6 148X455G5 148X455G2 148X455G3 148X455G4 148X455G7 148X455G1	174L509G5 Use with Self- release Coupling	1 3/16 1 1/4 1 7/16 1 1/2 1 11/16 1 3/4 1 15/16	1.188 1.251 1.438 1.501 1.688 1.751 1.938	14-20 14-20 14-20 14-20 14-20 14-20 14-20	1 3/4 1 3/4 2 1/6 2 1/6 2 1/2 2 1/2 2 1/2	3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼	2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼	7/16 9/16 9/16 9/16 9/16 9/16 11/16	1/4 3/6 3/6 3/6 3/6 3/6 1/2	1/2 2/14 2/14 2/14 2/14 2/14
Bate P (2-pole only)	148X499G2 148X499G1 148X499G3	174L511G1 Use with Self-release Coupling	1 ½/16 1 ½/4 1 ½/2	1.188 1.251 1.501	1/4-20 1/4-20 1/4-20	1 3/4 1 3/4 2 1/6	2 3/4 2 3/4 2 3/4	2 ¼ 2 ¼ 2 ¼	7/16 9/16 9/16	1/4 3/6 3/6	1/2 3/16 3/16
B444TP B445TP	148X460G7 148X460G5 148X460G4 148X460G6 148X460G6 148X460G2 148X460G1	148X461G1 Use with Self- release Coupling	1 3/16 1 7/16 1 1/2 1 11/16 1 13/16 1 15/16 2 3/16	1.188 1.438 1.501 1.688 1.813 1.938 2.188	14-20 14-20 14-20 14-20 14-20 14-20 14-16	1 3/4 2 1/8 2 1/8 2 1/2 2 1/2 2 1/2 3 1/4	3 1/4 3 1/4 3 1/4 3 1/4 3 1/4 3 1/4 3 1/4	2¾ 2¾ 2¾ 2¾ 2¾ 2¾ 2¾ 2¾	7/16 9/16 9/16 11/16 11/16	1/4 3/6 3/6 3/6 1/2 1/2 1/2	% 3/16 3/16 3/16 1/4 1/4

☐ Tolerances for the "BX" dimensions are +0.001 inch, -0.000 inch, up to and including $1\frac{1}{2}$ inch diameter, and +0.0015 inch, -0.000 inch for larger diameters.

Nonreverse coupling assemblies, frames 213TP—B286TP are complete, nonreverse assemblies, frames B324TP—B445TP, must be used together with appropriate self-release coupling.

X

3 ph 60 hz

GEM-2296E L. Atl. #N-17-72

20 HP

L & B #M1009 72D-367

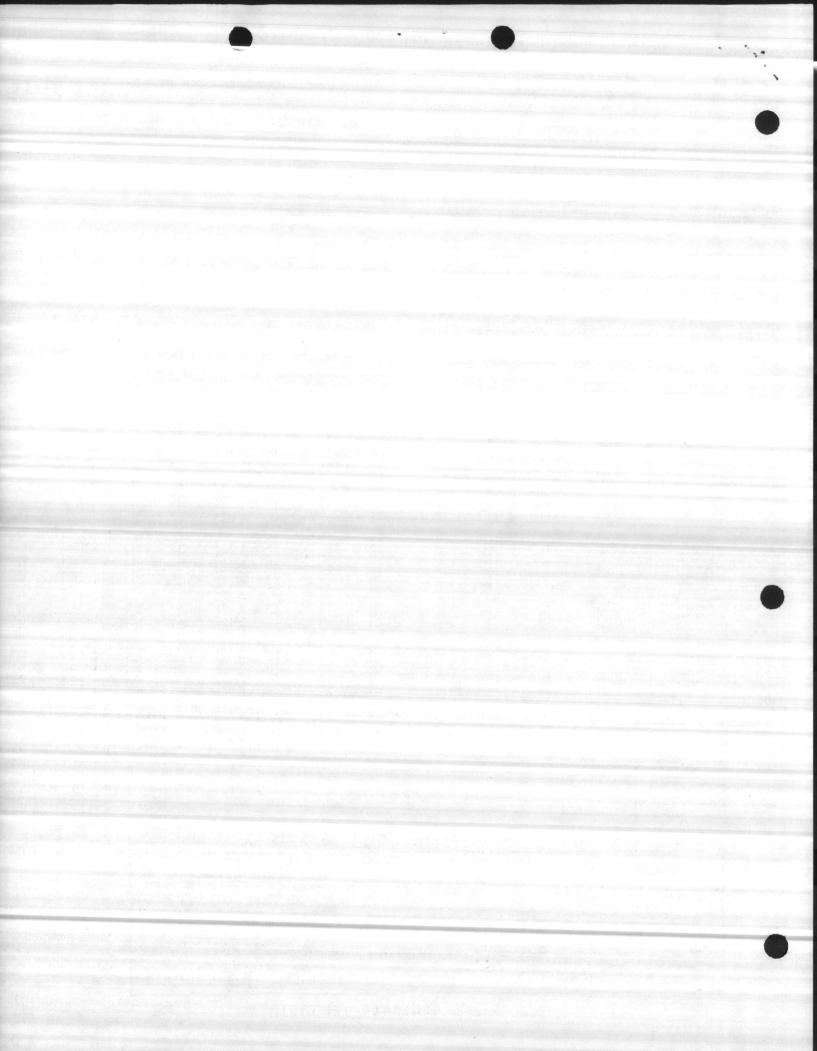
1800 RPM

Prints are: For Approval	Prints are: Approved for Construction
Customer Singer	

230/450 Volt

Customer's Order No. M1009 Item.....

Our Req. No. 405-32285 Item Approved by K.T.



TRI/CLAD • Hollow-shaft • Shielded (Dripproof)*

High-thrust

Normal-starting-torque

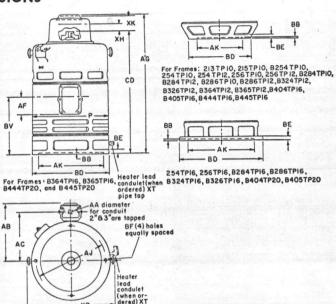
NEMA Type P Base

Type K Frames 213TP10 to B405TP20, 3600 Rpm and Below Frames B444TP16 to B445TP20, 1800 Rpm and Below θ

Self-release, Bolted or Nonreverse Coupling GEM-2296E

Sept. 8, 1970

DIMENSIONS



FOR 3600-RPM MOTORS ONLY

For a given pump-shaft diameter, the following table gives the maximum distance between the motor's top coupling and the pump's first line-shaft bearing. This table is based on keeping the head-shaft critical at least 25% above operating speed. The selection of a small headshaft diameter may make it necessary to support the headshaft in a close-fitting bushing in the lower end of the motor shaft.

Pump-shaft Diameter in Inches	Maximum Distance Between Top Coupling and Lower Suppo in Inches			
0.750	33			
1,000	38			
1.187	42			
1.437	45			
1.500	47			
1.688	50			
1.750	51			

								y wales	Dimensi	ons in I	nches								
Frame No.	Approx Net Wt in Lb	Р	AA	AB	АС	AF	AG	AJ	AK †	BB Min	BD	BE	BF	BV	CD	XH ‡	хк	XP	хт
213TP10 215TP10 B254TP10	165 180 205	10 1/8 10 1/8 10 1/8	1 1/4 1 1/4 1 1/2	9 3/8 9 3/8 9 3/8	75/16 75/16 75/16	3 ½ 3 ½ 3 ½	23 13/16 23 13/16 23 13/16	9 1/8 9 1/8 9 1/8	8 ¼ 8 ¼ 8 ¼	3/16 3/16 3/16	10 10 10	3/4 3/4 3/4	7/16 7/16 7/16	1015/16	20 15/16 20 15/16 20 15/16	1 3/4 1 3/4 1 3/4	2 3/4 2 3/4 2 3/4		1/2 1/2 1/2
254TP10 254TP12 254TP16 256TP10 256TP10 256TP16	270 270 270 310 310 310	1215/16 1215/16 1215/16 1215/16 1215/16 1215/16	1 ½ 1 ½ 1 ½ 1 ½ 1 ½ 1 ½	10 3/8 10 3/8 10 3/8 10 3/8 10 3/8 10 3/8	8 5/16 8 5/16 8 5/16 8 5/16 8 5/16	3 ½ 3 ½ 3 ½ 3 ½ 3 ½ 3 ½	26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½	9 1/8 9 1/8 14 3/4 9 1/8 9 1/8 14 3/4	8 1/4 8 1/4 13 1/2 8 1/4 8 1/4 13 1/2	3/16 3/16 1/4 3/16 3/16 1/4	10 12 16½ 10 12 16½	3/4 3/4 3/4 3/4 3/4 3/4	7/16 7/16 11/16 7/16 7/16 11/16	13 13 13 13 13	23 %16 23 %16 23 %16 23 %16 23 %16 23 %16	1 3/4 1 3/4 1 3/4 1 3/4 1 3/4 1 3/4	2 3/4 2 3/4 2 3/4 2 3/4 2 3/4 2 3/4 2 3/4		1/2 1/2 1/2 1/2 1/2 1/2 1/2
B284TP10 B284TP12 B284TP16 B286TP10 B286TP12 B286TP16	330 330 330 355 355 355	12 15/16 12 15/16 12 15/16 12 15/16 12 15/16 12 15/16	2 2 2 2 2 2 2	11 3/8 11 3/8 11 3/8 11 3/8 11 3/8 11 3/8	8 ½ 8 ½ 8 ½ 8 ½ 8 ½ 8 ½ 8 ½	4 5/8 4 5/8 4 5/8 4 5/8 4 5/8 4 5/8	26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½	9 1/8 9 1/8 14 3/4 9 1/8 9 1/8 14 3/4	8 1/4 8 1/4 13 1/2 8 1/4 8 1/4 13 1/2	3/16 3/16 1/4 3/16 3/16 1/4	10 12 16½ 10 12 16½	3/4 3/4 3/4 3/4 3/4 3/4	7/16 7/16 11/16 7/16 7/16 11/16	13 13 13 13 13	23 % 6 23 % 6 23 % 6 23 % 6 23 % 6 23 % 6 23 % 16	1 3/4 1 3/4 1 3/4 1 3/4 1 3/4 1 3/4	2 ³ / ₄ 2 ³ / ₄		1/2 1/2 1/2 1/2 1/2 1/2 1/2
B324TP16 B324TP16 B326TP12 B326TP16	460 460 510 510	14 ¼ 14 ¼ 14 ¼ 14 ¼	2 % 2 % 3 3	123/16 123/16 1315/16 1315/16	911/16 911/16 105/16 105/16	4 5/8 4 5/8 6 1/2 6 1/2	327/16 327/16 327/16 327/16	9 1/8 14 3/4 9 1/8 14 3/4	8 1/4 13 1/2 8 1/4 13 1/2	3/16 1/4 3/16 1/4	12 16½ 12 16½	7/8 7/8 7/8 7/8 7/8	7/16 11/16 7/16 11/16	157/16 157/16 157/16 157/16	28 ³ / ₁₆ 28 ³ / ₁₆ 28 ³ / ₁₆ 28 ³ / ₁₆	3 1/8 3 1/8 3 1/8 3 1/8	4 4 4 4	153/4 153/4 153/4 153/4	1/2 1/2 1/2 1/2
B364TP12 B364TP16 B365TP12 B365TP16	600 600 660 660	16 ¼ 16 ¼ 16 ¼ 16 ¼	3 3 3 3	14 13/16 14 13/16 14 13/16 14 13/16	11 3/16 11 3/16 11 3/16 11 3/16	61/2 61/2 61/2	357/16 357/16 357/16 357/16	9 1/8 14 3/4 9 1/8 14 3/4	8 1/4 13 1/2 8 1/4 13 1/2	1/4 3/16 1/4	12 16½ 12 16½	1 1/a 1 1 1/a 1 1/a	7/16 11/16 7/16 11/16	16 1/8 16 1/8 16 1/8 16 1/8	31 3/16 31 3/16 31 3/16 31 3/16	3 1/8 3 1/8 3 1/8 3 1/8	4 4 4 4	17 1/8 17 1/8 17 1/8 17 1/8	3/4 3/4 3/4 3/4 3/4
B404TP16 B404TP20 B405TP16 B405TP20	890 890 990 990	187/16 187/16 187/16 187/16	3 3 3 3	15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄	12 1/8 12 1/8 12 1/8 12 1/8	6 ½ 6 ½ 6 ½ 6 ½	41 ¼ 41 ¼ 41 ¼ 41 ¼	14 3/4 14 3/4 14 3/4 14 3/4	13½ 13½ 13½ 13½	1/4 1/4 1/4 1/4	16½ 20 16½ 20	7/8 7/8 7/8 7/8	11/16	19½ 19½ 19½ 19½	36 7/16 36 7/16 36 7/16 36 7/16	3 1/4 3 1/4 3 1/4 3 1/4	4 ½ 4 ½ 4 ½ 4 ½ 4 ½	20 1/s 20 1/s 20 1/s 20 1/s	3/4 3/4 3/4 3/4 3/4
B444TP16 B444TP20 B445TP16 B445TP20	1180 1180 1330 1330	20 % 20 % 20 % 20 %	3 3 3	16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆	13 5/16 13 5/16 13 5/16 13 5/16	61/2	47 1/8 47 1/8 47 1/8 47 1/8	143/4 143/4 143/4 143/4	13½ 13½ 13½ 13½	V4 V4 V4 V4	16½ 20 16½ 20	1 1/8 1 1/8 1 1/8 1 1/8	11/16	23 ¼ 23 ¼ 23 ¼ 23 ¼	41 % 41 % 41 % 41 %	3 1/8 3 1/8 3 1/8 3 1/8	5 5 5 5	22 22 22 22 22	3/4 3/4 3/4 3/4

Coupling dimensions on reverse side.

- * These motors meet NEMA specifications for weather-protected Type 1
- † 'AK' diameters of 8½ inches will come within the limits of +0.003 inch, -0.000 inch; diameters of 13½ inches will come within the limits of +0.005 inch, -0.000 inch.
- The total height of pump shaft and locking nut above top of coupling must not exceed dimension XH.
- § For 3600 rpm, Frames B324TP12 and B324TP16, conduit box dimensions are same as for Frames B326TP12 and B326TP16.
 θ For 3600 rpm in this frame size, refer to the Company.

Frames 213TP10 through B286TP16 have grease-lubricated upper guide and lower thrust bearings. All other frames have oil-lubricated upper thrust bearing and grease-lubricated lower guide bearing.

For 3600 rpm, Frames B404TP16 through B405TP20 inclusive maximum shaft permissible 1.751 inches.

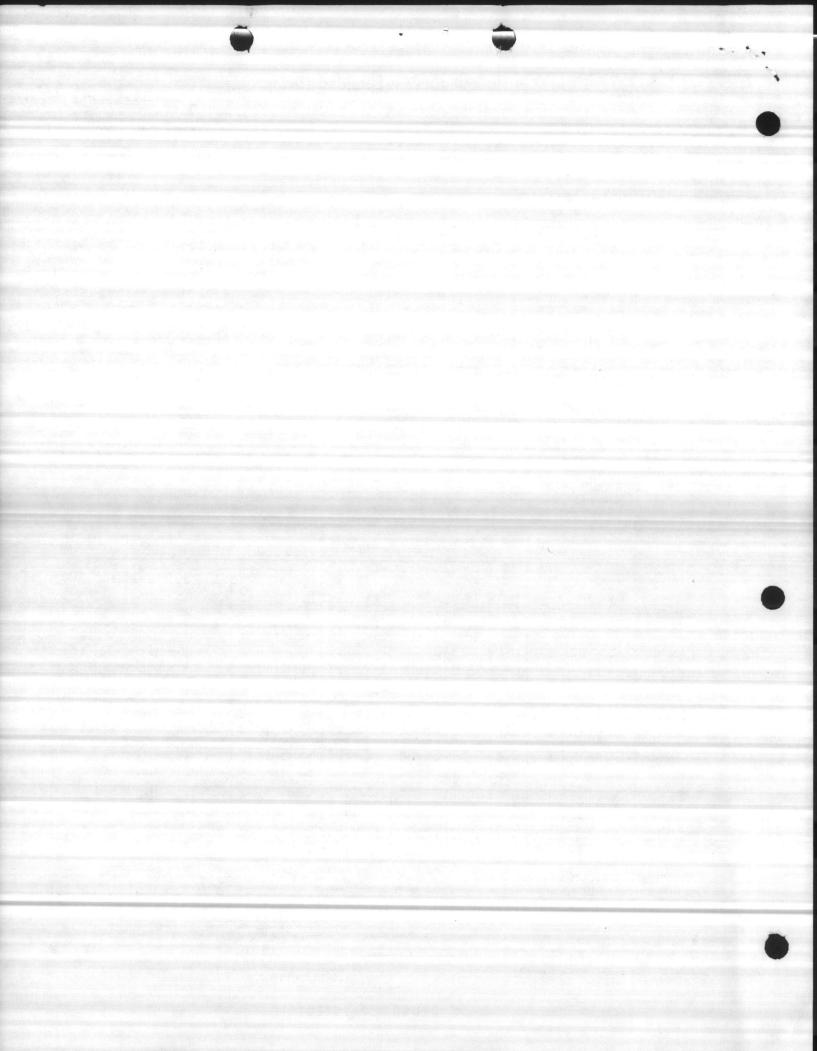
Nonreverse coupling assemblies, Frames 213TP to B286TP are complete/nonreverse assemblies, Frame B324TP to B45TP, must be used together with appropriate self-release coupling.

Provided mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side.

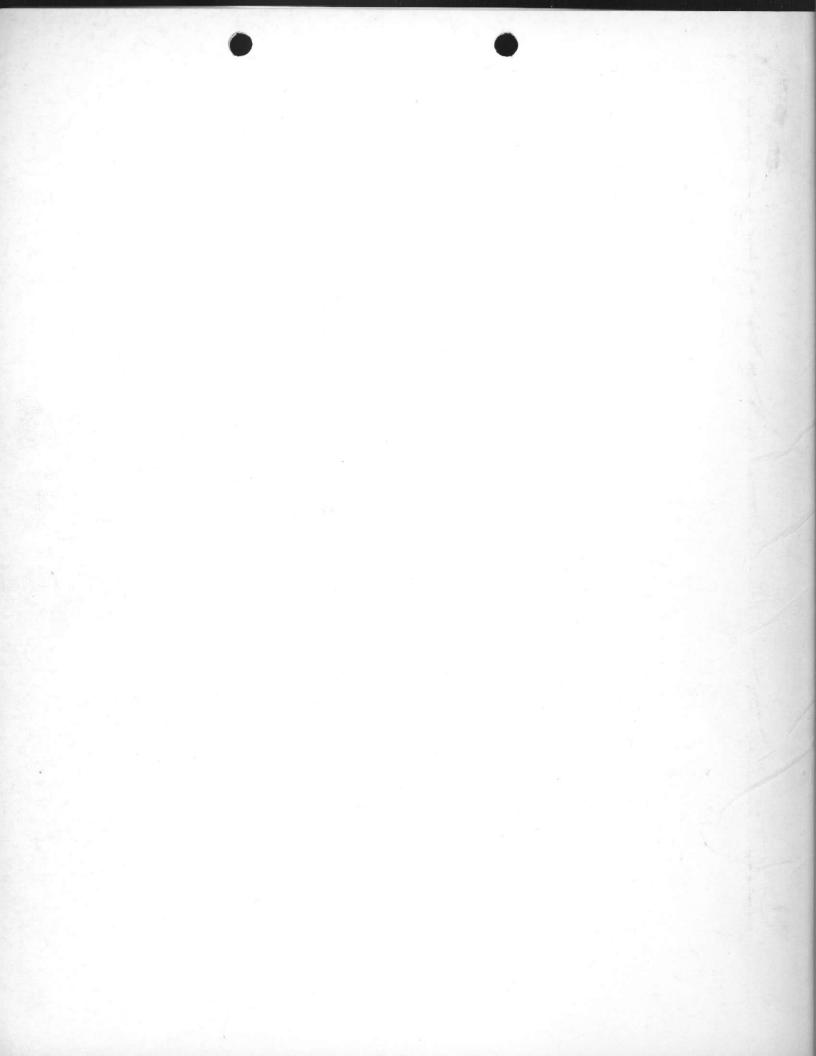
For shipping weight add 5 per cent to the above net weights.

For ESTIMATING ONLY unless endorsed for construction.

GEM-2296E From 992C375



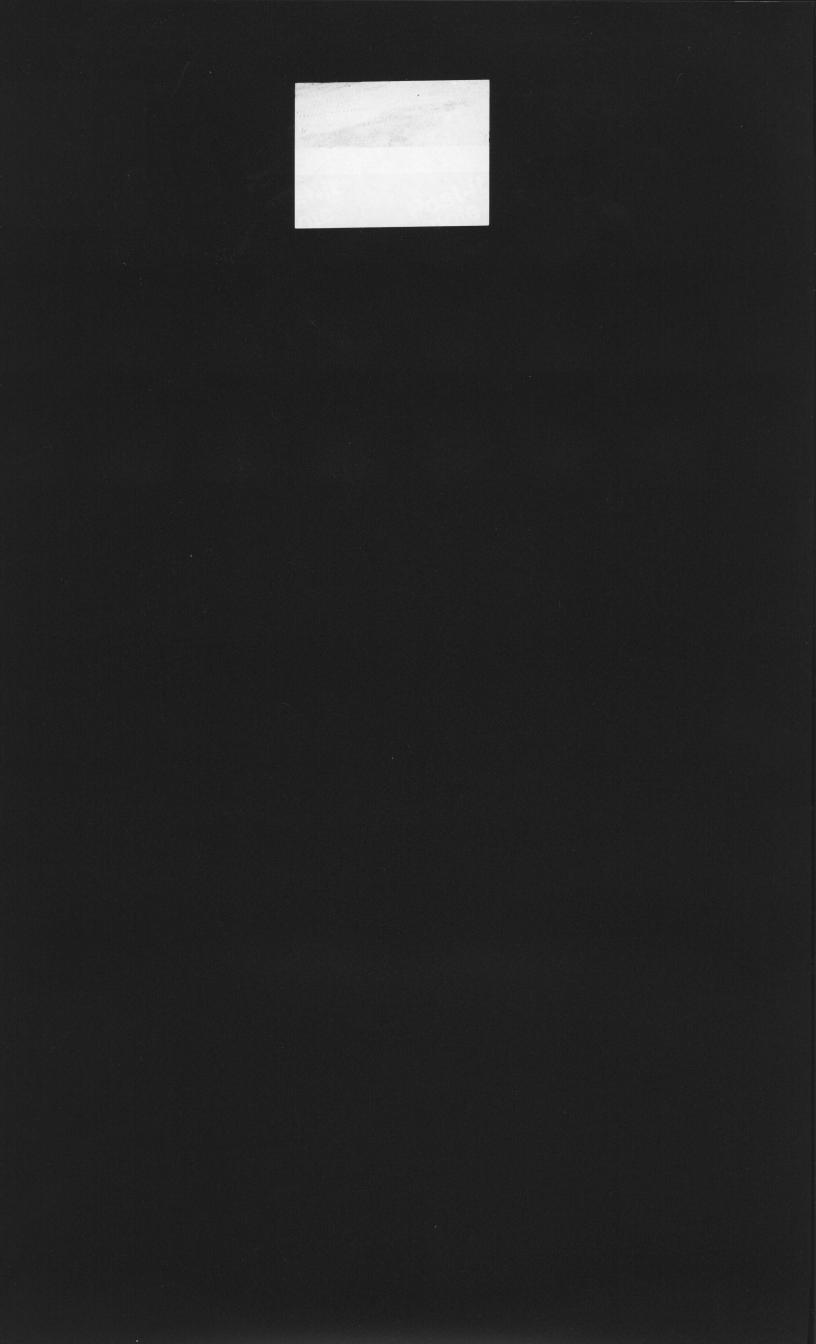




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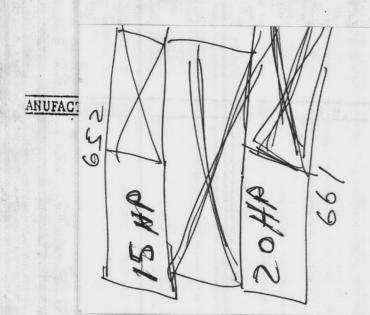
Cortin Construction Co JOB NO. 40936 Compedience N.C. Proposed Well # 10 300 bpm 50 OF 24 pipe CEMENTED IN TopLA of of screen Bravel 18 OF BLANK 100 ypm 10' OF SCREEN 5' OF BLANK 5' OF SCREEN Hillin III HITTHE TIE 168 5' OF BLANK 5' OF SCRIEN 128 5 OF BLANK



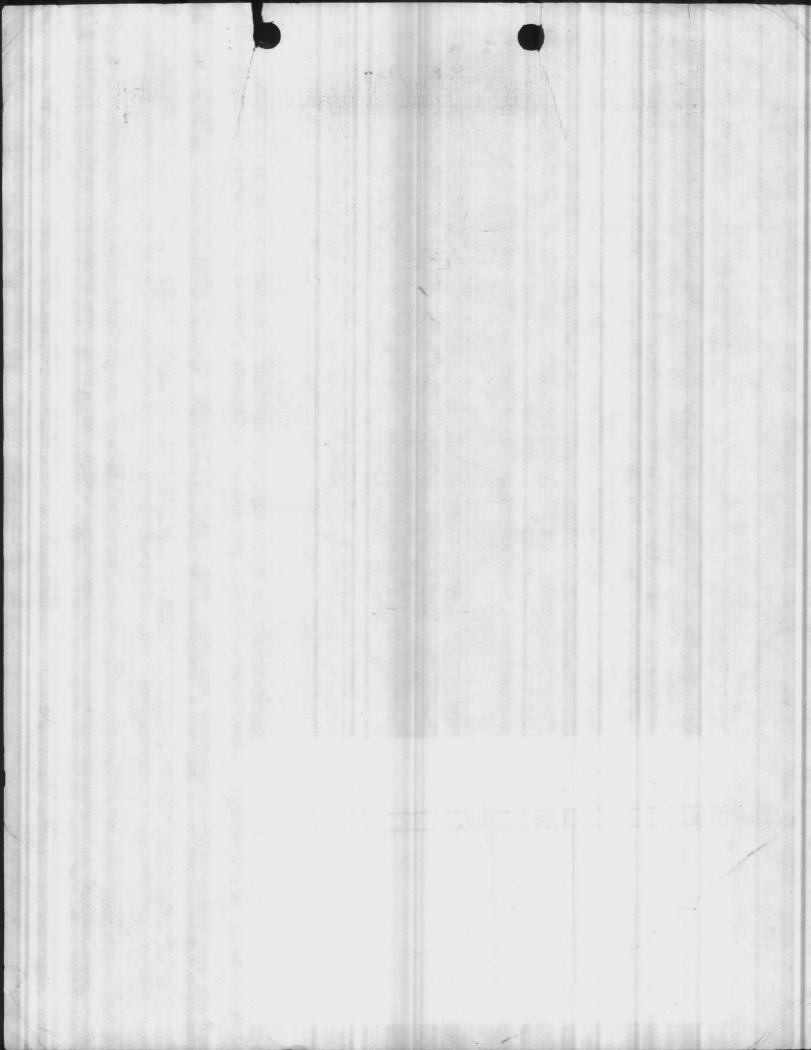
WELL NUMBER	652	BY Slever	and SA	128	DATE 3-2	8-01
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
110	15	42	27	98	100	ti.
		58	43	85	146	
		67	57	75	164	
		78	63	65	192	
		87	72	55	214	
		90	75	50	22/	
		95	80	48	230	
	2.11	100	95	40	240	
	Seft set	104	99	35	250	
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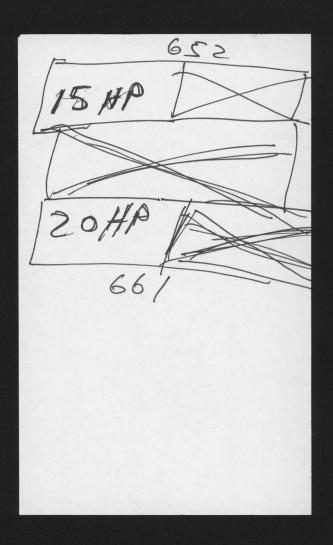
REMARKS

D1H-100+



TOTAL	HEAD		SIZE
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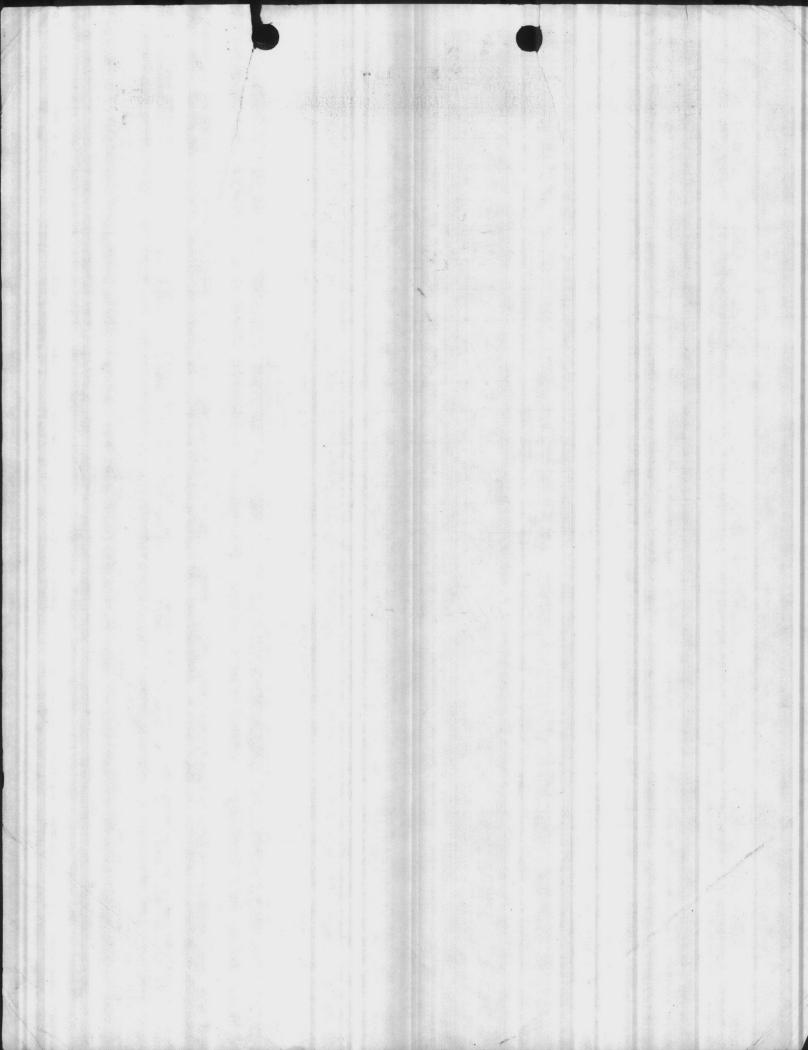


WELL NUMBER	652	BY Sleven	and SA	148	DATE 3-2	8-01
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
110	15	42	27	98	100	u i
		58	43	85	146	
<u>, , , , , , , , , , , , , , , , , , , </u>		67	57	75	164	
		78	63	65	192	
		87	72	55	214	
		90	75	50	22/	
		95	80	48	230	
		190	95	40	240	
	Seft set	104	99	35	250	
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REMARKS

P/H-100+

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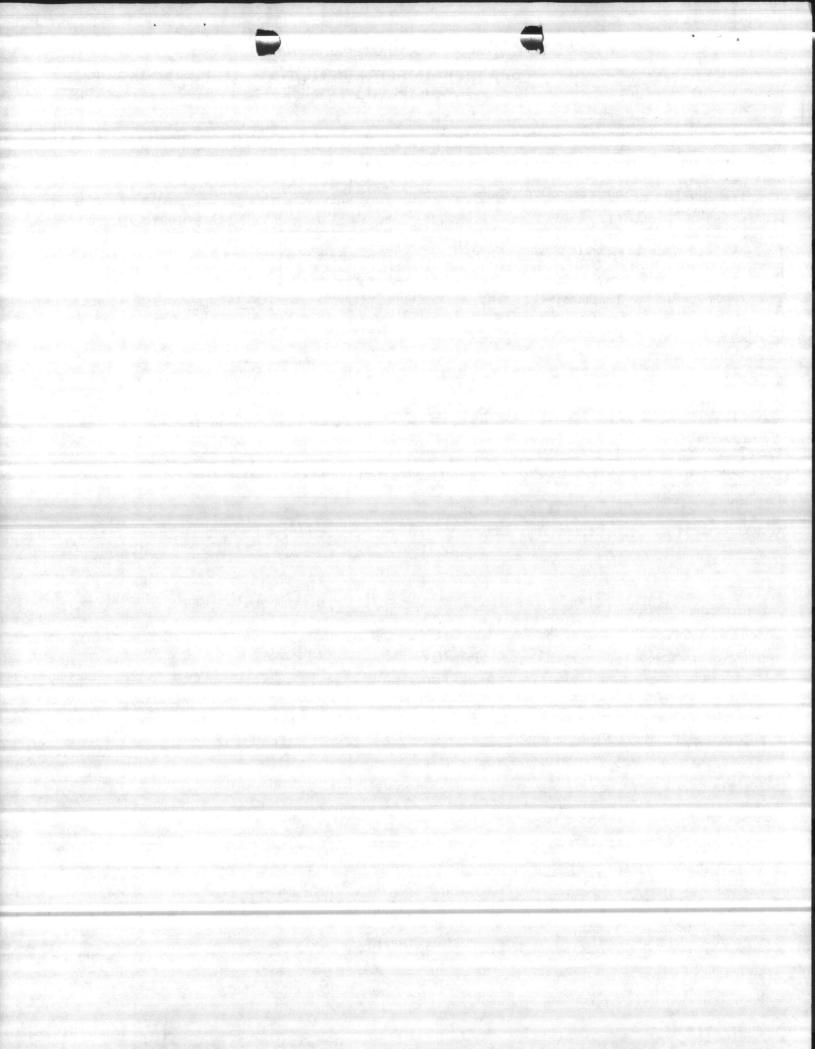
DATE 2-25-00 PWSID 04-67-041

WELL # _ HP 652
WELL NAME HAD NOT POINT HOZO
BLDG. HP 652
CODE
AVAILABILITY P
LOCATION LYMAN ROBD
LATITUDE 34.67207
LONGITUDE
WELL DIAMETER8"
WELL DEPTH/83
SCREEN INTERVAL
YIELD
STATIC LEVEL //
PUMPING LEVEL
PUMP TYPE VERTICAL TURBINE
MOTOR HP/5
INTAKE DEPTH126'
DESIGN CAPACITY 200
ACTUAL GPM 200
SIZE OF CONCRETE SLAB
EIGHT OF CASING//_'



	SOURCE INFORMATION GROUND WATER	Date Form Completed
Owner Assigned Well Name (If purchase	se, name of system)	Code G=Ground
652 44 DNOT PO	INT 652	W=Purchase/G Y=G w/direct influence Z=W w/direct influence
If Purchase, seller ID# Source Begin Date M M Y Y	SWTR! Y M D D Y Y	Availability P=Permanent E=Emergency I=Interim S=Seasonal O=Other
Location of well within the system (If purch	nase, location of master meter)	
Latitude (N) Longitude (W)	How Determined	PS Data No. of Sats. Locked on
Latitude (N) Deg. Min. Sec. Deg. Min. 3 4 40 19 0 27 18	G=GPS M=Map S=Surveyed	Q# or DOP#
(If purchase, use seller's primary source lat/ Vulnerable (VOCs) YN	Assessment Date	Y many many many many many many many many
ENTRY POINT INFORMA Owner Assigned Entry Point Code Entry Point Na Location:	D=Ground/non-permanent	Availability P=Year-round S=Seasonal E=Emergency I=Interim O=Other
Sources of pollution/distance: Surface water within 200'? N Adequate slope? (Y,N) Flooding?	If yes, actual distance feet If	yes, bact. samples collected?(Y,N)
	(VN) Inck	ed? (Y,N)
Condition of houses OK	Type of freeze protection:	Health
Properly vented? (Y,N) Casing dep	pth 6 ft. (If unknown, Well depth:	/83' Meter available? N (Y,N) Size: DX/Z
size of blow off: 4" (V)	Sample tap: Before treatment?	(Y,N) After treatment? (Y,N)
Dumps Canacian GPM. 200 146	HP: 15 Pump intake depth:	Auxiliary Power! N_(1,N
Type pump: VERTICAL TURB.	NE Height above flo	por (pump/casing):
Storage at well site: Elev:	Hÿdro:	Ground:
If hydroautomatic, air volume control?	(Y,N) Safety valves?(Y,N) Code	d?(Y,N)
High service pumps: 1gpm	_hp 2gpmhp 3gpm	hp Auxiliary rower.
1 1 was seemed as this well? A/ 1. If	ves complete back of form.	
If other wells are treated here, which ones?	ete back of form. Of West 3	where, where! I bearings
If purchase, retreat? N If yes, comple	ete back of form.	

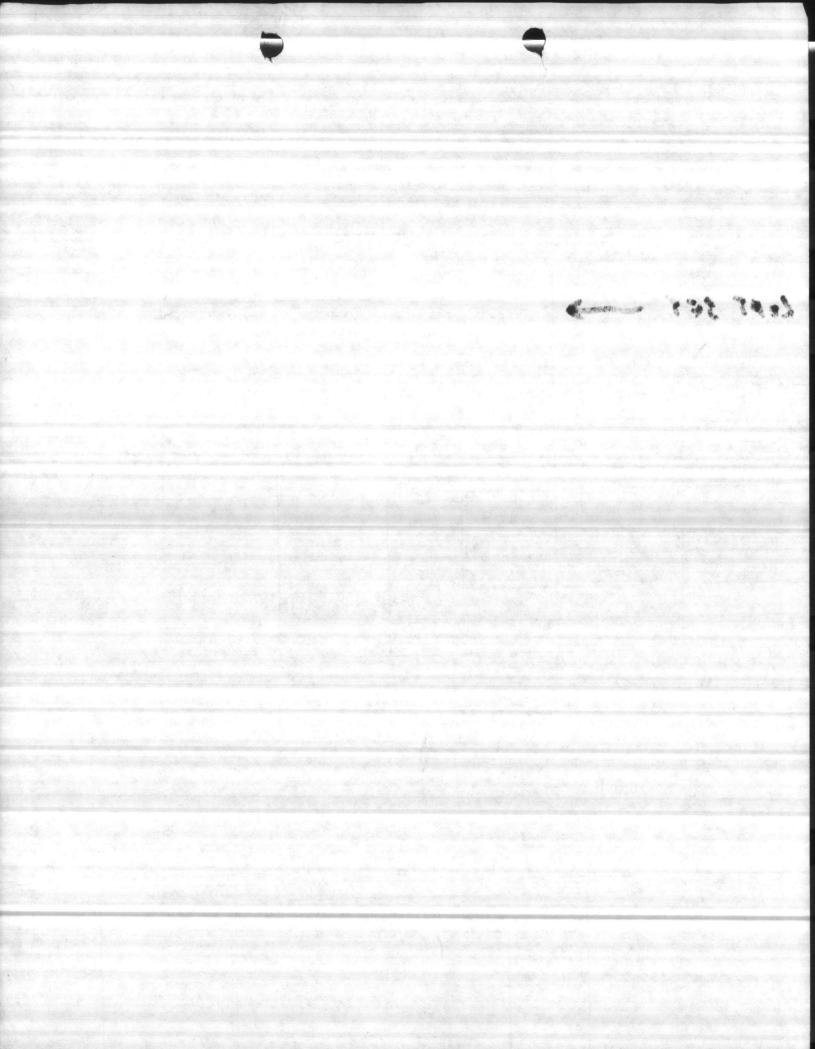
DEHNR 3803 (Revised 1Z/93)



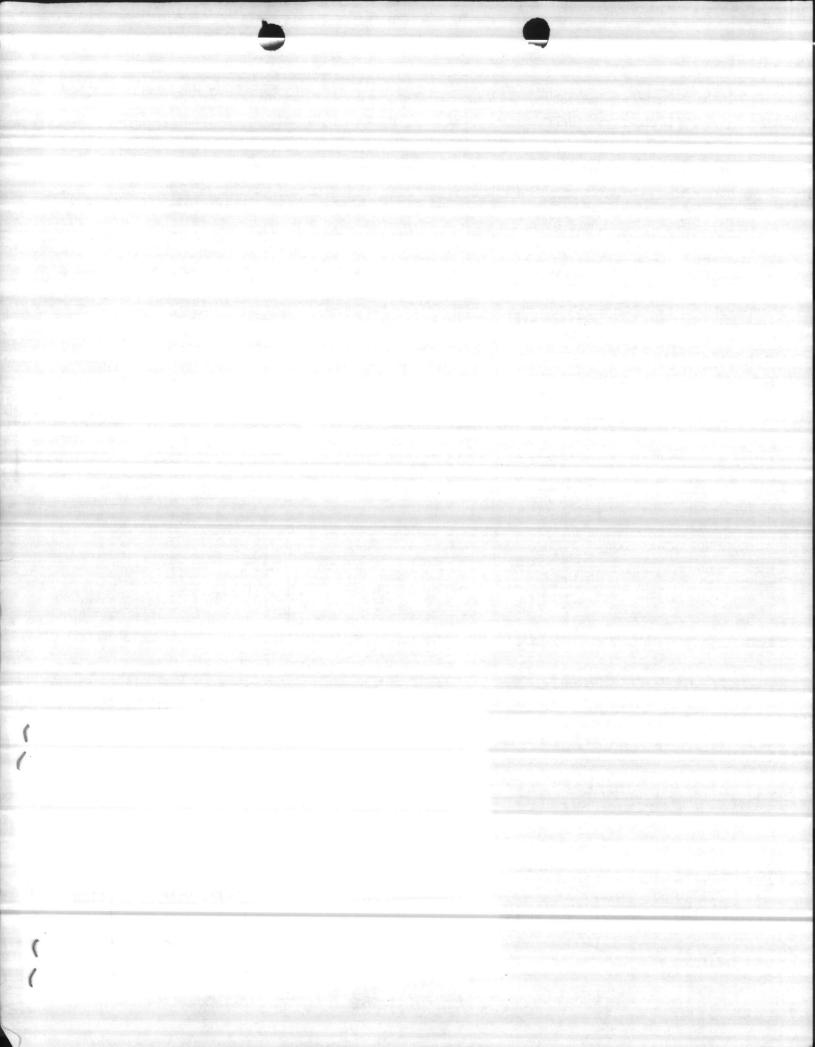
WELL NUMBER	652	BY THOM,	46/976	VENSON	DATE 2-	15-94
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
110	8	36	26	37	104	04
		38	28	32	108	
		39	29	25	119	
		45	35	20	125	
40 00		50	40	15	133	
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REMARKS 9005Z

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WELL NUMBER	652	BY Steve	sor & P	etern	DATE 4-4	1-97
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
100	11	33	22	20	100	10
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1		43	32	10	119	
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			WELL I STATIO PUMPIN LENGTH	65 PUMP # 10	8.0 90 ft.	
NUFACTURER	STAC	GE S.				
			G PI PEPT	H	200	•
					703	



D.B. /

WELL PUMP # 10

STATIC 8.0

PUMPING LEVEL 90 ft.

LENGTH OF AIRLINE /// DISCHARGE PRESSURE

GPM

1831

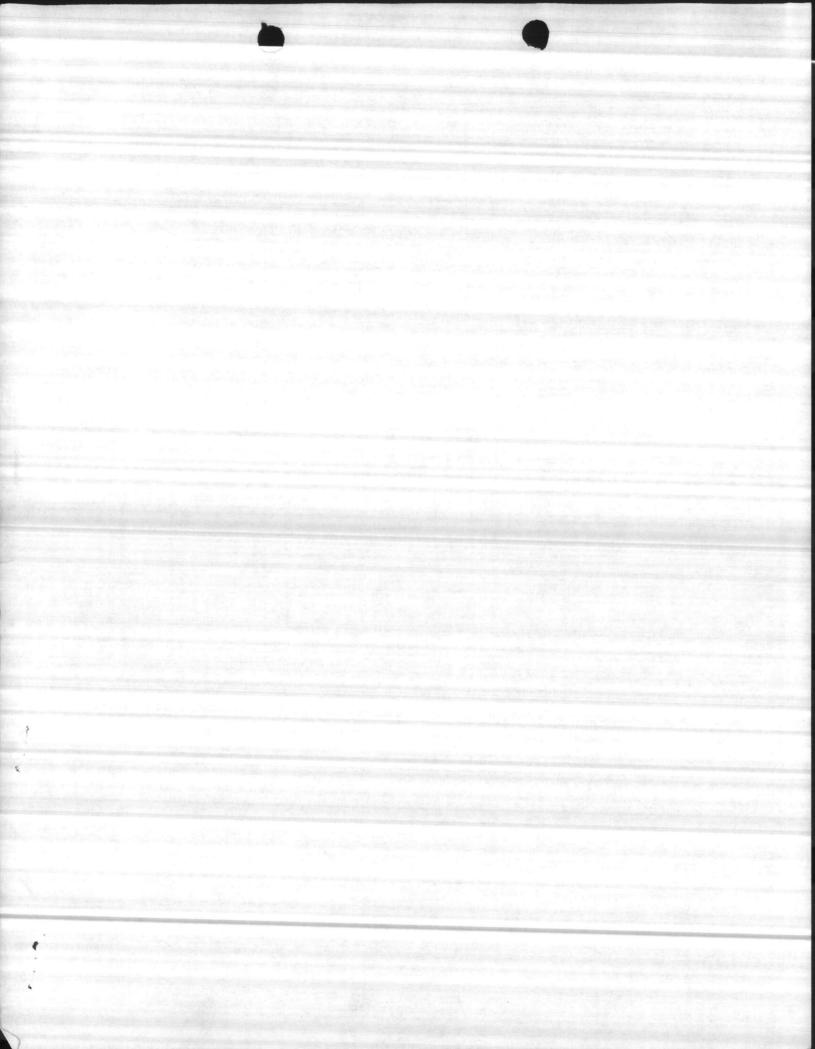


WELL NUMBER	652	BY Steven	sor & P	etern	DATE 4-4	-97
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
100	11	33	22	20	100	10
				15	Did not	charge
		43	32	10	119	
			20 20			
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REMARKS

D/H 42 PST

ANUFACTURER	STAGE	S.N.		
	OLAGE	3.N.	TOTAL HEAD	SIZE
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TELL NUMBER	152	BY Thom	45 # BR	own	DATE /0-0	26-84
IR LINE	STATIC LEVEL	PUMPING TEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1340
110	6	40	34	90	141	1350
		50	44	84	130	1400
		57	51	78	146	14.10
		64.	5-8	12	159	1420
* 1		68	62	- 68	167	1430
		72	66	64	180	1440
		77	71	59	187	1450
		80	74	54	199	1500
		85	79	50	205	1510.
		88	82	45	216	1500

REMARKS list set at 45 PSI 216 GPM

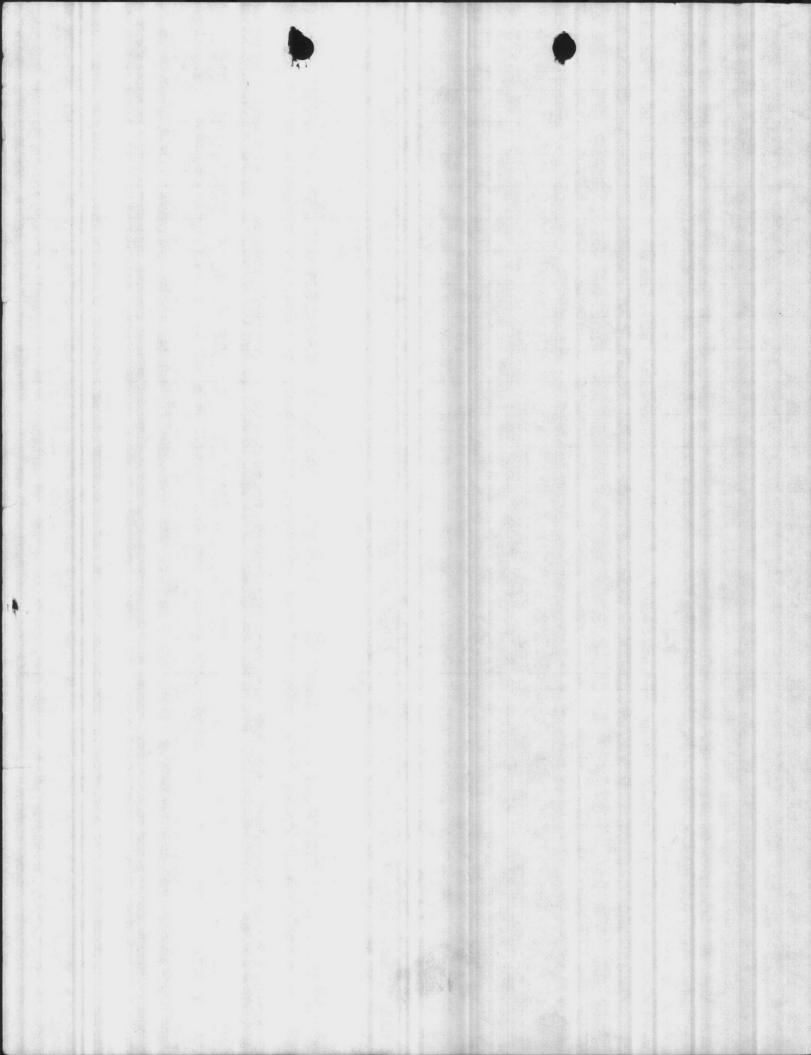
MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE



WELL NUMBER	652	BY THOM	45 /RH	YNOR	DATE 9-30-83		
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1425	
110	15	53	38	181	122	1435	
		59	44	77	130	1446	
		64	49	73	140	1500	
		70	55	68	154	1510	
		72	137	64	170	1521	
		83	47	59	183	1530	
		85	70	55	190	1540	
		90	75	50	205	1550	

REMARKS left net at 50 PSI 205 GPM

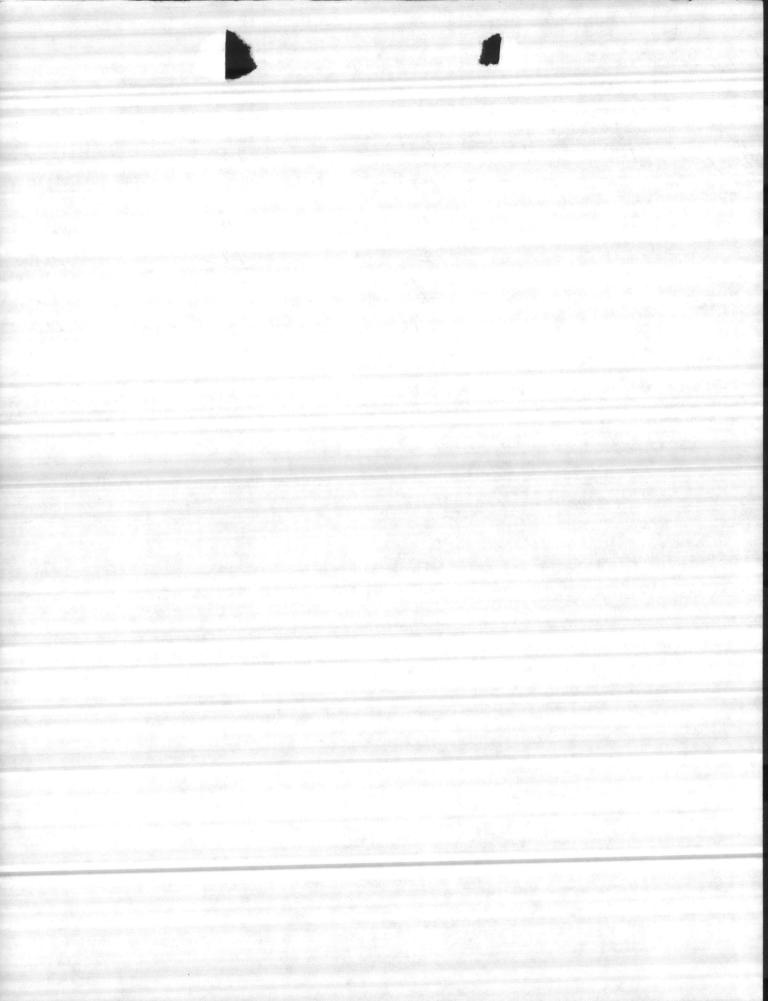
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WELL #		6			1		
652	LENGTH		10		1		
DATE	OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF BOAY DOWN	TOTAL CAP.
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		namentales de Constitución de maioles de la constitución de la constit	87'	57'	61 L135	185	
			90'	60'	58 13	192	
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WELL #							
652 DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	TOTAR'
4/3/17	110	8'	63		78	Consequence of the second of t	133
/ /	NAMES AND ASSESSED AS	rifer alle in the delice occupy regular are none or using the delice areas.	67		76		151
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MC	Q 34	40	19 N	7 7	18	48 W		
6. AGENCY STATION NO.	7. STATION NAME	E						
HP-652	HP-20-652							
8. DRAINAGE BASIN CODE No. Letter	9 STATE CODE	10. COUNTY CODE	11, COUN	TY NAME				
06 N	32	133	On	slow				
12. PERIOD OF RECORD Began Discontinued 1972	Y Contin Interru Exceed	nuous aption ds 1 Year	13		14.			
15. SITE 101 Stream	С	□104 Reservoir		, X	107 W	ell		
□102 Canal	C	☐105 Estuarine zon	ne		□108 Dr	ain		
□103 Lake		□106 Spring			□109 Ot	her		
16, TYPES OF DATA AVAILABLE A cter to indicate frequency of a	ND FREQUENCY measurement. Fo	OF MEASUREMED or parameters telev	NT (Enter :	appropriate numb	oer (1-8)	beside each	param-	
1 Continuous 2 Seasonal	3 Daily 4 Weekly	5 Mo 6 Qu	onthly arterly	7 An 8 Ot	mual her Perio	odic		
Physical	Chemic	:al		Biologic				
3:1Temperature 3:12Specific conductance 3:13Turbidity 3:14Color 3:15Odor 3:16p!_(field) 3:178.p!_(lab) 3:18Eh 3:19Suspended solids 3:20Other	332 _ 8 Ch 333 _ Nu 334 _ Nu 335 _ Co 336 _ 8 Ha 337 _ Ra 338 _ Dis 339 _ Otl 340 _ Mi 341 _ Pes 342 _ De 343 _ Bic 344 _ Ca	atrients (nitrogen) atrients (phosphorus priments (phosphorus priments adiochemical assolved oxygen after gases anor elements atricides (insecticid after gents - MBS acchemical oxygen arbon (total, dissolvents)	es, demand	361 — Colif 362 — Other org 363 — Other Sediment 371 — Conc 372 — Parti 373 — Parti 374 — Other	r micro- ganism, r centration cle size (phytoplankton (suspended)	on, etc.)	
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21. OFFICE COMPLETING FORM BASE MAINTENANCE DEPAR	RTMENT							
22. COMPILER'S NAME BOB WILSON					23. DA		Zear	



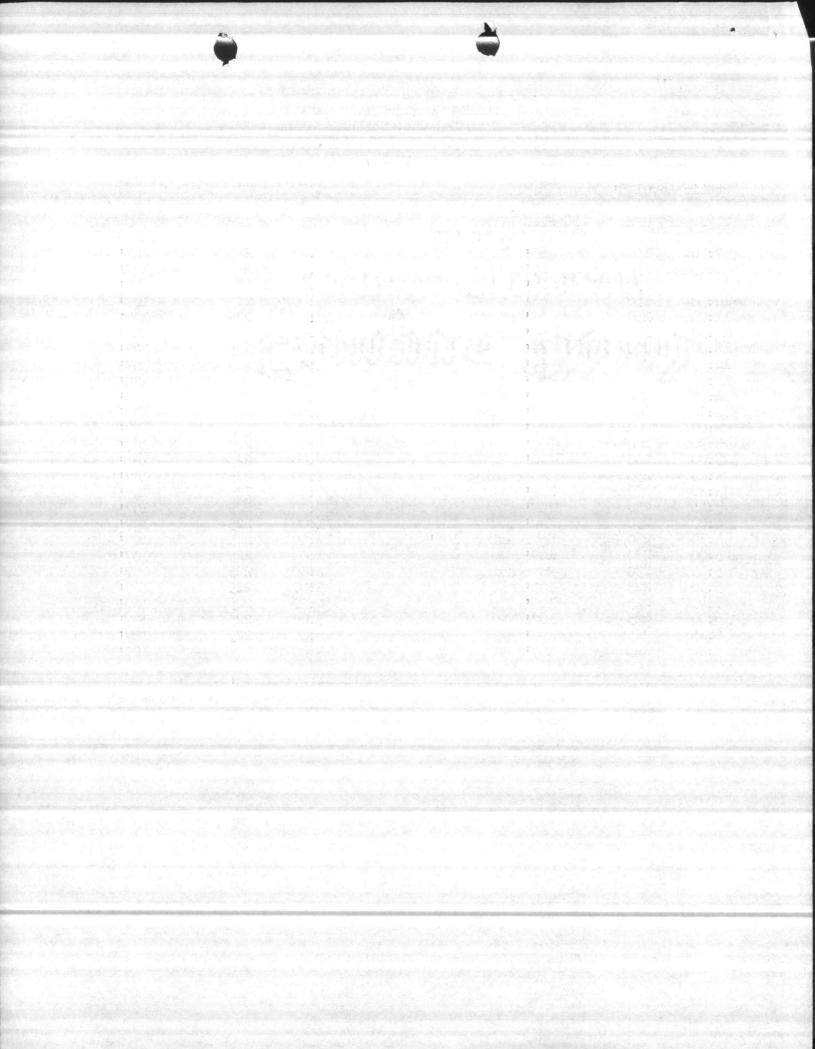
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CORBIN CONSTRUCTION COMPANY
Camp Lejeune, North Carolina
Pumping Test Well No. 10
January 18, 1972

Static Level 8' 0"

TIME	GP M	PUMPING LEVEL	TIME	GPM	PUMPING LEVEL
9:30	150	651 811	7:00	225	107
9:45	150	671 4"	7:30	225	107
10:00	150	671 1011	8:00	225	1071
10:30	150	681 211	9:00	225	107
11:00	150	681 611	10:00	225	107
11:30	150	681 1011	11:00	225	107*
12:00	200	881	12:00	225	1071
12:15	200	891	1:00	225	107
12:30	200	901	2:00	225	107
1:00	200	90 •	3:00	225	107
1:30	200	901	4:00	225	1071
2:00	200	901	5:00	225	1071
2:30	200	901	6:00	225	107
3:00	200	901	7:00	225	107
3:15	250	No reading	8:00	225	107
3:30	230	109	9:00	225	107
3:45	230	109	10:00	225	1071
4:00	230	109	11:00	225	1071
4:30	230/225	No reading /105	12:00	225	107
5:00	230	109	1:00	225	107
5:15	230	No reading	2:00	225	107
5:30	225	105	3:00	225	107
5:45	225	105	4:00	225	107
6:00	225	107	5:00	225	1071
6:15	225	107	6:00	225	107
6:30	225	107	7:00	225	107:

Airline 110



"Hello Analysis, Goodbye Worry"

WATER ANALYSIS LABORATORY 802 HAMLET HIGHWAY BENNETTSVILLE, SOUTH CAROLINA

(803) 479-4639

CONSULTANTS FOR: INDUSTRY MUNICIPALITIES HOME OWNERS DEVELOPERS IRRIGATION

PATE: November 20, 1971

Report To: Layne-Atlantic Co. Norfolk, Va.

11/20/71 Date Analyzed: _

Sample Number: __Test Well #10

140'-160' Camp Lejeune

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.3	Carbon Dioxide (CO ₂)	24
Iron (Fe)	0.15	Total Acidity (CaCO3)	38
Nitrate (NO3)	Trace -	Calcium Hardness (CaCO3)	201
Fluoride (F)	0.3	Magnesium Hardness (CaCO3))	20
Manganese (Mn)	0	Carbonate Hardness (CaOO3)	221
Total Hardness (CaCO3)	221 -	Noncarbonate Hardness (CaCO3)	20 /
Chlorides (CI)	10 -	Alkalinity (Phenolphthalein) (CaCO3)	0 /
Sulfate (SO ₄)	7.2 0	Carbonate Alkalinity (CaCO3)	0 -
Phosphate (PO ₄)	0.9 -	Bicarbonate Alkalinity (CaCO ₃)	245
Magnesium (Mg)	4.8	Total Alkalinity (CaCO3)	245
Calcium (Ca)	80.0	Total Dissolved Solids	239
Carbonate (CO ₃)	0	Specific Conductance (micromhos at 25%)	370 (R)
Bicarbonate (HCO3)	298 - EALL)	Appearance When Analyzed (TORBIDITY)	Clear
Hydroxide (OH)	0	Odor When Analyzed Not Ob;	<u>jection</u> able

Water Analysis Laboratory

LABORATORY 202 Hamlet Highway

Bennettsville, South Carolina 29512

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER, APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

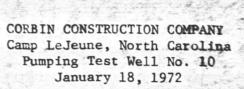
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Halon Stockers Libert 14

Bennetisville, South Carolina, 29512





Static Level 8' 0"

TIME	GPM	PUMPING LEVEL	TIME	GPM	PUMPING LEVEL
	The State of the S				
9:30	150	65' 8"	7:00	225	107'
9:45	150	67' 4"	7:30	225	107'
10:00	150	67'10"	8:00	225	107'
10:30	150	68' 2"	9:00	225	107'
11:00	150	68' 6"	10:00	225	107'
11:30	150	68'10"	11:00	225	107'
12:00	200	881	12:00	225	107
12:15	200	89 '	1:00	225	107 '
12:30	200	90'	2:00	225	107'
1:00	200	90'	3:00	225	107'
1:30	200	90'	4:00	225	107'
2:00	200	901	5:00	225	107'
2:30	200	90'	6:00	225	107'
3:00	200	90'	7:00	225	107'
			8:00	225	107'
3:15	250	no reading	9:00	225	107'
3:30	230	109'	10:00	225	107'
3:45	230	109'	11:00	225	107'
4:00	230	109'	12:00	225	107'
4:30	230/225	no reading/105	1:00	225	107'
5:00	230	109'	2:00	225	107'
5:15	230	no reading	3:00	225	107'
5:30	225	105'	4:00	225	107'
5:45	225	105'	5:00	225	107'
6:00	225	107	6:00	225	107'
6:15	225	107'	7:00	225	107'
6:30	225	107'			





WELL WATER SYSTEMS

PUMPING EQUIPMENT

WATER CONDITIONING EQUIPMENT

-ATLANTIC COMPANY

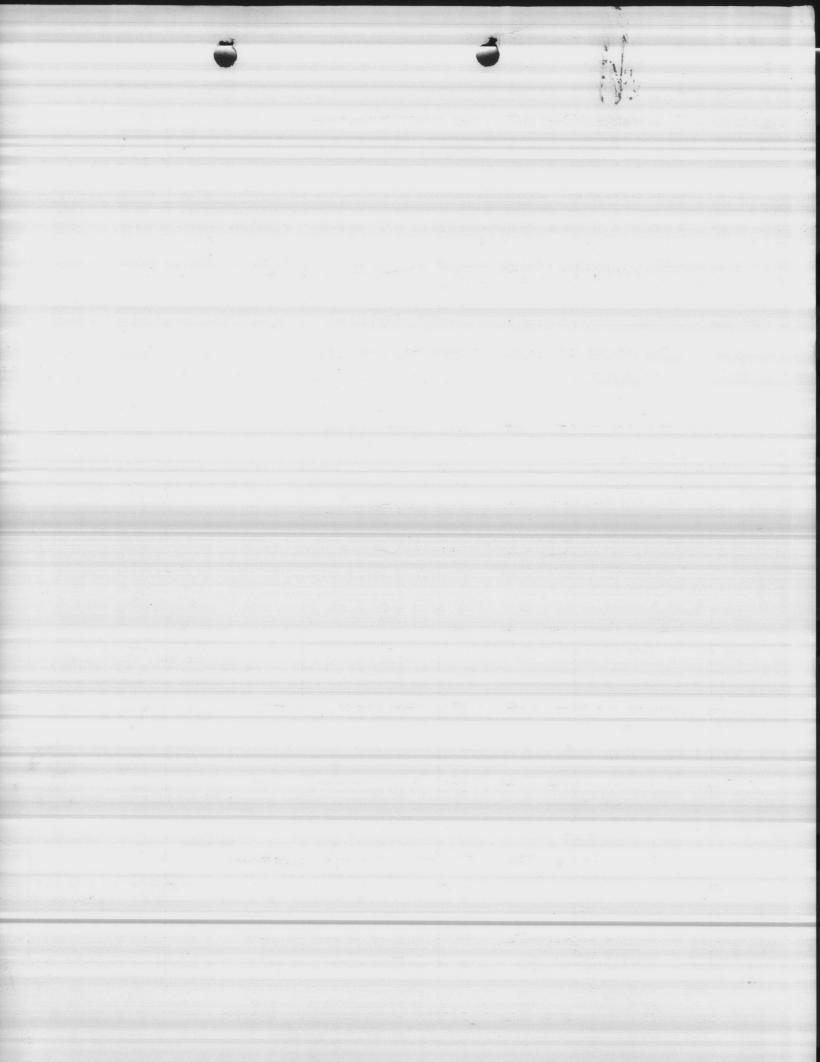
ASSOCIATED WITH LAYNE & BOWLER, INC.

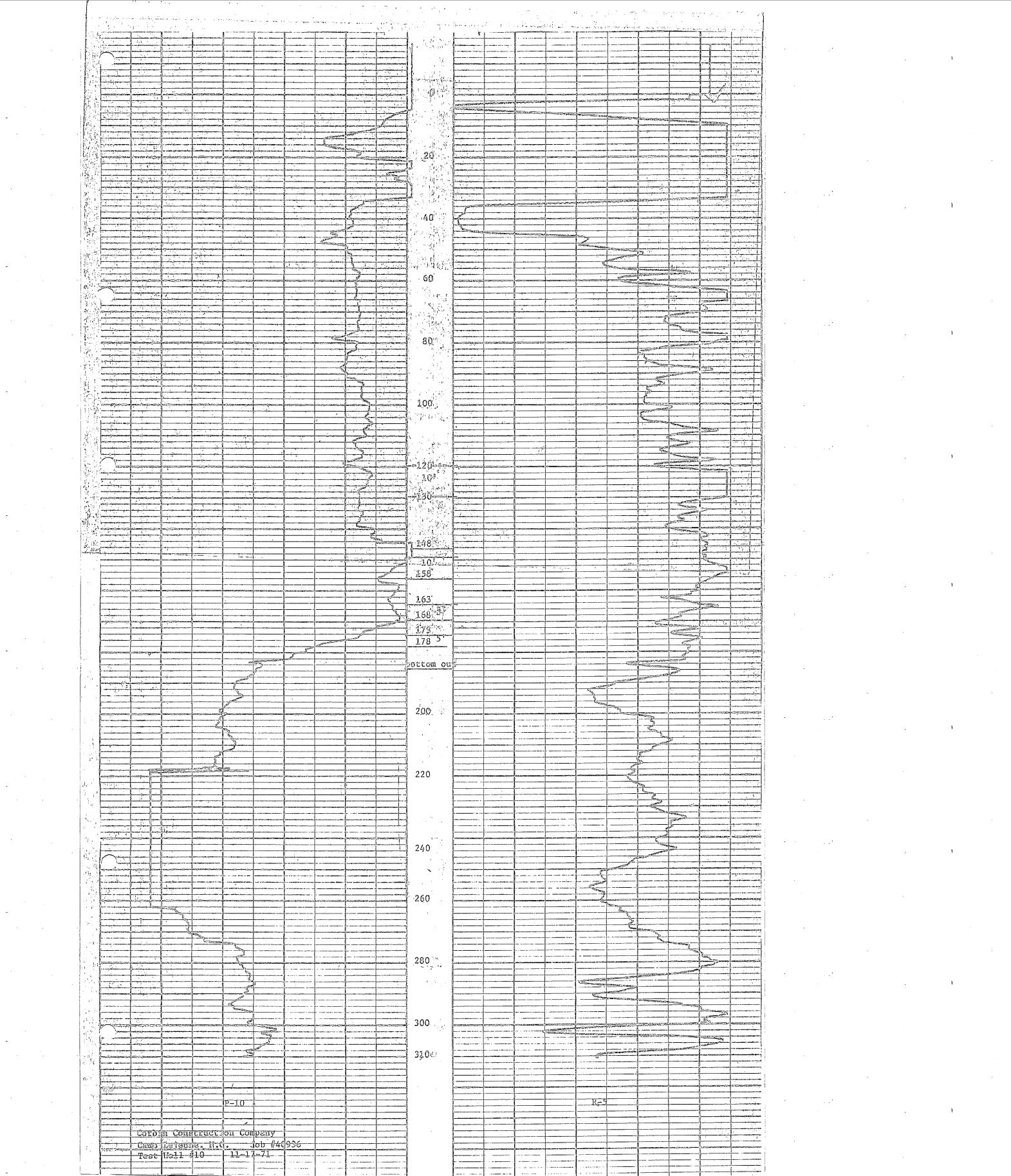
P. O. BOX 7095 . NORFOLK, VIRGINIA 23509

CORBIN CONSTRUCTION CO.
Camp Lejeune, N.C.

Well #10 November 17, 1971 FACTORY AND GENERAL OFFICE
MEMPHIS, TENN.
SALES OFFICES
ALBANY, GA.
GLEN BURNIE, MD.
NORFOLK, VA.
ORLANDO, FLA.
SAVANNAH, GA.

0 - 10'	Top soil sandy clay	
10 - 20'	Medium to fine white sand	
20 - 30'	Medium to fine white sand	
30 - 40°	Soft blue clay	
40 - 50'	Soft blue clay	
50 - 60°	Blue clay with streaks of lime & shell	rock
60 - 70°	Lime stone with streak of fine sand	
70 - 80'	Lime stone with streaks of sand	
80 - 90'	Soft lime stone with traces of clay	
90 - 100'	Shell fragments with traces of clay (so	oft)
100 - 110'	11 11 11 11 11	11
110 - 120'	11 11 11 11 11	11
120 - 130'	и и и и	11
130 - 140'	и и и и	11
140 - 150'	Fine sand and shell fragments	
150 - 160'	Fine sand and shell fragments	
160 - 170'	Fine sand with traces of shell and clay	У
170 - 180'	Shell fragments fine sandy clay	
180 - 190°	Shell fragments fine sandy clay	
190 - 200'	Shell fragments fine sandy clay	
200 - 210'	Fine sand and shell fragments (soft)	
210 - 220'	Fine to medium sandy clay	
220 - 230'	Fine to medium sandy clay	
230 - 240'	Very fine sand	
240 - 250'	Fine sandy clay	
250 - 260'	Fine silty sand - shell (soft)	
260 - 270'	Fine silty sand (soft)	
270 - 280'	Fine silty sand and shell (soft)	
280 - 290¹	" " " " " "	
290 - 300°	и и и и и	
300 - 310'	п п п п п	





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Well : 10

Discharge head per section 11A, par. 11A.3.1 ---- 130
Pumping level @ 200 gpm ---- 90
Total head ---- 220

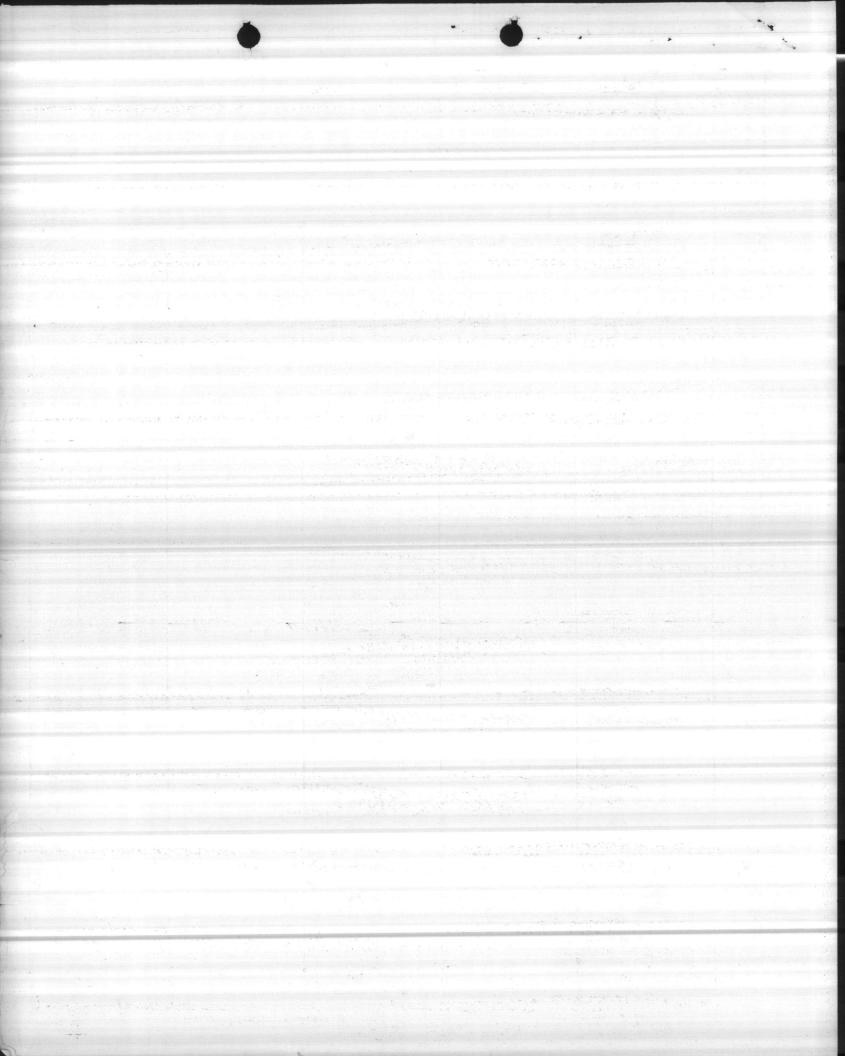
Pump

8" PRHC 7 stage 15 hp

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CURVE NO. PB 1810

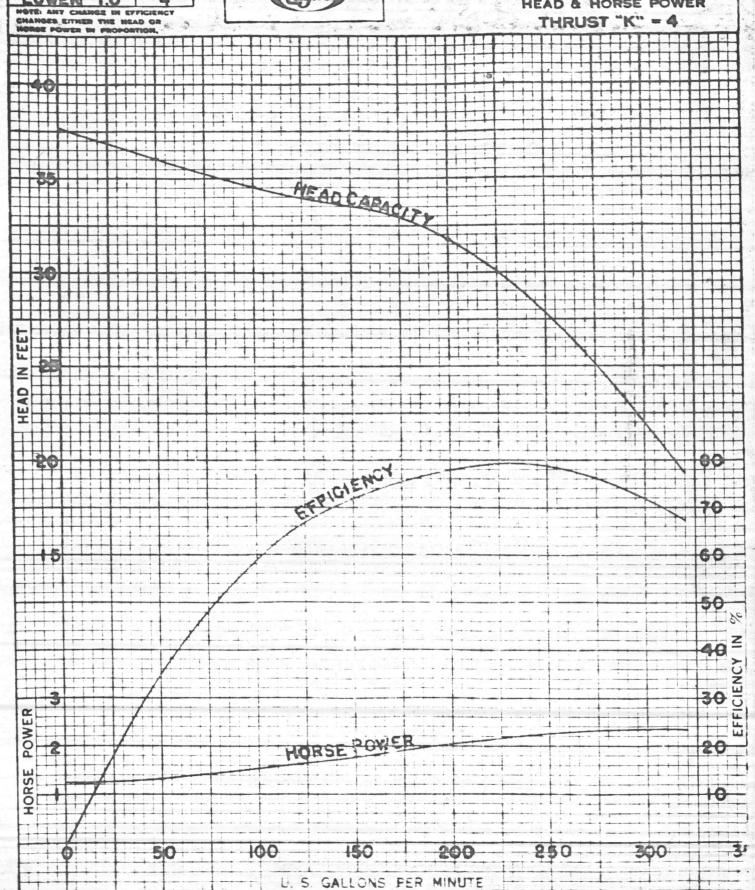
EHANGE EPPICIENCY AS POLLOWS LOWER 5.5 LOWER 4.0 2 2.5 3 LOWER LOWER 1.0 4

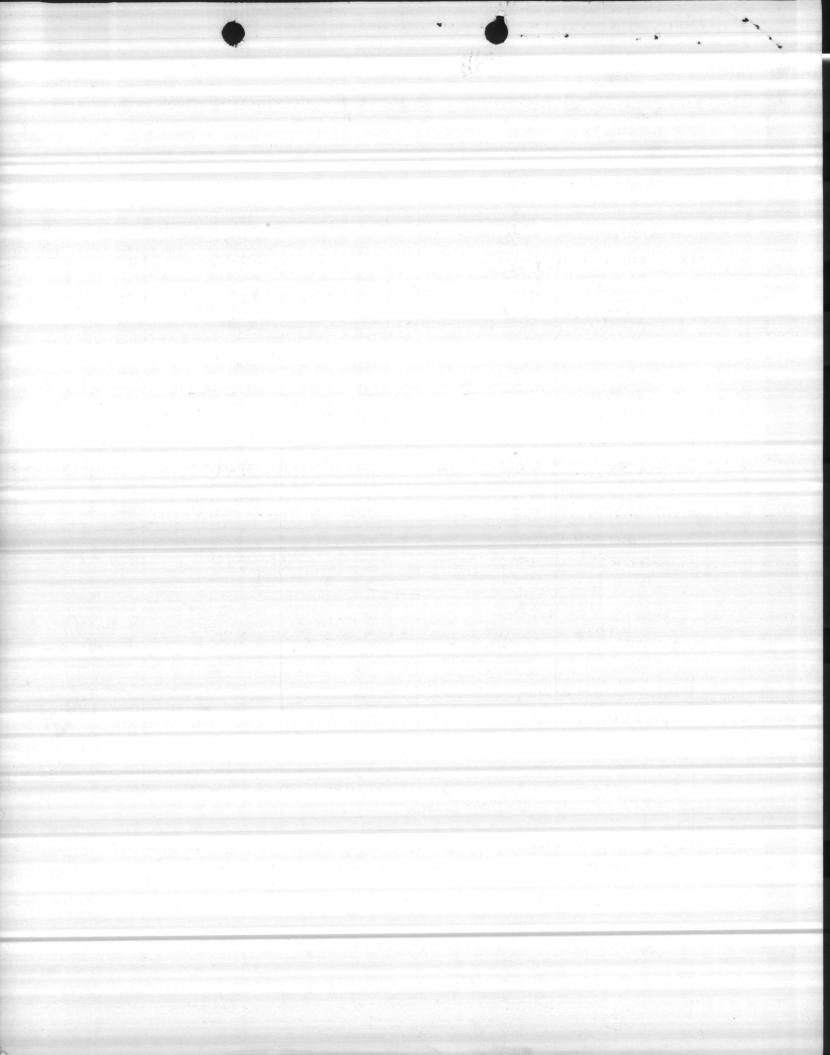
SINGER LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A. (eyne)

8" PRHC RPM

SINGLE STAGE LABORATORY HEAD & HORSE POWER

ED







PUMP RECORD

PUMP No.

71194

For Camp LeJeune,

North Carolina



SI NGER- Layne Atlantic Co.

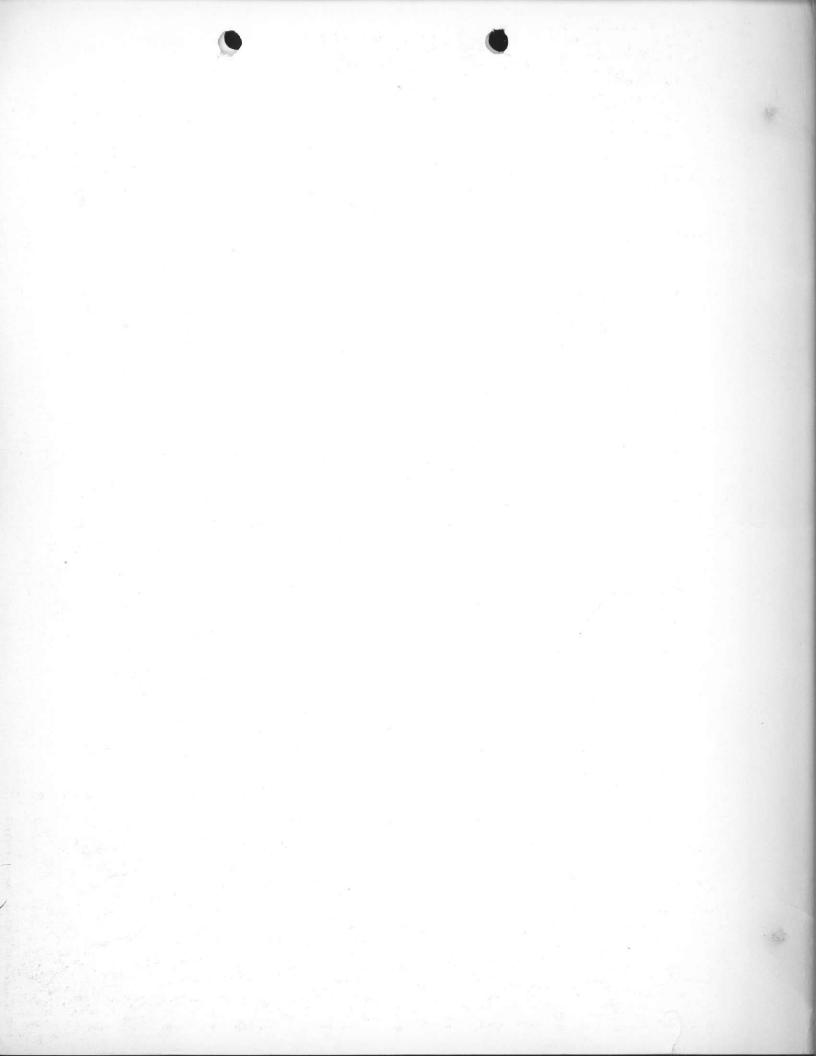
Norfolk,

Va.

Manufactured By:

SINGER

LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A.

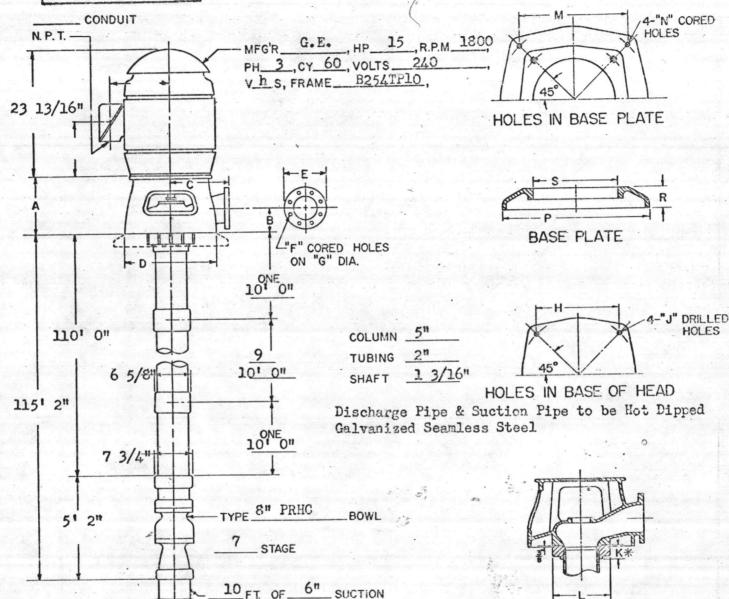




INSTALLATION PLAN

TYPE TF413 DISCHARGE HEAD

USE THESE DIMENSIONS ONLY WHEN CERTIFIED BY FACTORY



* FOR COLUMN SETTINGS OF 200' OR GREATER, "K"=11"

SECTION THRU HEAD

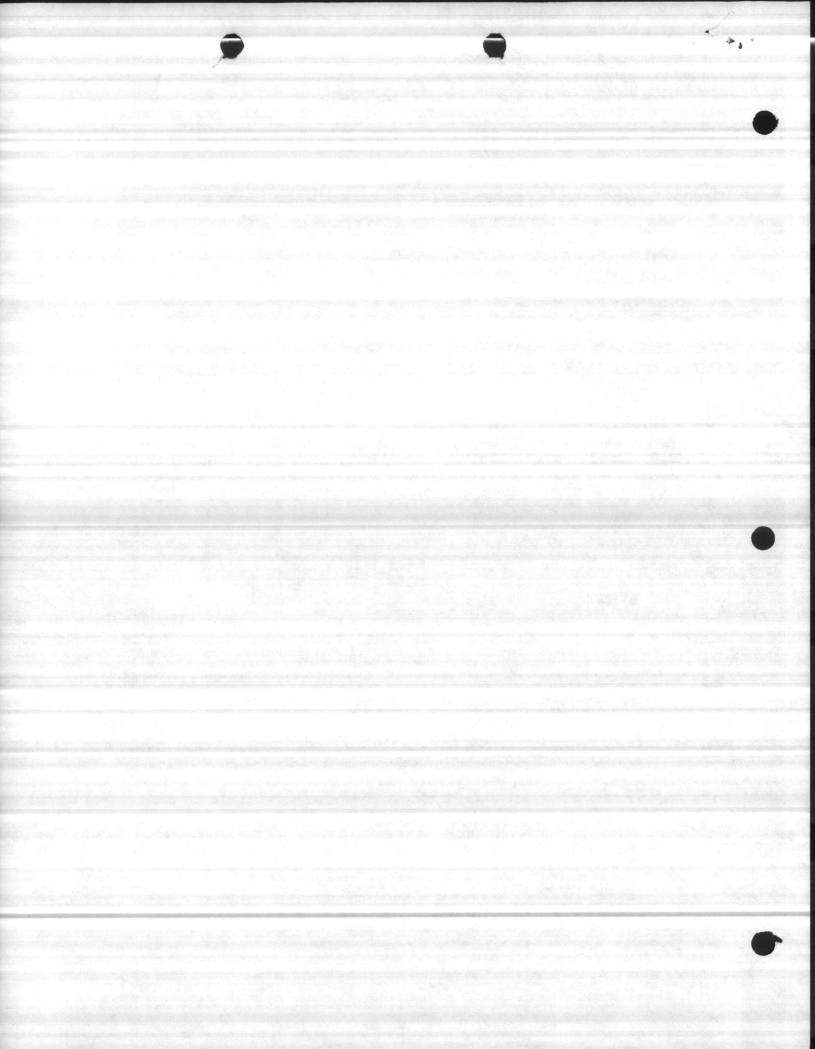
YOUR NO: N-16-72 OUR NO: 72D-369 PUMP NO: 71194 DATE: 2/2/72 200 G.P.M. CUSTOMER: 220 1750 T.D.H. LOCATION: FOR APPROVAL: R.P.M. B.H.P.

6" " CONE STRAINER

HEAD	A	В	C	D	E.	F	G	Н	J	K*	L	M	N	P	R	S
TF413												1615				
TF613	14	6	11	18	11	8-7	91/2	141	11	2-7	11	1615	7 8	21	2	17
TF418	13	6	141	23	9	8-3	71/2	175	13	213	10	201	78	26-2	23	2 3
TF618	15	6	141	23	11	8-7	9 1	17 5	13	27	12-1	2016	7.8	261	23	213
TF818	18	73	144	23	13-1	8-7	113	17 %	15	3 16	13 2	2016	7	261	2%	213
TFI018	18	83	14-1	23	16	13-1	144	175	13	3 11	16	201	7 8	26 1/2	23	213
TF1218	20	95	16 4	26	19	1-2	17	135	13	3 11	19	23 11	7 8	32	34	24

HEAD-	A	B	C	D	E	F	G	H	J	K*	L	M	N	D.	R	S
TF625	15	81	13-7	31	H	8-7	91	2316	13	27	12-	39	1	38	37	25
TF825	20	81	18-4	31	131	8-4	T	23!	13	3-16	13-2	29	1	38	34	20
TF1025	20	8	184	31	16	12-1	142	23	16	5.0	16	29	i	33	3-2	29
TF1225	21	9.5	18-4	31	12	12-1	17	231	13	3 16	19	29	1	30	37	23
TF12251	21	95	124	31	19	12-1	17	23/16	15	4 7	21	29	!	38	-	123
TF1425	21	103	181	31	21	12-1	184	23 16	15	4/10	51	29	1	38	37	150
FF1227	24	93.	21	36	19	12-1	17	275	100	3 11	19	33 =	1	43	4-	23

HOLES



VERTICAL CENTRIFUGAL PUMP-INSTALLATION OF PUMP HEADS WITH STYLE 60 STUFFING BOX HOLLOW SHAFT-MOTOR DRIVEN BUTT-JOINT TOP COLUMN FLANGE

DISASSEMBLE AND CLEAN Before installation, the pump head should be disassembled and all parts thoroughly cleaned with kerosene. Remove the stuffing box from the discharge ell.

MOUNT DISCHARGE ELL With the style 60 packing box a butt-joint, top-column flange is used. Therefore, no adjustment is necessary. Clean the face of the top flange and the bottom flange of the discharge ell and coat with Layncote. Note condition of top of the projecting tubing and remove with a file any burrs or sharp edges that might cut the 0 ring when it is installed. Bolt discharge ell and column together.

PACKING BOX Clean the tension bearing and stuffing box thoroughly before continuing with installation. Insert the stuffing box first, having the "O" ring in place (a light coat of oil should be given the "O" ring). The tension bearing can now be installed, the threaded portion being coated with Layncote. Slip bearing over shaft and screw into tubing until the bearing flange butts the stuffing box. (This should be a hand tight snug fit). The bearing is now ready to take the tension.

TENSION The amount of tension should be based on 1/8" tube travel per 100 ft. of setting, this is put in terms of No. of turns of the tension bearing in the table below:

SIZE	NUMBER	NUMBER OF TURNS PER 100
TUBING	THREADS	FEET OF SETTING
1 1/4"	16	2
1 1/2"	12	1 1/2
2"	10	1 1/4
2 1/2", 3"	8	
ε 3 1/2"	OLD STD.	
2 1/2", 3"	10	
ε 3 1/2"	NEW STD.	1 1/4
4" & UP	10	1 1/4

ALIGNMENT The pump shaft MUST now be in the exact center of the pump head and exactly perpendicular to the machined surface of the discharge ell. This can be checked with a stright edge, square, and pair of calipers. The discharge ell can be shaifted slightly on the concrete foundation or tilted with shims until the shaft is properly aligned.

MOTOR MOUNT Lower the hollow shaft motor over the drive shaft, taking care not to disturb the alignment. To insure proper operation of the pump it is necessary that the motor be centered exactly, so great care should be taken in this operation. Bolt motor to discharge ell or motor stand with cap screws.

When a hollow shaft motor is used the drive shaft is keyed to a removable motor coupling. Screw on and tighten the drive shaft nut, lifting the shaft until the impellers are drawn against the top of the pump bowl. In this position the shaft cannot be rotated. The nut should then be loosened 1/4 to 1/2 turn or until the shaft turns freely. A gib key is then inserted to prevent the drive shaft nut from working loose.

GROUT BASE AND CONNECT DISCHARGE Grout the discharge ell in position, being careful not to disturb the alignment of the pump head. In case the discharge nipple is to be connected to a water main, a Dresser Coupling should be used. The main should be placed as nearly as possible in line with the discharge nipple. The Dresser Coupling prevents throwing any strain on the pump head if the discharge nipple and main are not exactly in line.

LUBRICATING SYSTEM Connect the hand oil pump, drip feed lubricator or automatic solenoid lubricator to the oil connection in the tension bushing. When first connected allow about one cup full oil to enter the tubing. Then adjust the drip cup or automatic lubricator to allow the following quantity of oil to enter the tubing:

For setting up to 50 feet - 5 drops per minute For setting up to 100 feet - 10 drops per minute For setting up to 150 feet - 15 drops per minute For setting up to 200 feet - 20 drops per minute For setting up to 250 feet - 25 drops per minute For setting up to 300 feet - 30 drops per minute

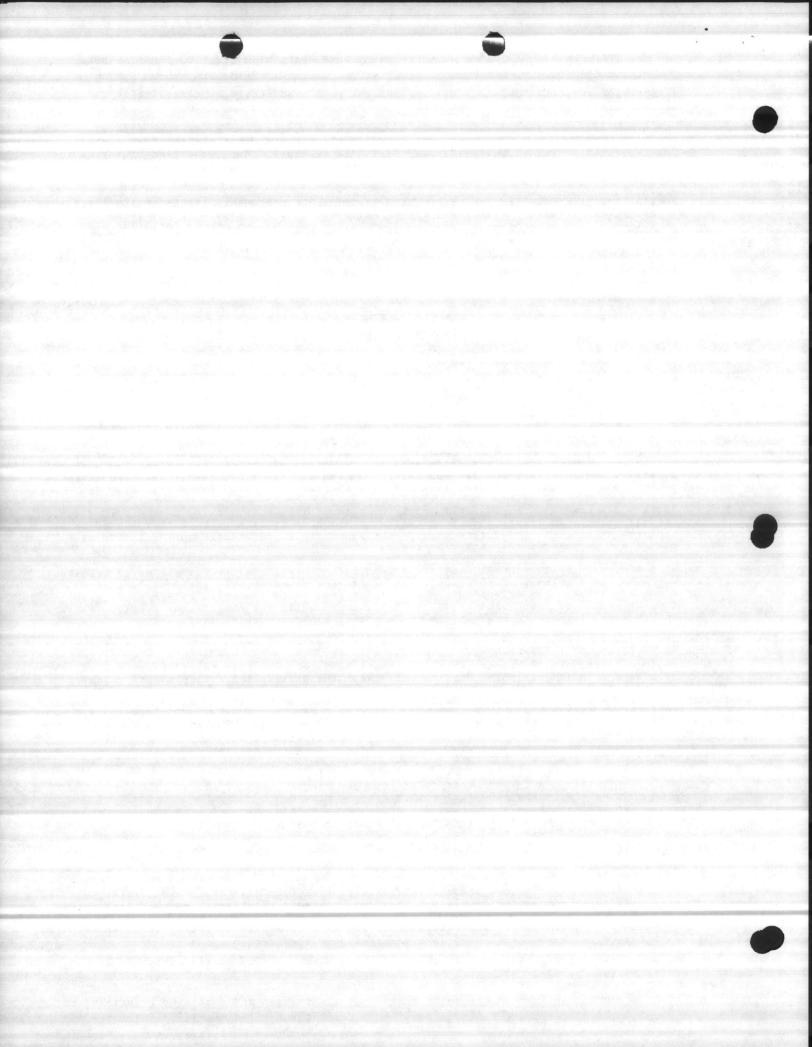
When using a force feed oil pump inject about one cup full of oil for each 24 hours of operation.

The oil should be of a good grade of mineral oil free from grit or foreign matter, with a viscosity rating of approximately S.A.E. 10 and having a relatively low cold pour point.

 $\frac{\text{STARTING}}{\text{pump must}} \frac{\text{PUMP}}{\text{operate in a left hand or counter clock-wise direction.}}$

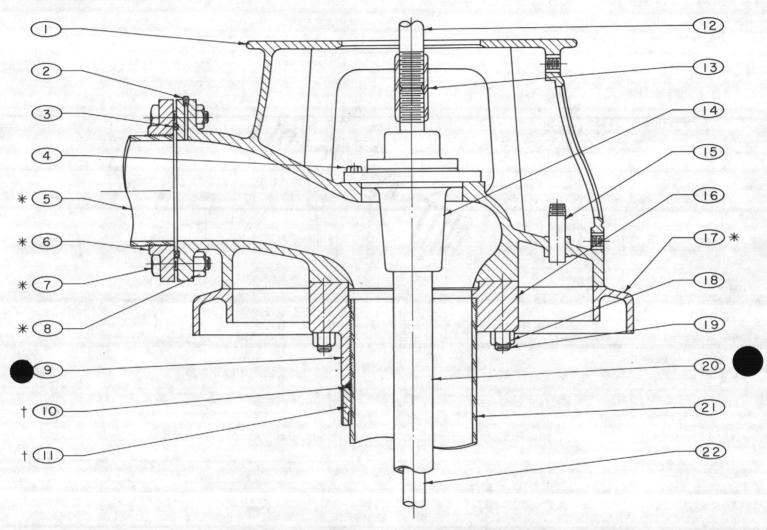
Open pet cock located adjacent to packing box to release air from discharge column, and close as soon as water discharges from pet cock.

After the pump has been in operation a few hours, shut down and check the adjustment of the pump runners. The pump shaft may have been screwed up tighter by the power applied and thereby shortened.



TYPE TF DISCHARGE HEAD ENCLOSED LINE SHAFT





* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

NO.	DESCRIPTION
	DISCHARGE HEAD .
2	PIPE PLUG, PRESSURE GAUGE
3	PACKING, COMPANION FLANGE
4	CAPSCREW (STUFFING BOX)
5	DISCHARGE PIPE
6	COMPANION FLANGE
7	MACHINE BOLT, COMPANION FLG.
8	HEX NUT, COMPANION FLANGE
9	ADJ. TOP COLUMN FLANGE
10	PACKING
11	PACKING RING

TUSED FOR SETTINGS GREATER THAN 200 FT.

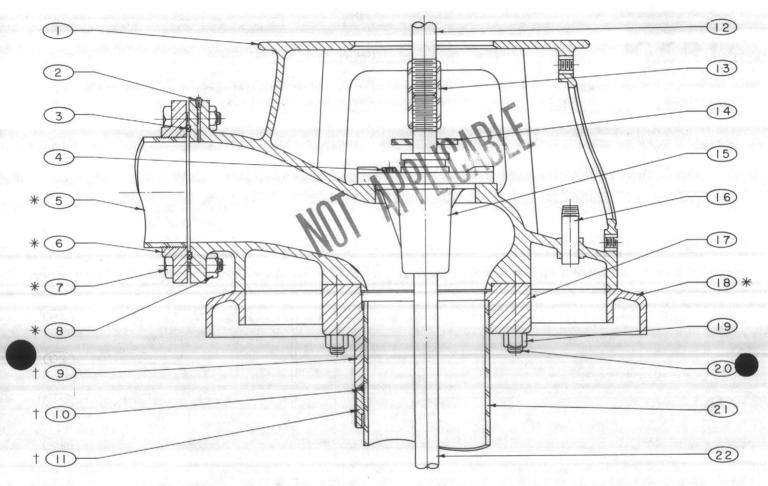
NO.	DESCRIPTION				
12	MOTOR DRIVE SHAFT				
13	HEAD COUPLING				
14	STUFFING BOX (ASSEMBLY)				
15	PIPE NIPPLE (AUXILIARY OPN'G)				
16	TOP COLUMN FLANGE				
17	BASE PLATE				
18	HEX NUT				
19	STUD				
20	TUBING				
21	TOP COLUMN PIPE				
22	LINE SHAFT, TOP PIECE				

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

REVISED 10-1-67
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

TYPE TF DISCHARGE HEAD OPEN LINE SHAFT





*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

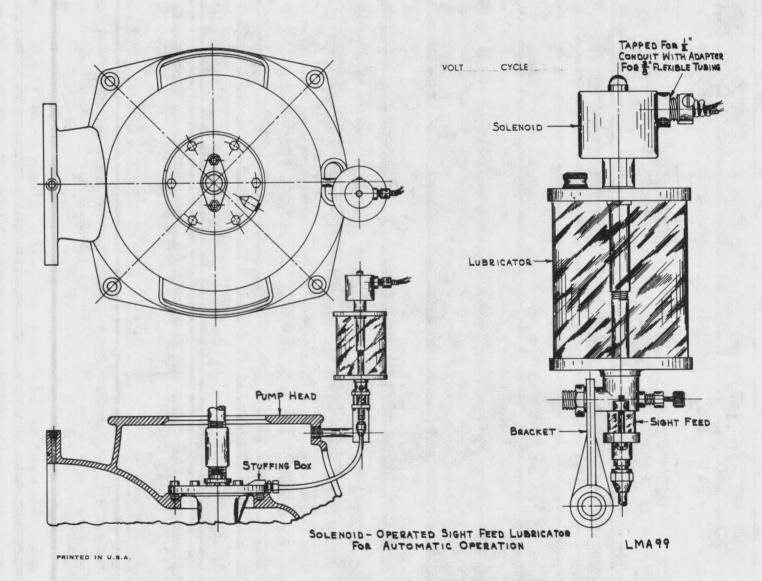
NO.	DESCRIPTION
1	DISCHARGE HEAD
2	PIPE PLUG, PRESSURE GAUGE
3	PACKING, COMPANION FLANGE
4	CAPSCREW (STUFFING BOX)
5	DISCHARGE PIPE
6	COMPANION FLANGE
7	MACHINE BOLT, COMPANION FLG.
8	HEX NUT, COMPANION FLANGE
9	ADJ. TOP COLUMN FLANGE
10	PACKING
11	PACKING RING

TUSED FOR SETTINGS GREATER THAN 200 FT.

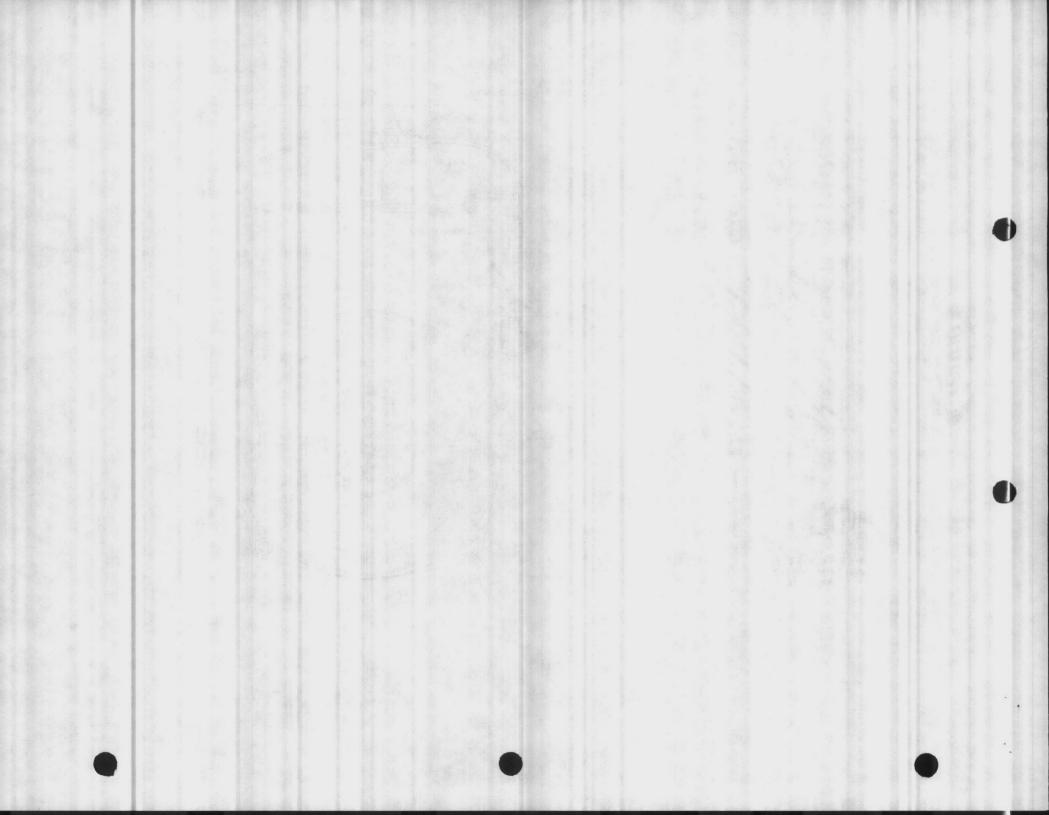
NO.	DESCRIPTION
12	MOTOR DRIVE SHAFT
13	HEAD COUPLING
14	WATER SLINGER
15	STUFFING BOX (ASSEMBLY)
16	PIPE NIPPLE (AUXILIARY OPN'G)
17	TOP COLUMN FLANGE
18	BASE PLATE
19	HEX NUT
20	STUD
21	TOP COLUMN PIPE
22	LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

REVISED - 10-1-67
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

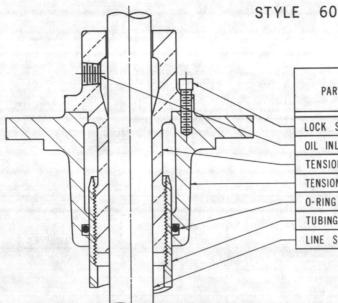








STUFFING BOX ASSEMBLY OIL LUBRICATION



	MATERIAL						
PART NAME	STANDARD	SPECIAL					
LOCK SCREW	STEEL	TATE BY ST					
OIL INLET							
TENSION BEARING	BRONZE	i dan la tan					
TENSION BOX	CAST IRON						
O-RING	BUNA-N						
TUBING	C.SSCH. 80 PIPE						
LINE SHAFT	C-1045 CAR. STL.						

IN ORDERING REPLACEMENT PARTS, SPECIFY PARTS DESCRIPTION AND PUMP SERIAL NO.

INSTALLATION AND OPERATING INSTRUCTIONS

- 1. REMOVE THE LOCK SCREW AND THE O-RING AND THOROUGHLY CLEAN THE TENSION BOX INCLUDING THE O-RING GROOVE. REMOVE ANY NICKS OR BURRS FROM THE UPPER AND LOWER MOUNTING FACES AND MALE REGISTER WITH A FINE FLAT FILE. RE-INSTALL AND LIGHTLY OIL THE EXPOSED SURFACE OF THE O-RING.
- CLEAGO THE SURFACE OF THE HEAD THAT RECEIVES THE TENSION BOX AND REMOVE AGY NICKS OR BURRS WITH A FINE FLAT FILE.
- CAREFULLY INSTALL THE TENSION BOX, ALIGN THE MOUNTING HOLES WITH THE TAPS IN THE HEAD AND SEAT THE BOX TO THE HEAD. INSTALL AND EVENLY TIGHTEN THE MOUNTING CAPSCREWS.
- 4. CLEAN THE TENSION BEARING THOROUGHLY AND REMOVE ANY NICKS OR BURRS FROM THE MOUNTING FACE AND REGISTER WITH A FINE FLAT FILE. REMOVE ANY NICKS OR BURRS FROM THE THREADS WITH A THREE CORNERED FILE.
- OIL THE THREADS AND THE BORE AND CAREFULLY PLACE THE TENSION BEARING OVER THE SHAFT AND THREAD (RIGHT HAND) INTO THE TUBING. CONTINUE THREADING UNTIL THE LOWER FLANGE FACE FIRMLY CONTACTS THE TENSION BOX FACE.
- FOR THE PROPER AMOUNT OF TUBE TENSION, REFER TO INSTRUCTIONS PBI 100
 PAGE 1 OR 2. FOR SETTINGS LESS THAN 100 FEET, TIGHTEN TO THE NEAREST
 LOCKING POSITION.

CHART 1 BELOW GIVES THE AMOUNT OF PULL-UP FOR EACH COMPLETE TURN. OF THE TENSION BEARING.

CHART 1

SIZE TUBING	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4" & UP
NO. THD'S/IN	16	12	10	10		8	10
"A"	.063"	.083"	.100"	.100"		.125"	.100"

"A" = AMOUNT OF PULL-UP FOR EACH COMPLETE TURN OF THE TENSION BEARING.
THE TOTAL NUMBER OF TURNS REQUIRED CAN BE CALCULATED BY DIVIDING THE
FIGURE ABOVE INTO THE TENSION FIGURE FROM PBI 100.

EXAMPLE: 500 FEET OF 10" (.279" WALL) \times 1 11/16" \times 2 1/2": FROM PBI 100, THE PROPER TENSION OR PULL-UP IS FOUND TO BE 0.529" AND FROM CHART 1, THE PULL-UP PER COMPLETE TURN IS 0.100" FOR 2 1/2" 10 THD. THEING.

TOTAL NO. OF TURNS = $0.529 \\ 0.100 = 5.29$ OR APPROXIMATELY 5 1/4.

IF AFTER ADJUSTING THE TENSION BEARING THE PROPER NUMBER OF TURNS, NO SLOT ALIGNS WITH THE LOCK SCREW TAP IN THE BOX, IT IS RECOMMENDED THAT THE BEARING BE BACKED OFF TO THE NEAREST ALIGNMENT POSITION IE IT TAKES MORE THAN AN EIGHTH TURN FORWARD TO ACHIEVE ALIGNMENT.

- 7. INSTALL AND TIGHTEN THE LOCK SCREW.
- 8. CONNECT THE LUBRICATOR TO THE OIL CONNECTION IN THE TENSION BEARING.

FILL THE LUBRICATOR WITH A GOOD GRADE MINERAL OIL HAVING A VISCOSITY RATING OF APPROXIMATELY S.A.E. 10 AND HAVING A RELATIVELY LOW COLD POUR POINT.

CONTINUED ON PAGE 2



STYLE 60 INSTALLATION AND OPERATING INSTRUCTIONS

(CONTINUED)

IMPORTANT:

PRIOR TO INITIAL START-UP AND AFTER A SHUT DOWN OF 150 HOURS OR LONGER, THE LUBRICATOR SHOULD BE ADJUSTED FOR THE RECOMMENDED NUMBER OF DROPS PER MINUTE AS OUTLINED IN CHART 2 AND ALLOWED TO OPERATE AT THIS RATE FOR 20 MINUTES FOR EACH 100 FEET OF SETTING.

FOR NORMAL OPERATION, THE LUBRICATOR SHOULD BE ADJUSTED IN ACCORDANCE WITH CHART 2.

CHART 2

	"A"	"B"		
SHAFT SIZE	LUBRICATOR SETTING IN DROPS PER MIN.	DROPS PER MIN.PER EACH 100 FT. SETTIN		
7/8 - 1 3/16	5	2		
1 1/2 - 1 11/16	7	3		
1 15/16 - 2 7/16	10	4		
2 11/16	12	5		

TOTAL DROPS/MIN. = "A" + $(\underbrace{\text{SETTING}}_{100} \times \text{"B"})$

EXAMPLE: 500 FEET OF 1 11/16" \times 2 1/2" TOTAL DROPS/MIN. = 7 \times $(\frac{500}{100} \times 3)$ = 7 + (5 \times 3) = 7 + 15 = 22

9. THE LUBRICATOR SHOULD BE CHECKED PERIODICALLY AND RESET IF REQUIRED TO MAINTAIN THE PROPER FLOW.

THE APPROXIMATE NUMBER OF HOURS OF CONTINUOUS OPERATION AT VARIOUS FLOW RATES CAN BE FOUND IN CHART 3. IT IS GENERALLY RECOMMENDED THAT THE LUBRICATION BE RE-FILLED WHEN IT IS NO LESS THAN ONE QUARTER FULL.

CHART 3

	NUMBER OF HOURS	OF CONTINUOUS OPE	RATION					
FLOW RATE	LUBRICATOR CAPACITY							
DROPS/MIN.	1 QUART	2 QUART	3 QUART					
5	110	220	440					
10	55	110	220					
15	38	75	150					
20	28	55	110					
25	22	.45	90					
30	19	38	75					
40	14	28	55					
50	11	22	45					



TUBE TENSION ADJUSTMENT CHART

COLUMN	SHAFT AND		CANADA III		1	UBE TENSIO	N IN INCHE	S					
SIZE	TUBING SIZE		SETTING IN FEET										
		100	200	300	400	500	600	700	800	900	1000		
3" MC*	1 1/4 x 7/8	0.025	0.103	0.233	0.415	0.649							
(.187)	1 1/2 x 1	0.028	0.115	0.261	0.465	0.726							
4" *	1 1/4 x 7/8	0.020	0.083	0.186	0.333	0.520	0.750	1.021	1.334	1.688	2.08		
(.237)	1 1/2 x 1	0.022	0.090	0.202	0.361	0,564	0.813	1.107	1.447	1.831	2.260		
SCH. 40S	2 x 1 3/16	0.025	0.103	0.233	0.416	0.650	0.936	1.275	1.666	2.108	2.60		
5" *	1 1/4 x 7/8	0.018	0,075	0.171	0.305	0,476	0.686	0.934	1.220	1.544	1.906		
(.258)	1 1/2 x 1	0.020	0.081	0.182	0.325	0.508	0.733	0.998	1.303	1.650	2.036		
SCH. 40S	2 x 1 3/16	0.022	0.091	0.205	0.366	0.571	0.824	1.121	1.465	1.854	2.289		
	1 1/4 x 7/8	0.017	0.071	0.160	0.286	0.447	0,644	0.878	1.146	1.451	1.791		
6" *	1 1/2 x 1	0.018	0.075	0.169	0.302	0.472	0.681	0.927	1.211	1.532	1.892		
(.280)	2 x 1 3/16	0.020	0.083	0.187	0.333	0.521	0.751	1.022	1.335	1.690	2.086		
SCH 40S	2 1/2 x 1 1/2	0.024	0.098	0.220	0.393	0.613	0.884	1.204	1.572	1.990	2.457		
	2 1/2 x 1 11/16	0.025	0.102	0.231	0.412	0.643	0.927	1.263	1.649	2.088	2,577		
	3 x 1 15/16	0.029	0.119	0.269	0.480	0.750	1.080	1.471	1.922	2.432	3.003		
	1 1/2 x 1	0.017	0.071	0.161	0.287	0.449	0.647	0.881	1.151	1.457	1.798		
	2 x 1 3/16	0.019	0.077	0.175	0.313	0.488	0.704	0.958	1.252	1.584	1.956		
7" *	2 1/2 x 1 1/2	0.022	0.089	0.202	0.360	0.563	0.811	1.105	1.443	1.827	2.255		
(.300)	2 1/2 x 1 11/16	0.023	0.093	0.211	0.376	0.587	0,846	1.153	1,506	1.906	2.353		
	3 x 1 15/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.726	2.184	2.696		
	3 1/2 x 2 3/16	0.030	0.121	0.272	0.485	0.757	1.092	1.486	1.941	2.457	3.034		
	3 1/2 x 2 7/16	0.031	0.127	0.287	0,512	0.800	1.153	1.570	2.050	2.595	3.204		
	2 x 1 3/16	0.019	0.076	0.173	0.308	0.481	0.694	0.945	1.234	1.562	1.928		
8" *	2 1/2 x 1 1/2	0.022	0.088	0.198	0.354	0.552	0.796	1.084	1.416	1.793	2.213		
(.277) SCH 30	2 1/2 x 1 11/16	0.022	0.091	0.206	0.368	0.575	0.829	1.129	1.475	1.867	2.306		
	3 x 1 15/16	0.026	0.105	0.236	0.421	0.657	0.947	1.290	1.634	2.132	2,632		
	3 1/2 x 2 3/16	0.029	0.117	0.265	0.472	0.737	1.062	1.447	1,890	2.392	2,953		
	3 1/2 x 2 7/16	0.031	0.124	0.279	0.498	0.778	1.121	1.526	1.993	2.522	3.114		
	2 x 1 3/16	0.018	0.074	0.166	0,297	0.464	0.668	0.910	1.189	1.505	1.858		
8"	2 1/2 x 1 1/2	0.020	0.083	0.188	0.336	0.525	0.757	1.031	1.347	1.704	2.104		
(.322)	2 1/2 x 1 11/16	0.021	0.087	0.196	0.349	0.545	0.786	1.070	1.398	1.769	2.184		
SCH. 40S	3 x 1 15/16	0.024	0.098	0.221	0.394	0.616	0.887	1.208	1.579	1.998	2.467		
	3 1/2 x 2 3/16	0.027	0.109	0.246	0.439	0.685	0.987	1.344	1.756	2.223	2.744		
	3 1/2 x 2 7/16	0.028	0.115	0.259	0.461	0.720	1.038	1.413	1.846	2.336	2.884		
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.455	0.655	0.892	1.166	1.476	1.822		
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.511	0.737	1.003	1.311	1.659	2.048		
9" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.339	0.530	0.763	1.040	1.358	1.719	2.122		
(.312)	3 x 1 15/16	0.023	0.095	0.213	0.381	0.595	0.857	1.167	1.524	1.929	2.382		
	3 1/2 x 2 3/16	0.026	0.105	0.236	0.422	0.658	0.949	1.292	1.688	2.136	2.637		
ija sastoji	3 1/2 x 2 7/16	0.027	0.110	0.248	0,442	0,690	0.995	1.355	1.770	2.240	2.766		
	2 x 1 3/16	0.018	0.072	0.163	0.291	0,454	0,655	0.891	1.164	1.474	1.819		
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0,510	0,736	1.002	1.309	1.656	2.045		
10" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0,338	0.529	0.762	1.038	1,355	1.716	2.118		
(.279)	3 x 1 15/16	0.023	0.094	0.213	0.380	0.593	0.855	1.164	1.521	1.925	2.377		
	3 1/2 x 2 3/16	0.026	0.104	0.236	0.420	0.657	0.946	1.289	1.683	2.131	2.630		
80.00	3 1/2 x 2 7/16	0.027	0.110	0.247	0.441	0.689	0.992	1.351	1.765	2.234			
	4 x 2 11/16	0.030	0.122	0.276	0.492	0.769	1.108	1.509	1.971	2,494	2.758 3.079		
	2 x 1 3/16	0.017	0.071	0.159	0.285	0.445	0.641	0.873	1.141		75.9		
	2 1/2 x 1 1/2	0.019	0.079	0.178	0.318	0,445	0.715	0.974		1.444	1.783		
10"	2 1/2 x 1 11/16	0.020	0.081	0.178	0.328	0,496	0.739	1.007	1.272	1.610	1.988		
(.307)	3 x 1 15/16	0.022	0.091	0.205	0.366	0.572			1.315	1.664	2.055		
SCH. 30	3 1/2 x 2 3/16	0.025	0.100	0.205	0.403		0.824	1.122	1.466	2.0/12	2,290		
00111 00	3 1/2 x 2 7/16	0.025	0.105	0.236	0.403	0.629	0.907	1.235	1.614	2.042	2.521		
	- 11 - V - 1/10	0.020	OITOS	0.430	U,444	0.659	0.949	1.292	1.688	2.137	2.638		

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD



TUBE TENSION ADJUSTMENT CHART

CO1 18881	SHAFT AND	TUBE TENSION IN INCHES									
COLUMN				7492112810715		SETTING I	N FEET		Ti Deregion		
SIZE	TUBING SIZE	100	200	300	400	500	600	700	800	900	1000
	2 x 1 3/16	0.017	0.068	0.154	0.276	0.430	0,620	0.845	1.104	1.397	1.729
	2 1/2 x 1 1/2	0.018	0.075	0.170	0.303	0.474	0,683	0.930	1.215	1.538	1.899
10"	2 1/2 x 1 11/16	0.019	0.077	0,175	0.312	0,488	0.703	0.958	1.251	1.583	1.955
(,365)	3 x 1 15/16	0,021	0,085	0,193	0.344	0,538	0,775	1.055	1.378	1.745	2.154
405	3 1/2 x 2 3/16	0.023	0.093	0.210	0.376	0.586	0,845	1.151	1.504	1.903	2.349
	3 1/2 x 2 7/16	0.024	0.097	0.219	0.391	0.611	0.881	1.199	1.567	1.983	2.448
	4 x 2 11/16	0.026	0.107	0.242	0.431	0,673	0.970	1.321	1.725	2.183	2.695
	2 1/2 x 1 1/2	0.018	0.074	0.166	0.297	0.464	0.670	0.912	1.191	1.508	1.861
12" *	2 1/2 x 1 11/16	0.019	0.076	0.171	0.306	0,477	0,688	0.937	1.225	1.550	1.913
(.330)	3 x 1 15/16	0.020	0.083	0.188	0.335	0.524	0,755	1.028	1.342	1.699	2.098
SCH. 30	3 1/2 x 2 3/16	0.022	0,090	0,204	0.364	0,569	0,820	1,116	1.458	1.846	2.278
-	3 1/2 x 2 7/16	0.023	0.094	0,212	0.379	0,592	0,853	1,161	1.517	1.919	2.370
	4 x 2 11/16	0.025	0.103	0,233	0.415	0,649	0,935	1.273	1.663	2.105	2.599
estensing Felle	2 1/2 x 1 1/2	0.018	0.072	0.162	0.289	0.451	0,650	0.886	1.157	1.464	1.808
12"	2 1/2 x 1 11/16	0.018	0.073	0.166	0.296	0.463	0.667	0.908	1.187	1.502	1.854
(,375)	3 x 1 15/16	0.020	0.080	0.181	0.322	0,503	0.726	0.988	1.291	1.634	2.017
ala .	3 1/2 x 2 3/16	0.021	0.086	0.195	0.348	0.543	0.783	1.066	1.393	1.763	2.177
year things to be	3 1/2 x 2 7/16	0.022	0.090	0.202	0.361	0.563	0.812	1.106	1.444	1.828	2.257
	4 x 2 11/16	0.024	0.098	0.220	0.393	0.614	0.885	1.205	1.574	1.992	2.459
	2 1/2 x 1 1/2	0.017	0.070	0.158	0.283	0.442	0.637	0.868	1.133	1.435	1.771
14" "	2 1/2 x 1 11/16	0.018	0.072	0.162	0.290	0.452	0.652	0.888	1.160	1.468	813
(.375)	3 x 1 15/16	0.019	0.078	0.175	0.313	0.489	0.705	0.961	1.255	1.588	1.961
SCH. 30S	3 1/2 x 2 3/16	0.021	0.084	0.189	0.337	0.526	0.758	1.032	1.348	1.706	2.106
	3 1/2 x 2 7/16	0.021	0.086	0.195	0.348	0.544	0.784	1.067	1.394	1.765	2.179
	4 x 2 11/16	0.023	0.094	0.212	0.378	0.590	0.850	1.157	1.512	1,914	2.362
16" *	3 x 1 15/16	0.018	0.075	0.169	0.302	0.472					
(.375)	3 1/2 x 2 3/16	0.020	0.080	0.180	0.322	0.503	1				
SCH. 30S	3 1/2 x 2 7/16	0.020	0.082	0.186	0.332	0.519					
0.000	4 x 2 11/16	0.022	0.089	0,201	0.358	0.559		BEAUTIFE REPORT	Account to the	latus rollects, also d	e more and

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD.



VERTICAL CENTRIFUGAL PUMP

Installation of Pump Bowls and Golumn

Butt Joint Column

Enclosed Line Shaft

Derrick Installation of a Layne Pump requires a derrick 30 to 40 feet in height and a hand winch or power hoist of sufficient size to handle the total weight.

Foundation The concrete foundation for the pump base should be built in accordance with foundation plans furnished by the factory. Where a separate pump base plate is used it should be set in position in the concrete foundation before the pump bowls and column are installed but not grouted into position until the installation is completed.

of Well

Dimensions Check the inside diameter of the well and the outside diameter of the pump bowls and column flanges or couplings to be sure that the pump and column will go in the well with

ample clearance. The well casing must be straight and without obstructions that might bend the line shaft. Measure the static level of the water in the well to determine if the pump has been furnished with the proper depth of setting. The pump bowls should be submerged when the pump is operating and we do not recommend or guarantee satisfactory operation with a suction lift.

Check Material

Check all parts of the pump against the packing list to find out whether all parts have been received. If any parts are missing claim should be made at once to the railroad company.

Joints

Clean All All threads and flanged couplings of the discharge pipe and protective tubing should be carefully cleaned and at the time of installation coated with LAYNCOTE. Care should be

taken that there be absolutely no sand or grit between flanges or couplings when making up the joints.

If a basket suction is used it should be lowered into the well first and held by pipe clamps. The suction pipe is picked up and screwed into the coupling at top of basket suction. The basket suction and suction pipe are then lowered into the well until about 18 inches of suction pipe extend above the well casing. The suction pipe is clamped in this position with pipe clamps. When the suction pipe has only threads at the top end care should be taken to place the clamps under the small lug welded on the pipe.

Pump Bowls The pump bowls should be carefully inspected before placing in the well. Rotate impeller shaft several times by hand to be sure that it does not bind at any point. The impeller shaft should have about 4-inch or more end play. DO NOT STRAIN SHAFT IN ANY WAY THAT MIGHT BEND IT AND DO NOT LIFT PUMP BOWLS BY THE SHAFT. The pump bowls can best be handled by a pair of pipe clamps. The bowls should be lifted into position and screwed or bolted to the suction pipe. The clamps on the suction pipe are then removed and the bowls and suction pipe lowered into the well until the top of the discharge nozzle is about 18 inches above the well casing or top of foundation. The bowls are then supported at this point by pipe clamps.

Discharge

Check the enclosed chart to determine the correct spacing of the spiders in the dis-Column Pipe charge column. If the discharge pipe screws into the pump bowl be sure to have the cou-

pling at the top end of the first section either with the spider or without the spider as shown on the chart. If the lower section of discharge pipe has a special flange to connect to the pump bowls be sure to arrange the pipe with this flange at the lower end.

Tubing and Shaft

Protective The shaft and protective tubing are shipped assembled in 20-ft. or 10-ft. lengths and packed with sufficient lubricant to prevent rusting. A 20-it. length or 10-ft. length of shaft and tubing is required for each 20-ft. or 10-ft. length of pipe.

Remove the protecting cap only from the top end of the tubing, which is the end fitted with the bronze shaft bearing and tubing coupling. Slide the assembled tubing and shafting into the discharge column pipe, making sure that the bronze bearing end of the assembly will be on top.

Installing Dis-

Pull the tubing about six inches below the lower end of the discharge pipe and tie charge Column them together in this position with a piece of rope by taking several half

hitches around the pipe and then the tubing.

Raise the assembled section of pipe, tubing and shafting until it is hanging vertically in the derrick with the lower end of the tubing about one inch above a board placed on the foundation. Remove the lower plug from the tubing to release the shaft. Raise the discharge pipe about six inches and take several half hitches around the shaft. This method avoids straining the shaft as the column is swung under the derrick. Swing the discharge pipe into position over the pump bowls and screw the shaft into the shaft coupling until it butts aginst the impeller shaft.

THE THREADS AND THE ENDS OF THE SHAFTING AND THE SHAFT COUPLINGS MUST BE PERFECTLY CLEAN.

Lower the discharge pipe and tubing and screw the tubing onto the main bearing box about 3 or 4 threads Then coat the threads on the bronze box with L A Y N C O T E and screw the tubing on the box until it butts. The discharge pipe is then bolted or screwed to the pump bowls.

Remove the clamps from the pump bowls and lower the pump bowls with the section of discharge column until the column extends about 18 inches above the well casing or foundation. Clamp the discharge column in this position.

Remove the bronze shaft bearing and tubing coupling and pour about one pint of oil into the tubing. The oil used should be a good grade of mineral oil free from grit and foreign matter, with a viscosity rating approximately SAE 10 and having a relatively low cold pour point.

When the next section of discharge column is in position in the derrick replace the bronze bearing, screwing it into the tubing about 3 or 4 threads. After the spider and spider bushing or aligning ring have been installed (as described below) and the shaft connection is made, lower the discharge pipe and tubing and screw the tubing onto the bronze bearing about 3 or 4 threads. Then cost the threads of the bearing with LAYNCOTE and screw the tubing on the bearing until the ends butt tightly together. IT IS VERY IMPORTANT THAT EVERY TUBING JOINT BE TIGHT AND to form a seal the ends of the tubing must be smooth and square. While handling and installing the tubing use care to keep from scoring or damaging the ends in any way.

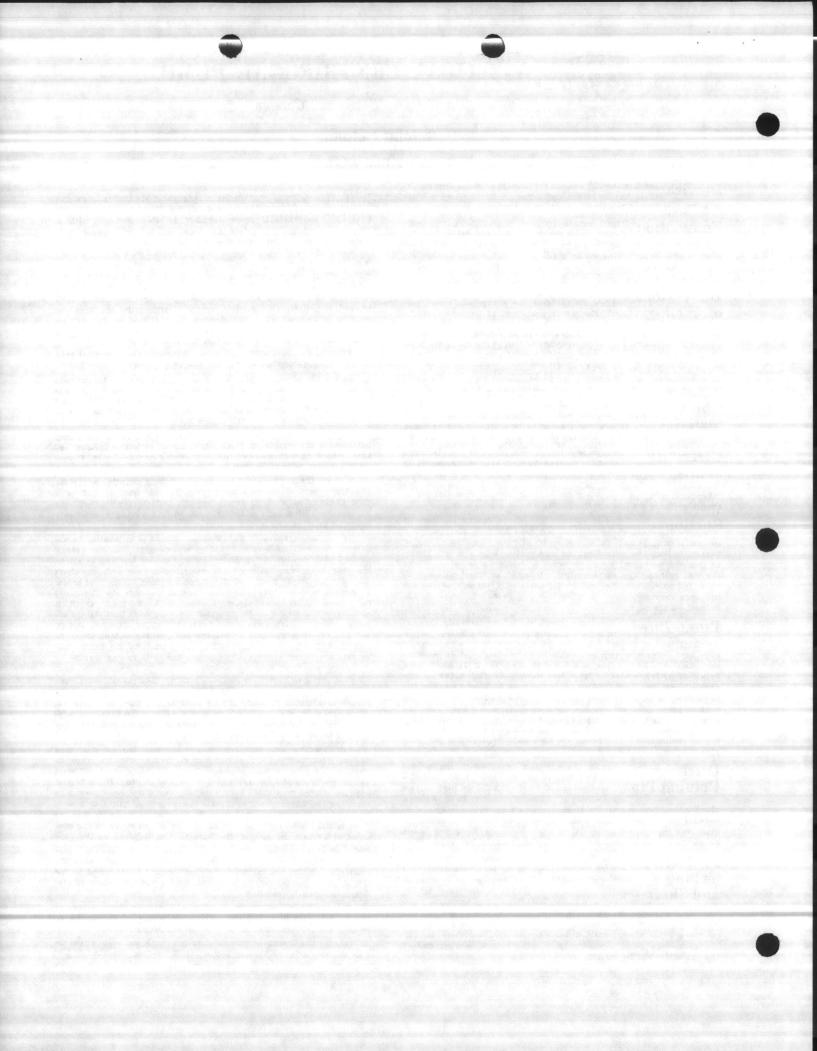
When flanged column is used, slip a bronze spider or aligning ring over the top of the tubing and fit it into the recess in the flange. (Refer to spider spacing chart to determine whether a flange or aligning ring should be used at the joint in question). When screw coupled column is used the spider is cast integral with the coupling. The rubber spider bushings are installed in the spiders before shipment from the factory.

Each section of discharge column is installed as described above. When screw couplings are used care should be taken in starting the pipe in the coupling. The pipe should start by hand and screw by hand to within 5 or 6 threads of butting. If the thread appears tighter than this check carefully for a damaged thread as the pipe should not be forced into the coupling. The last 5 or 6 threads should be made up with a chain tong, making sure that the joint is tight with the pipe butting against the shoulder in the coupling or against the end of the pipe in the coupling as the case might be.

When the hue shaft connects to the motor drive shaft below the tension assembly, the motor drive shaft should be attached to the line shaft in the top section of tubing before the top length of discharge column is installed.

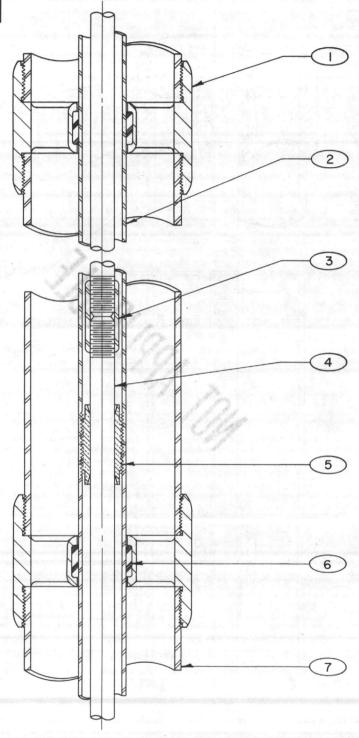
The top length of discharge pipe will usually have a special flange or special threads to connect to the bottom of the discharge ell and the top length of shaft will be of special length.

in case the discharge column does not check out within reasonable limits notify the factory to furnish the correct lengths.





DISCHARGE COLUMN ASSEMBLY SCREWED TYPE - ENCLOSED LINE SHAFT



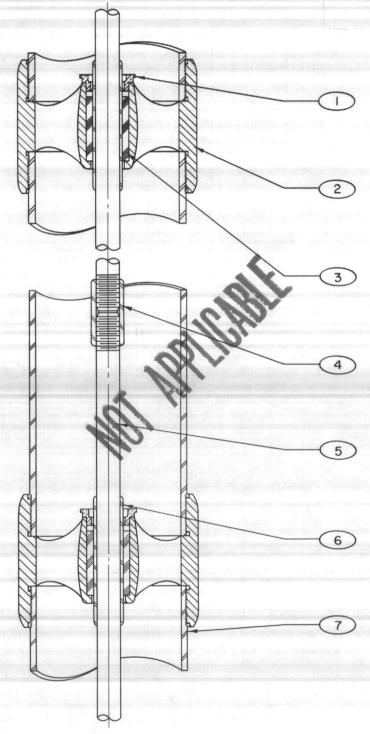
NO.	DESCRIPTION
	COMBINATION COUPLING
2	SHAFT TUBING
3	SHAFT COUPLING
4	LINE SHAFT

NO.	DESCRIPTION							
5	SHAFT BOX							
6	RUBBER BEARING							
7	COLUMN PIPE							

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.



DISCHARGE COLUMN SEMBLY SCREWED COUPLED - OPEN LINE SHAFT



ITEM NO.	DESCRIPTION
1	LOCK RING
2	COMBINATION COUPLING
3	RUBBER BEARING
4	SHAFT COUPLING

NO.	DESCRIPTION
5	LINE SHAFT
6	MONEL SLEEVE
7	COLUMN PIPE
	the second secon

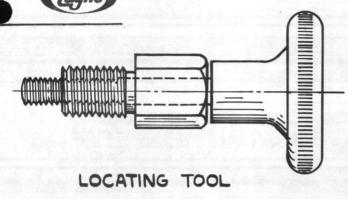
IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

PRINTED IN U.S. A.

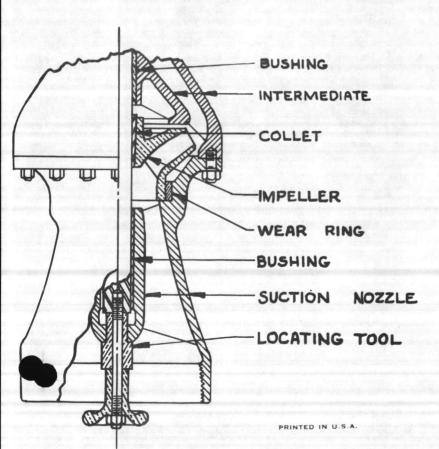
SINGER LAYNE & BOWLER DIVISION MEMPHIS, TENNESSEE U.S.A.

INSTRUCTIONS FOR ASSEMBLYING

Layre AND DISMANTLING PUMP BOWLS WITH COLLETS



TOUR DRIVER

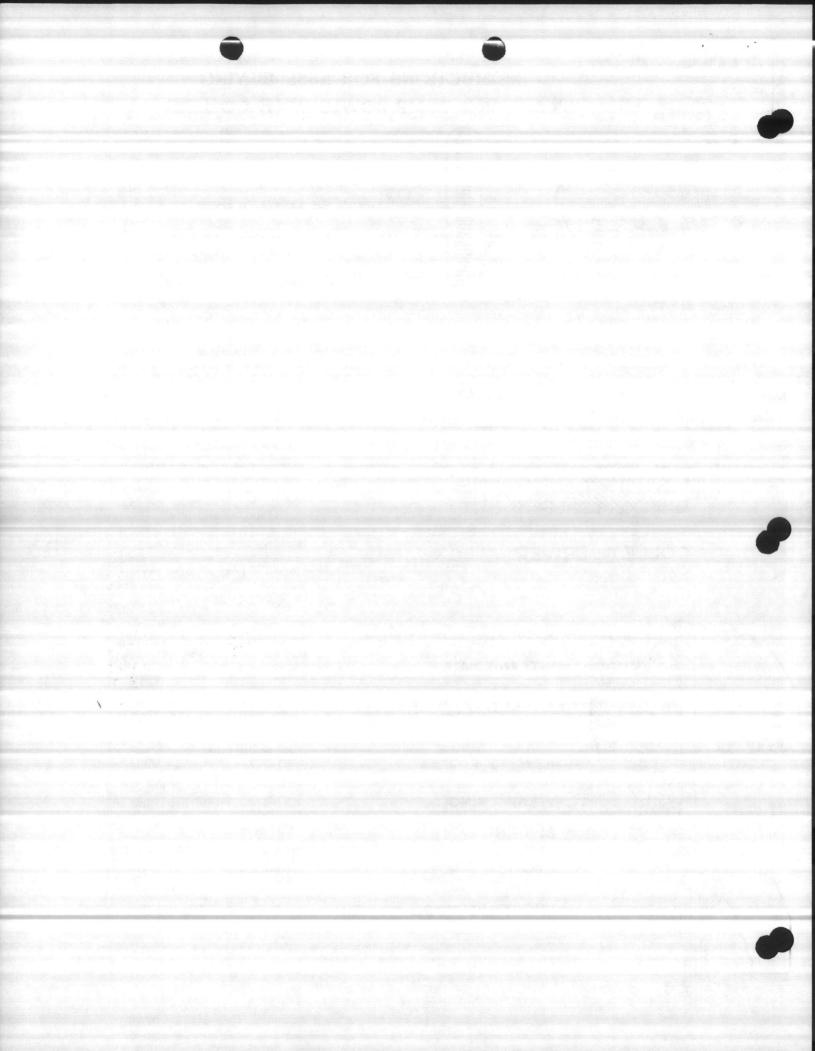


TO ASSEMBLE BOWL

- 1. Remove cap screw from the bottom of the suction nozzle.
- 2. Screw locating tool into bottom end of suction nozzle hub.
- Insert impeller shaft into suction nozzle bearing and turn handwheel of locating tool until impeller shaft is pulled down tight against the shoulder of the tool.
- 4. Place the impeller over the shaft. Slip the collet over the shaft with the small end first. (A screw driver can be used to spread collet for ease in slipping over shaft). Hold the impeller firmly into the wear ring recess and drive the collet into place with the male end of the collet driver.
- 5. Remove collet driver and assemble first intermediate stage. Place the next impeller over the shaft and continue to assemble as explained above.
- When the bowl is completely assembled remove locating tool and replace cap screw in suction nozzle.

TO DISMANTLE BOWL

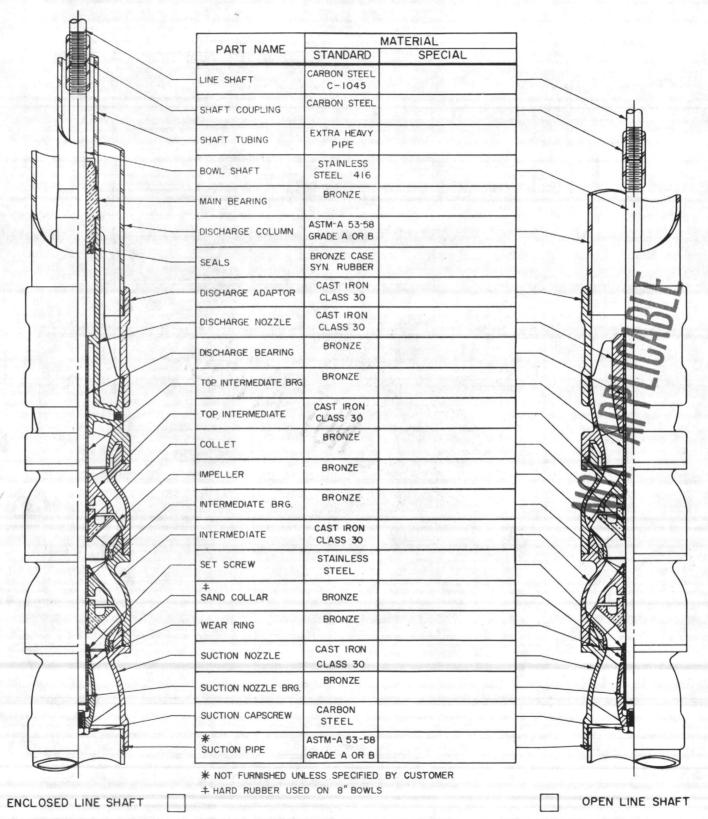
- Remove discharge nozzle. Place collet driver over shaft with the female end first and while holding the impeller out of the wear ring recess, drive the impeller off of the collet. Remove the collet and impeller.
- Remove the intermediate shell and drive the impeller off of the next collet. Continue to dismantle in like manner.





DEEP WELL

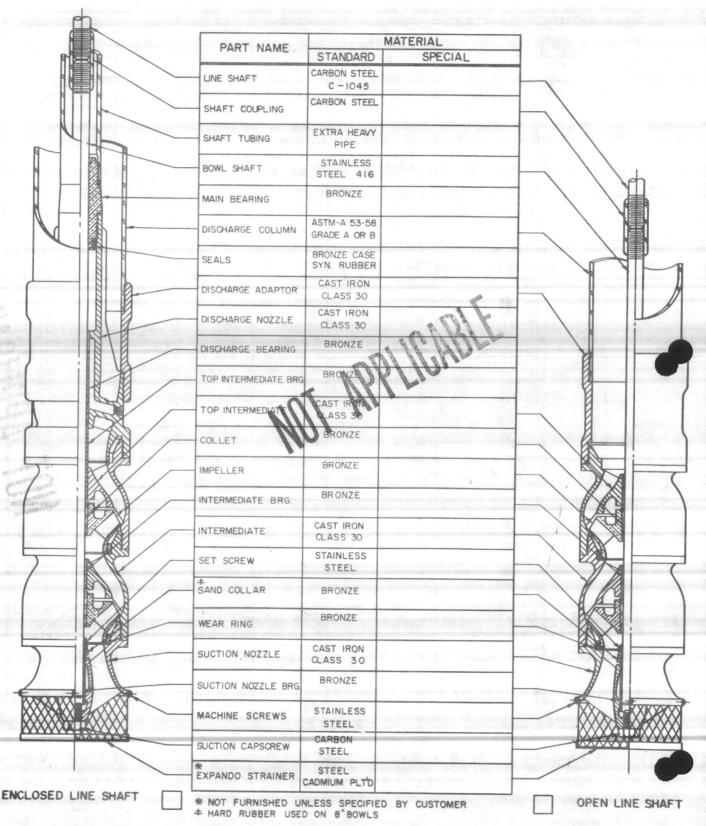
8"B, DR, PR, RK, T, UR - 10" RK, T, U - 12" T, UR



VERTICAL TURNE PUMP

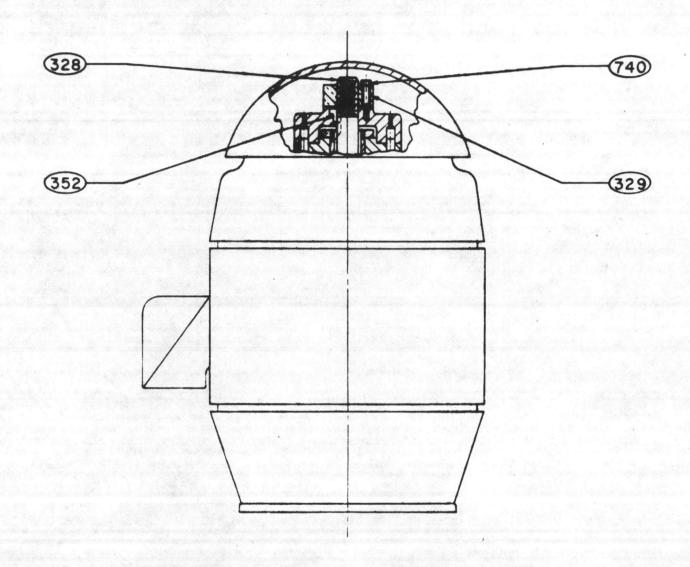
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

8"B, DR, PR, RK, T, UR-10" RK, T, U-12" T, UR



(leyne)

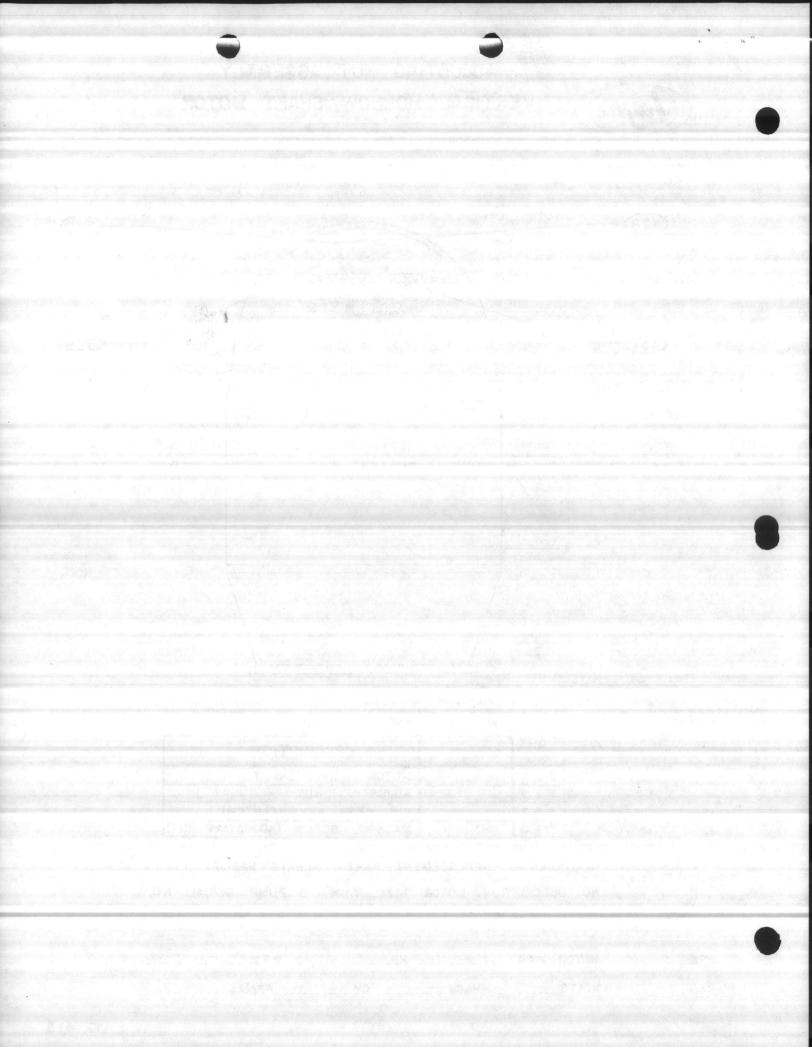
ADJUSTING NUT ASSEMBLY VERTICAL HOLLOW SHAFT MOTOR



PART	DESCRIPTION
328	MOTOR DRIVE SHAFT
3.29	ADJUSTING NUT
352	GIB. HEAD KEY (CLUTCH)
740	MACHINE SCREW (ADJUSTING NUT)

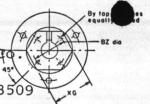
IN ORDERING REPLACEMENT PARTS, ALWAYS SPECIFY PARTS
NO, DESCRIPTION, MOTOR SIZE, TYPE, & PUMP SERIAL NO.

MOTOR	MFG		HP.	R.P.M.	• • • • • • • • • • • • • • • • • • • •
VOLTS		PHASE	CY	FRAME	



COUPLING DIMENSIONS

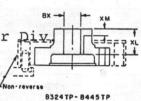
5 - Singer Layne Atlantic Go Box 7095 Forfolk, Va. 235

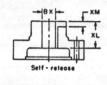


FRAMES 254TP - 286TP
UPPER BRG-MRC 210SFF or Equiv.
LOWER BRG-MRC 7316P or Equiv.

5 - Singer Lavne &

Layne & Bowler Di Box 8097 Memphis, Tenn 38108







213 TP-6

DIMENSIONS	OF	COUPLINGS	IN	INCHES	

Topic	Cat	. No.	BX	Bore		a Cardy and	1	125	Part of the	KEY	WAY
Frame No.	Self-release or Bolted	Nonreverse	Nominal	Actual	BY	BZ	xG	ΧL	XM"	Width	Depth
213TP 215TP B254TP	143X420G 143X420G8 148X420G6	148X421G2 148X421G3 148X421G1	3/4 1/6	0.751 876 1.001	10-32 10-32 10-32	13/6	21/4	1 3/16 1 3/16 1 3/16	11/32 7/14 1/16	³ /16 V/ ₄	3/32 1/2 1/4
254TP 256TP B284TP B286TP	148X250G15 148X250G17 148X250G13 148X250G14 148X250G16 148X250G22	148X251G3 148X251G5 148X251G1 148X251G2 148X251G4 148X251G7	3/4 7/6 1 1 3/16 1 1/4 1 1/4	.751 .876 1.001 1.188 1.251	10-32 10-32 10-32 10-32 14-20 14-20 14-20	1 3/6 1 3/6 1 3/6 1 3/6 1 3/4 1 3/4	2 1/4 2 1/4 2 1/4 2 1/4 2 1/4 2 1/4	1 ½ 1 ½ 1 ½ 1 ½ 1 ½ 1 ½	11/32 7/16 7/16 7/16 7/16 7/16 9/16	% % % %	3/32 1/6 1/6 1/6 3/16
B324TP B326TP	148X399G3 148X399G2 148X399G6 148X399G5 148X399G7 148X399G1	148X400G1 Use with Self- release Coupling	1 1 3/16 1 1/4 1 1/4 1 7/16 1 1/2	1.001 1.188 1.251 1.251 1.438 1.501	10-32 ¼-20 ¼-20 ¼-20 ¼-20 ¼-20	1 3/6 1 3/4 1 3/4 1 3/4 2 1/6 2 1/6	2 1/6 2 1/6 2 1/6 2 1/6 2 1/6	1 13/16 1 13/16 1 13/16 1 13/16 1 13/16 1 13/16	7/16 7/16 7/16 9/16 9/16	1/4 1/4 1/4 1/4 1/6 1/6 1/6	1/2 1/4 1/4 1/4 1/4 1/4 1/4
B364TP B365TP	148X403G5 148X403G6 148X403G9 148X403G2 148X403G10 148X403G4 148X403G8 148X403G1	148X404G1 Use with Self- release Coupling	1 3/16 1 1/4 1 1/6 1 1/6 1 1/16 1 1/16 1 3/4	1.001 1.188 1.251 1.376 1.438 1.501 1.688 1.751	10-32 14-20 14-20 14-20 14-20 14-20 14-20 14-20	1 3/4 1 3/4 2 3/6 2 3/6 2 3/6 2 3/6 2 3/6 2 3/6	3 ¼ 3 ¼ 2 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	%6 %6 %6 %6 %6 %6 %6 %6 %6	7/4 7/4 7/4 7/4 7/4 7/4 7/4	1/6 2/16 2/16 2/16 2/16 2/16 2/16
B404TP B405TP	148X455G6 148X455G5 148X455G2 148X455G3 148X455G4 148X455G7 148X455G1	174L509G5 Use with Self- release Coupling	1 %6 1 ¼ 1 ¼ 1 ¼ 1 ½ 1 1 ¼ 1 34 1 34	1.188 1.251 1.438 1.501 1.688 1.751 1.938	14-20 14-20 14-20 14-20 14-20 14-20 14-20	1 3/4 1 3/4 2 1/6 2 1/6 2 1/2 2 1/2 2 1/2	3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼ 3 ¼	2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼ 2 ¼	7/16 9/16 9/16 9/16 9/16 9/16 11/16	7/4 7/6 7/6 7/6 7/6 7/6 7/6 7/2	1/2 3/16 3/16 3/16 3/16 3/16 1/4
B404TP B405TP (2-pole only)	148X499G2 148X499G1 148X499G3	174L511G1 Use with Self-release Coupling	1 3/16 1 1/4 1 1/2	1.188 1.251 1.501	1/4 -20 1/4 -20 1/4 -20	1 3/4 1 3/4 2 1/8	2 3/4 2 3/4 2 3/4	2 1/4 2 1/4 2 1/4	7/16 9/16 9/16	1/4 3/6 3/6	√a 3/16 3/16
B444TP B445TP	148X460G7 148X460G5 148X460G4 148X460G3 148X460G6 148X460G2 148X460G1	148X461G1 Use with Self- release Coupling	1 3/16 1 7/16 1 1/2 1 11/16 1 13/16 1 15/16 2 3/16	1,188 1,438 1,501 1,688 1,813 1,938 2,188	14-20 14-20 14-20 14-20 14-20 14-20 14-16	1 3/4 2 1/6 2 1/6 2 1/2 2 1/2 2 1/2 3 1/4	3 % 3 % 3 % 3 % 3 % 3 % 3 % 3 %	2 1/4 2 1/4 2 1/4 2 1/4 2 1/4 2 1/4 2 1/4	7/16 9/16 9/16 9/16 11/16 11/16	1/4 3/6 3/6 3/6 1/2 1/2 1/2	1/2 3/16 3/16 3/16 1/4 1/4 1/4

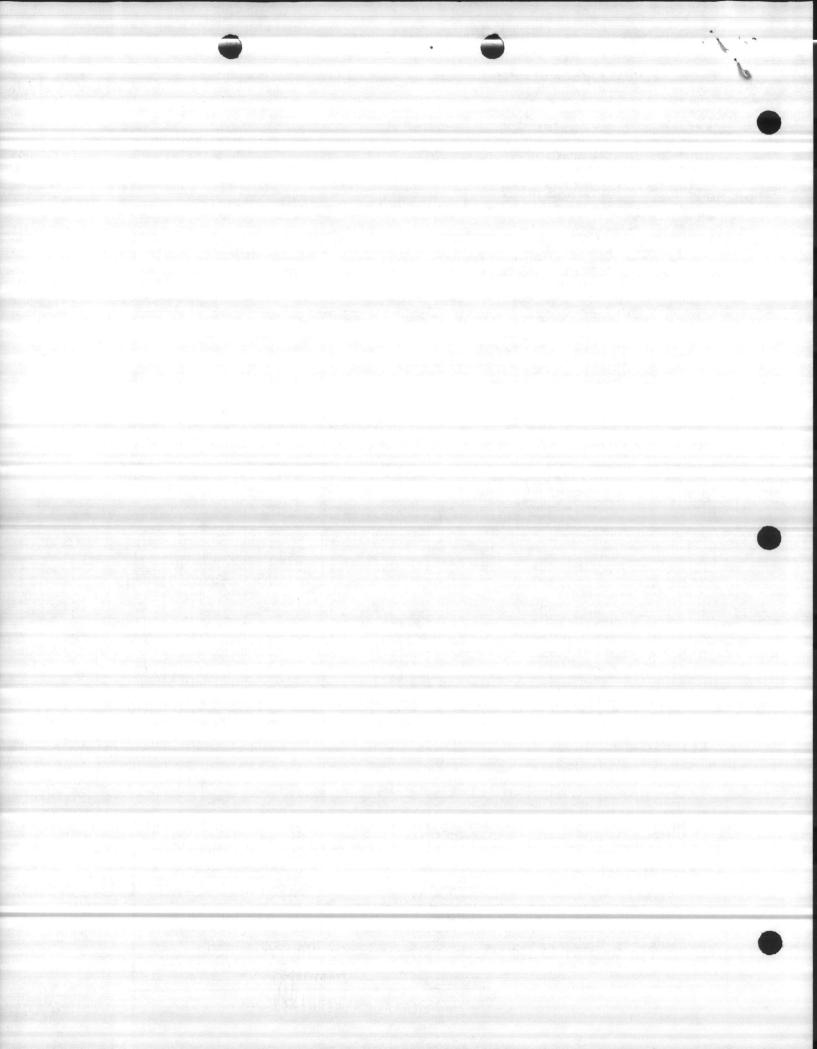
☐Tolerances for the "BX" dimensions are +0.001 inch, -0.000 inch, up to and including 1½ inch diameter, and +0.0015 inch, -0.000 inch for larger diameters.

Nonreverse coupling assemblies, frames 213TP—B286TP are complete, nonreverse assemblies, frames B324TP—B445TP, must be used together with appropriate self-release coupling.

GEM-2296E

L. Atl. #N-17-72 L&B M1011 72D-369

15 HP	1800 RPM	230/460	Volt	3 ph	60 hz	
Prints are: For Approval					Prints are: Approved for Const	ruction X
Customer S	inger					
Customer's Or	der No. M1011				Item	
Our Req. No.	405-32284	Iten	1	Appr	oved by K. T.	





TRI/CLAD • Hollow-shaft • Shielded (Dripproof)*

High-thrust

Normal-starting-torque

NEMA Type P Base

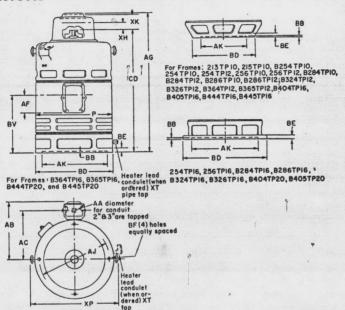
Type K Frames 213TP10 to B405TP20, 3600 Rpm and Below Frames B444TP16 to B445TP20, 1800 Rpm and Belowheta

Self-release, Bolted or Nonreverse Coupling

GEM-2296E

Sept. 8, 1970

DIMENSIONS



FOR 3600-RPM MOTORS ONLY

For a given pump-shaft diameter, the following table gives the maximum distance between the motor's top coupling and the pump's first line-shaft bearing. This table is based on keeping the head-shaft critical at least 25% above operating speed. The selection of a small headshaft diameter may make it necessary to support the headshaft in a close-fitting bushing in the lower end of the motor shaft.

Pump-shaft Diameter in Inches	Maximum Distance Between Top Coupling and Lower Suppor in Inches					
0.750 1.000	33					
1.187	42					
1.437	45					
1.500	47					
1.688	50					
1.750	51					

	Approx								Dimensi	ons in I	nches								
No.	Net Wt in Lb	Р	AA	AB	AC	AF	AG	LA	AK †	BB Min	BD	BE	BF	BV	CD	XH ‡	хк	XP	1:
213TP10 215TP10 B254TP10	165 180 205	10 1/8 10 1/8 10 1/8	1 1/4	93/8 93/8 93/8	7 5/16 7 5/16 7 5/16	3 ½ 3½ 3½ 3½	23 13/16 23 13/16 23 13/16	9 1/8 9 1/8 9 1/8	8 ¼ 8 ¼ 8 ¼	3/16 3/16 3/16	10 10 10	3/4 3/4 3/4	7/16 7/16 7/16	1015/16	2015/16 2015/16 2015/16	1 3/4 1 3/4 1 3/4	2 ³ / ₄ 2 ³ / ₄ 2 ³ / ₄		-
254TP10 254TP12 254TP16 256TP10 256TP12 256TP16	270 270 270 310 310 310	1215/16 1215/16 1215/16 1215/16 1215/16 1215/16	1 ½ 1 ½ 1 ½ 1 ½ 1 ½ 1 ½	10 3/8 10 3/8 10 3/8 10 3/8 10 3/8 10 3/8	8 5/16 8 5/16 8 5/16 8 5/16 8 5/16	3 ½ 3 ½ 3 ½ 3 ½ 3 ½ 3 ½ 3 ½	26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½	9 1/8 9 1/8 14 3/4 9 1/8 9 1/8 14 3/4	8 1/4 8 1/4 13 1/2 8 1/4 8 1/4 13 1/2	3/16 3/16 1/4 3/16 3/16 1/4	10 12 16½ 10 12 16½	3/4 3/4 3/4 3/4 3/4 3/4	7/16 7/16 11/16 7/16 7/16 11/16	13 13 13 13 13	23 %16 23 %16 23 %16 23 %16 23 %16 23 %16	1 3/4 1 3/4 1 3/4 1 3/4 1 3/4 1 3/4	2 ³ / ₄ 2 ³ / ₄		
B284TP10 B284TP12 B284TP16 B286TP10 B286TP12 B286TP16	330 330 330 355 355 355	1215/16 1215/16 1215/16 1215/16 1215/16 1215/16	2 2 2 2 2 2	11 3/8 11 3/8 11 3/8 11 3/8 11 3/8 11 3/8	8 ½ 8 ½ 8 ½ 8 ½ 8 ½ 8 ½ 8 ½	4 5/8 4 5/8 4 5/8 4 5/8 4 5/8 4 5/8 4 5/8	26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½ 26 ½	9 1/8 9 1/8 14 3/4 9 1/8 9 1/8 14 3/4	8 ¼ 8 ¼ 13 ½ 8 ¼ 8 ¼ 13 ½	3/16 3/16 1/4 3/16 3/16	10 12 16½ 10 12 16½	3/4 3/4 3/4 3/4 3/4 3/4 3/4	7/16 7/16 11/16 7/16 7/16 11/16	13 13 13 13 13	23 %6 23 %6 23 %6 23 %6 23 %6 23 %6 23 %6	1 3/4 1 3/4 1 3/4 1 3/4 1 3/4 1 3/4	2 ³ / ₄ 2 ³ / ₄		
B324TP12 B324TP16 B326TP12 B326TP16	460 460 510 510	14 ¼ 14 ¼ 14 ¼ 14 ¼	2 § 2 § 3	123/16 123/16 1315/16 1315/16	9 ¹¹ / ₁₆ 9 ¹¹ / ₁₆ 10 ⁵ / ₁₆ 10 ⁵ / ₁₆	4 5/8 4 5/8 6 1/2 6 1/2	327/16 327/16 327/16 327/16	9 1/8 14 3/4 9 1/8 14 3/4	8 1/4 13 1/2 8 1/4 13 1/2	3/16 1/4 3/16 1/4	12 16½ 12 16½	7/8 7/8 7/8 7/8 7/8	7/16 11/16 7/16 11/16	157/16 157/16 157/16 157/16	28 ³ / ₁₆ 28 ³ / ₁₆ 28 ³ / ₁₆ 28 ³ / ₁₆	3 1/8 3 1/8 3 1/8 3 1/8	4 4 4	15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄ 15 ³ / ₄	
B364TP12 B364TP16 B365TP12 B365TP16	600 600 660 660	16 ¼ 16 ¼ 16 ¼ 16 ¼	3 3 3 3	14 13/18 14 13/16 14 13/16 14 13/16	11 3/16 11 3/16 11 3/16 11 3/16	6 ½ 6 ½ 6 ½ 6 ½	357/16 357/16 357/16 357/16	9 1/8 14 3/4 9 1/8 14 3/4	8 1/4 13 1/2 8 1/4 13 1/2	3/16 1/4 3/16 1/4	12 16½ 12 16½	1 1/8	7/16 11/16 7/16 11/16	16 1/8 16 1/8 16 1/8 16 1/8	31 ³ / ₁₆ 31 ³ / ₁₆ 31 ³ / ₁₆ 31 ³ / ₁₆	3 1/8 3 1/8 3 1/8 3 1/8	4 4 4 4	17 1/8 17 1/8 17 1/8 17 1/8	
B404TP16 B404TP20 B405TP16 B405TP20	890 890 990 990	187/16 187/16 187/16 187/16	3 3 3	153/4 153/4 153/4 153/4	12 1/8 12 1/8 12 1/8 12 1/8	6 ½ 6 ½ 6 ½ 6 ½	41 ¼ 41 ¼ 41 ¼ 41 ¼	14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄	13½ 13½ 13½ 13½ 13½	¼ ¼ ¼ ¼	16½ 20 16½ 20	7/a 7/8 7/8 7/8 7/8	11/16	19½ 19½ 19½ 19½	36 1/16 36 1/16 36 1/16 36 1/16	3 ¼ 3 ¼ 3 ¼ 3 ¼	4 ½ 4 ½ 4 ½ 4 ½	20 1/a 20 1/a 20 1/a 20 1/a 20 1/a	
B444TP16 B444TP20 B445TP16 B445TP20	1180 1180 1330 1330	20 3/8 20 3/8 20 3/8 20 3/8	3 3 3	16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆ 16 ¹⁵ / ₁₆	13 5/16 13 5/16 13 5/16 13 5/16	61/2	47 1/8 47 1/8 47 1/8 47 1/8	14 ³ / ₄ 14 ³ / ₄ 14 ³ / ₄	13½ 13½ 13½ 13½	V4 V4 V4	16½ 20 16½ 20	1 1/8 1 1/8 1 1/8 1 1/8	11/16	23 ¼ 23 ¼ 23 ¼ 23 ¼	41 1/8 41 1/8 41 1/8 41 1/8	3 1/8 3 1/8 3 1/8 3 1/8	5 5 5 5	22 22 22 22 22	

Coupling dimensions on reverse side.

- * These motors meet NEMA specifications for weather-protected Type 1
- † 'AK' diameters of 8½ inches will come within the limits of +0.003 inch, -0.000 inch; diameters of 13½ inches will come within the limits of +0.005 inch, -0.000 inch.
- The total height of pump shaft and locking nut above top of coupling must not exceed dimension XH.
- § For 3600 rpm, Frames B324TP12 and B324TP16, conduit box dimensions are same as for Frames B326TP12 and B326TP16.
 θ For 3600 rpm in this frame size, refer to the Company.

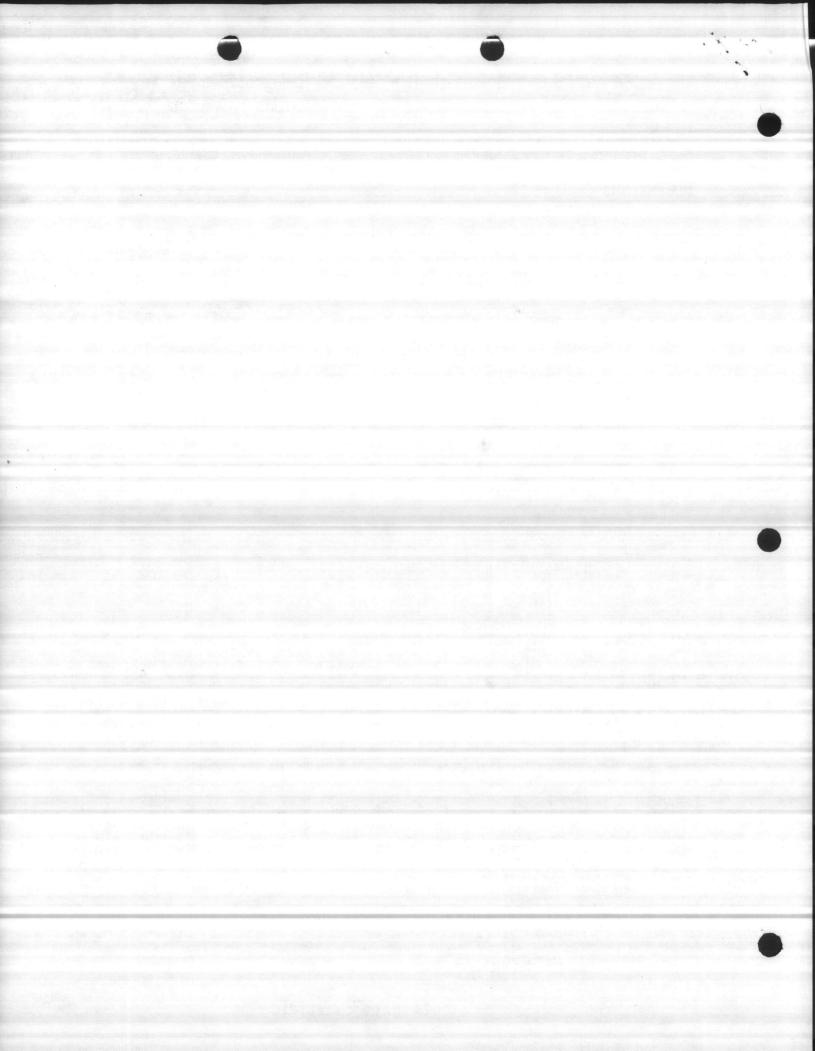
Frames 213TP10 through B286TP16 have grease-lubricated upper guide and lower thrust bearings. All other frames have oil-lubricated upper thrust bearing and grease-lubricated lower guide bearing. For 3600 rpm, Frames B404TP16 through B405TP20 inclusive maximum shaft permissible 1.751 inches.

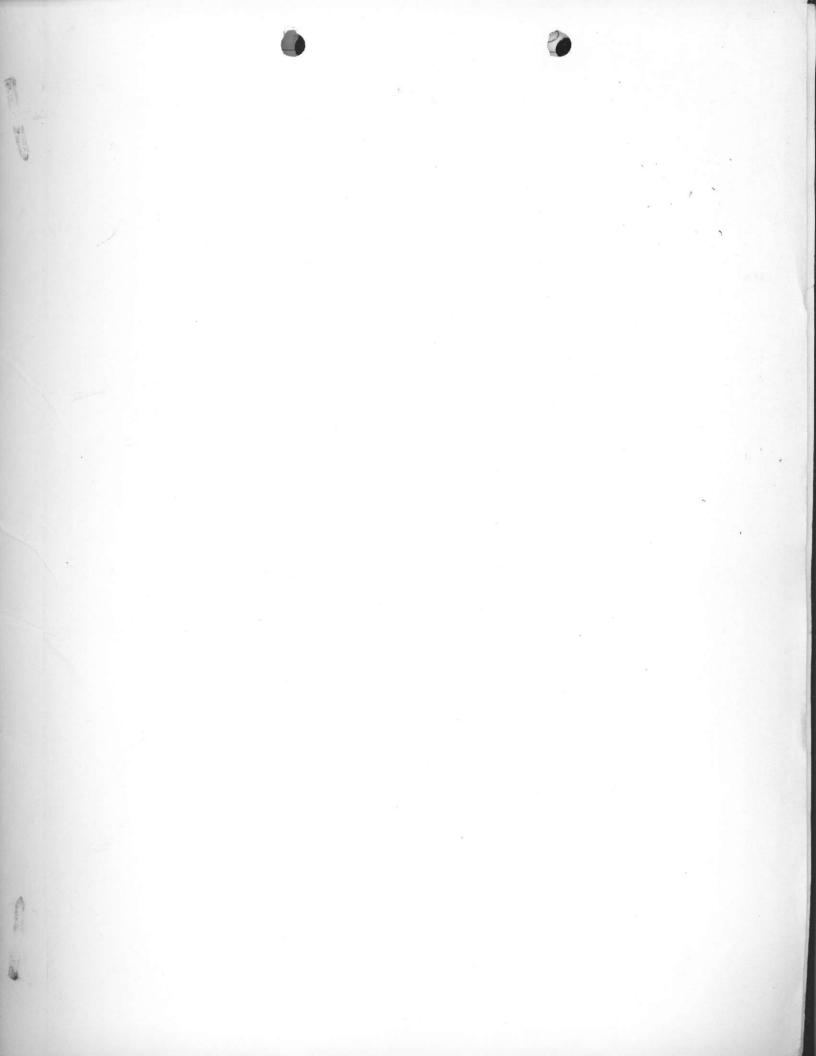
Nonreverse coupling assemblies, Frames 213TP to B286TP are complete, nonreverse assemblies, Frame B324TP to B445TP, must be used together with appropriate self-release coupling.

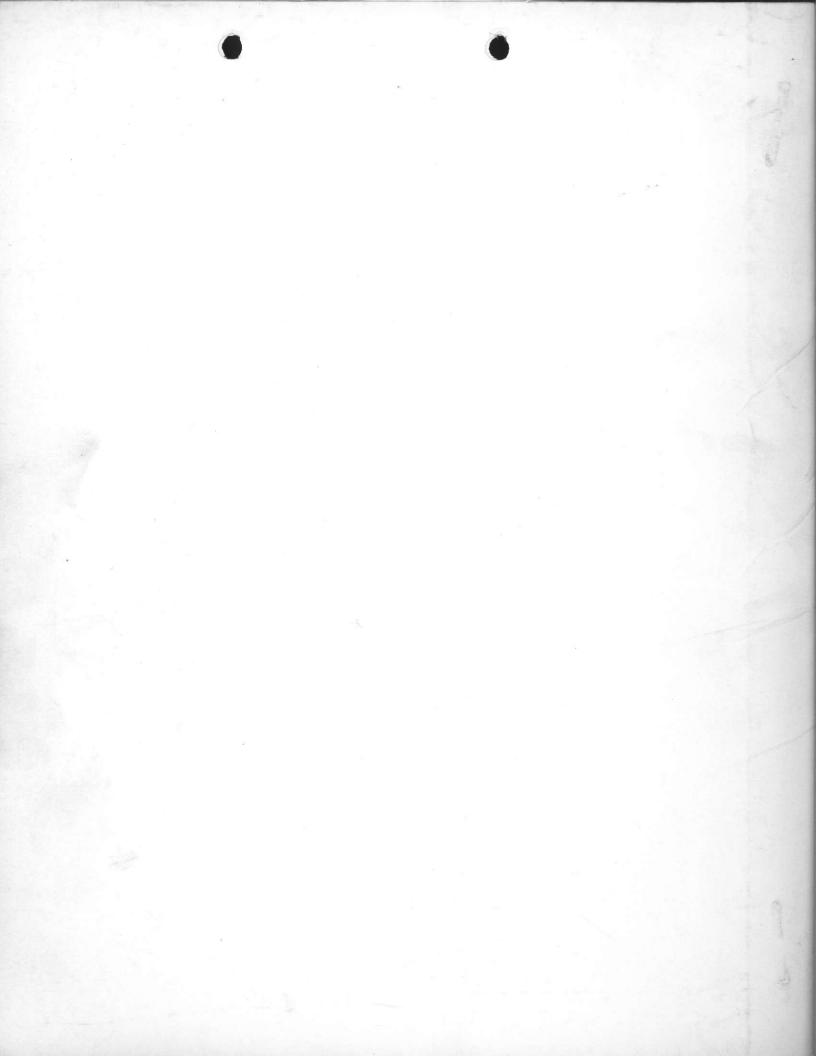
Provided mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side.

For shipping weight add 5 per cent to the above net weights.

For ESTIMATING ONLY unless endorsed for construction.





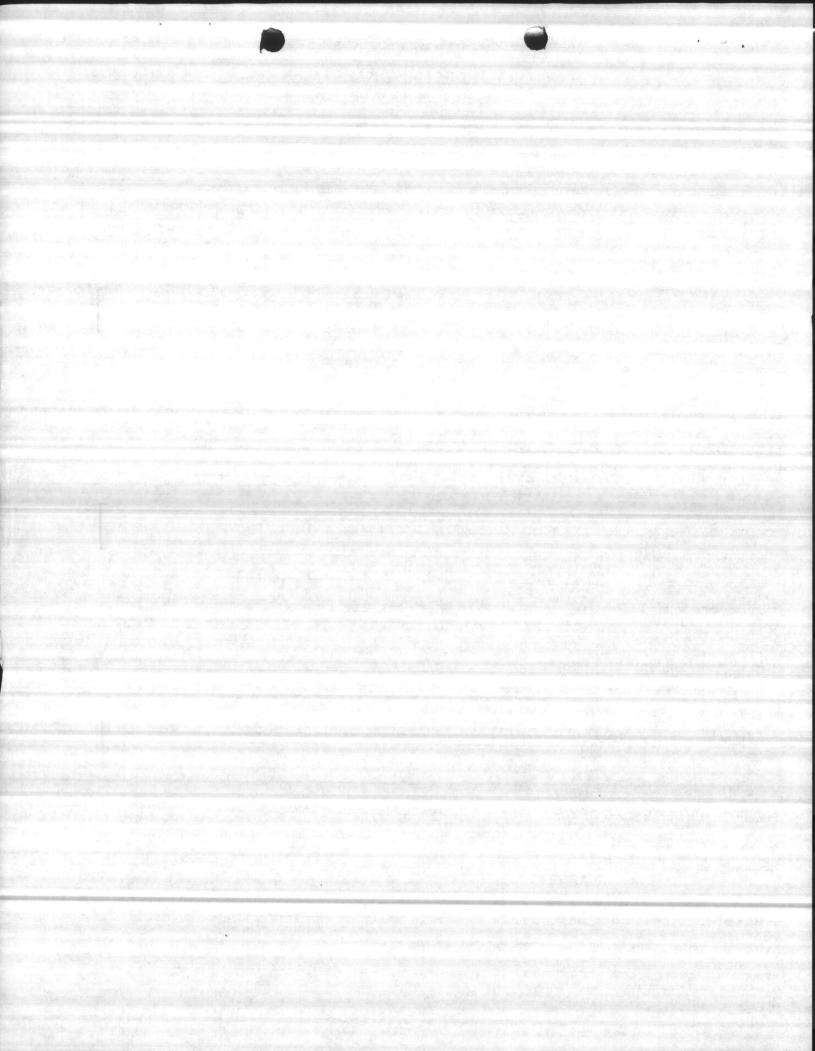


North Department of Environment, result, and Division of Environmental Health, Public Water Supply Se

·	GROUND WATER	Date Form Completed M M D D Y Y O 1 2 5 9 5
Owner Assigned Well Name (If purchase, a	name of system)	Code G=Ground
453 HADNOT POI	MT 653	G=Ground W=Purchase/G Y=G w/direct influence Z=W w/direct influence
If Purchase, seller ID# Source Begin Date	Source exempt— Direct Influence Date SWTR? Y N N D D Y Y	P=Permanent E=Emergency S=Seasonal O=Other
Location of well within the system (If purchase	, location of master meter)	T/B ABANDONED
OUD PINEY GEES	NROADIIII	
Latitude (N) Longitude (W)	How Determined G=GPS	GPS Data No. of Sats. Locked on
344228 077694	M=Map S=Surveyed	Q# or DOP#
(If purchase, use seller's primary source lat/lor	ng)	Y Y
Vulnerable (VOCs) VN	Assessment Date	
ENTRY POINT INFORMAT Owner Assigned Entry Point Code Entry Point Name HP653	D=Ground/non-permanent	Availability P=Year-round S=Seasonal E=Emergency I=Interim O=Other
Location:		
Sources of pollution/distance: Surface water within 200'? Y	If yes, actual distance feet	If yes, bact. samples collected?(Y,N)
Adequate slope?(Y,N) Flooding?	(Y,N) Maintenance:	
Well House: Free of stored materials?()		cked?(Y,N)
Condition of house:	Type of freeze protection:	
Well: Diameter: S' Type: SC Properly vented? (Y,N) Casing depth	Yield (gr. 40 ft. (lf unknown, Well depth: _	Properly sealed! (Y,N) 250 Meter available! (Y,N)
Concrete slab adequate?(Y,N) If no, Size of blow-off:(Y)	Canala entre Refore treatmen	Y.N' After treatment?(Y,N'
Size of blow-off: 4	IP: Pump intake depth:	Auxiliary rower:
Type pump: TERTICAL TURBI.	NE Height above	Hoor (bamb) castre).
Storage at well site: Elev:	Hÿdro:	Ground:
If hydroautomatic, air volume control?h	_(Y,N) Safety valves?(Y,N) Co	ded? (Y,N) n hp Auxiliary Power? (Y,N)
Is the water treated at this well? WY If ye	s, complete back of form.	
If other wells are treated here, which ones?	If treated el	sewhere, where? # 20 PLAN !
If purchase, retreat? Y If yes, complete	back of form.	

DEHNR 3803 (Revised 1Z/93)

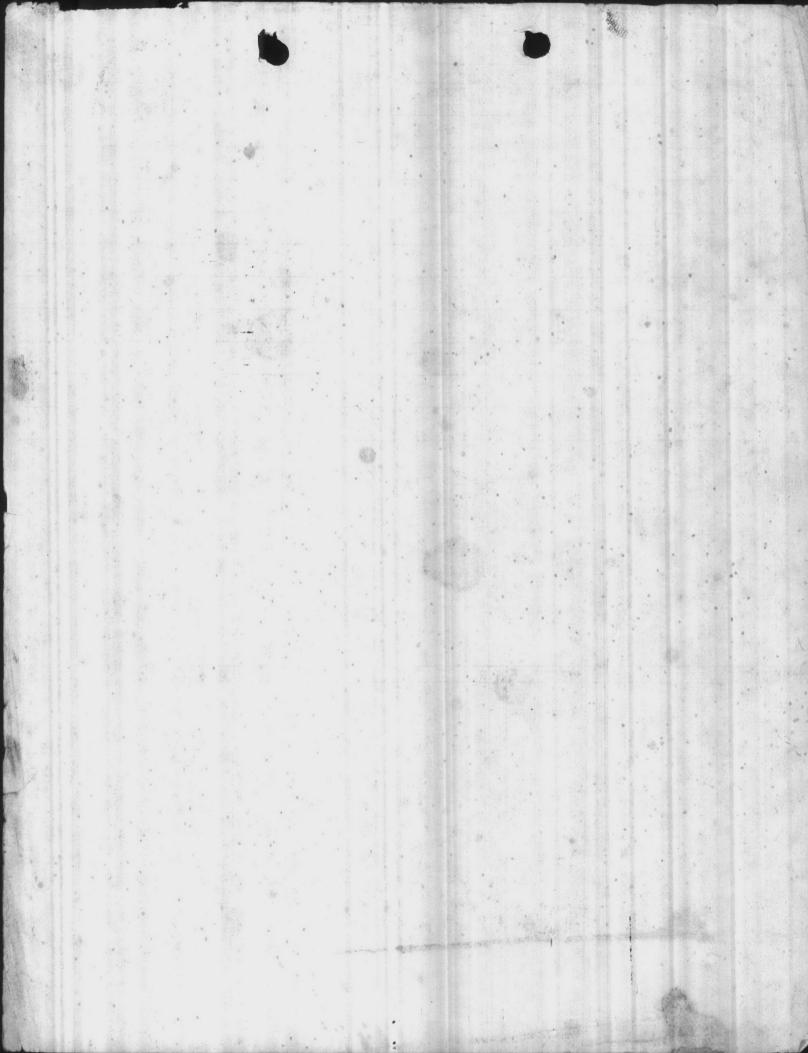
P. 04,



WELL NUMBER	653	BY Thomas	15 4 B1	Rown	DATE 10-3084			
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM-	START 1945		
79	:35	44.	9:	45	104	1255		
		63	18:	42	111	1305		
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		57	22.	36	159	1325		
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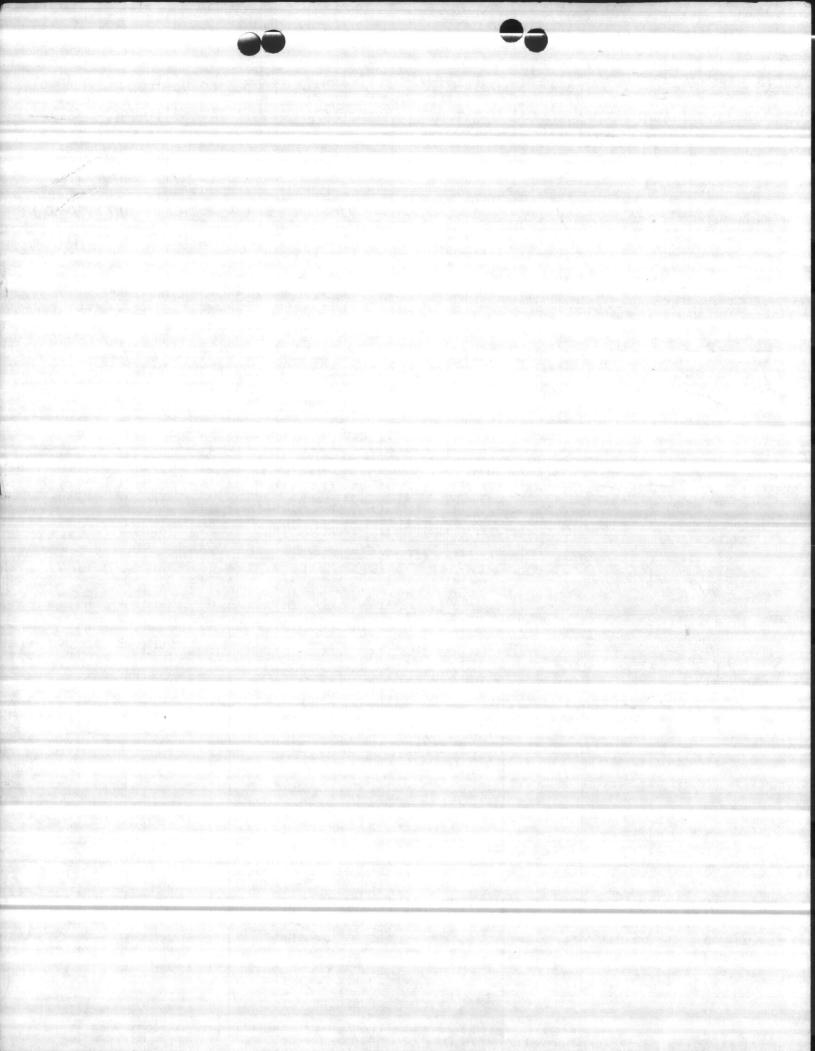


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WELL NUMBER	653	BY THO	MAS/F	AYNOR	DATE 9-1	3-83
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91	41	55)4	50	108	1105
		58	17	47	122	1116
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CORBIN CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

POST OFFICE BOX 5004

JACKSONVILLE, NORTH CAROLINA 28540

March 29, 1978

Commander, Atlantic Division Naval Facilities Engineering Command Norfolk, Virginia 28542 (Code 05)

Res Contract N62470-76-C-6799 Replace four water wells Marine Corps Base Camp Lejeune, N.C.

Gentlemen:

We are enclosing four (4) copies of the following information on well No. 619 located on Piney Green Road, Comp Lejeune, N.C.

> Drillers log Electric log Water analysis

We estimate this well will produce approximately 175 to 225 gpm by taking the water from the 105-140 foot level and from the 155-185 foot level.

Please advise us of your decision promptly so we may begin developing this well.

Very truly yours,

EAST COAST CONSTRUCTION COMPANY, INC.

W. H. Myers

WHM/oon

ce ROICC Marine Corps Base, CL

enclosure 1 copy of well data

	ATLANTIC DIVISION
NAVAL	FACILITIES ENGINEERING COMMAND
	NORFOLK, VIRGINIA 23511

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EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540 353-4479 or 353-6044

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC
DRILLERS LOG

WELL #619

0 20 Sand and Clay
20 35 Sand
35 45 Clay
45 54 Sand and Clay
54 56 Soft Limestone
56 57 Sand
57 100 Soft Limestone
100 190 Soft Limestone
190 235 Fine Sand
235 270 Sand and Clay

NORFOLK, VIRGINIA 23511
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ATLANTIC DIVISION

NAVAL FACILITIES ENGINEERING COMMAND

FOR OFFICER IN CHARGE OF CONSTRUCTION

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EAST COAST CONSTRUCTION CO., INC. CONTRACT N62470-76-C-6799 REPLACE FOUR WATER WELLS MARINE CORPS BASE CAMP LEJUENE, NC

(403) 479-4639

"Hello Analysis, Coodby Worry"

WATER ANALYSIS LABORATORY BOZ HAMLET HIGHWAY

BENNETTSVILLE, SOUTH CAROLINA

3/22/78

Report To: Carolina Well & Pump Co. Sanford, N. C.

Date Analyzed: 3/22/78

Sample Number: 170 Feet
WEII No 619

Analysis Results -- Parts Per Million

<u>Determination</u>	· () ()	<u>Determination</u>	
الو	7.4	Carbon Dioxide (CO ₂)	2 ·
Tron (Fe)	0.65	Total Acidity (CaCO3)	2
Nitrate (NO ₃)	Trace	Calcium Hardness (GaGO3)	153
Fluoride (F)	0.5	Magnesium Hardness (CaOO3))	39
Manganese (Mn)	, 0	Carbonate Hardness (CaOOg)	192
Total Hardness (CaCO3)	_192	Noncarbonate Hardness (CaCO3)	0
Chlorides (Cl)		Alkalinity (Phenolphthalein) (CaCO ₂)	0
Sulfate (SO ₄)	12.8	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)		Bicarbonate Alkalinity (CaCO3)	260
Magnesium (Mg)	9.6	Total Alkalinity (CaCO3)	260
Calcium (Ca)	62	Total Dissolved Solids	299
Carbonate (CO ₃)	" 0	Specific Conductance (micromhos at 25%)	460
Bicarbonate (HCO3)	317	Appearance When Analyzed	Clear
Hydroxide (OH)	_ 0	Odor When Analyzed Not O	<u>bjectio</u> na
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Haler Andreis Laboratory * L. .. 802 Hamlet Highway

Bermettsville, South Carolina 29512

LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE. WATER: APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES."

ATTI ANTIO DIVIC ON	
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EAST COAST CONSTRUCTION CO., INC. CONTRACT N62470-76-C-6799 REPLACE FOUR WATER WELLS MARINE CORRS BASE CAMP-LEJUENE, NO

(MARS) 479-4639

BENNETTSVILLE SOUTH CAROLIN

IRRIGATION

DATE 3/22/78

Report To: Carolina Well & Pump Co. Sanford, N. C.

Date Analyzed: 3/22/78

Sample Number: 131 Feet
WEII # 619

Analysis Results--Parts Per Million

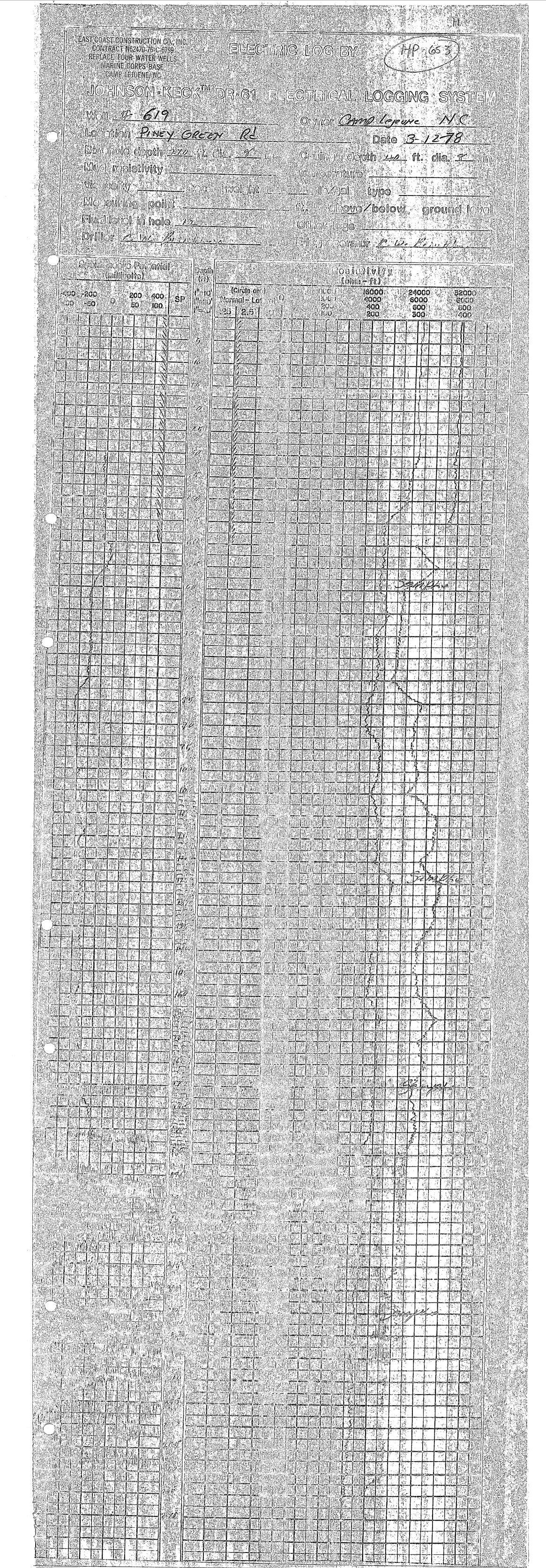
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Determination	* # # 5 * * * * * * * * * * * * * * * *	<u>Determination</u>	
pli same and the second	_7.3	Carbon Dioxide (CO ₂)	2
Iron (Fe)	0.2501	Total Acidity (CaCO ₃)	4
Nitrate (NO3)	Trace	Calcium Hardness (CaCO ₂)	187
Fluoride (F)	<u>-0.3</u>	Magnesium Hardness (CaOO ₃))	· 15
Manganese (Mn)		Carbonate Hardness (CaOO3)	202
Total Hardness (CaCO3)	202	Noncarbonate Hardness (CaOO3)	O
Chlorides (Cl)	_14	Alkalinity (Phenolphthalein) (CaCO3)	0
Sulfate (SO4)	7.6	Carbonate Alkalinity (CaCO3)	Ö
Phosphate (PO ₄)	<u> </u>	Bicarbonate Alkalinity (CaCO3)	240
Magnesium (Mg)	<u>_3.6</u> ,	Total Alkalinity (CaCOa)	240
Calcium (Ca)	74.2	Total Dissolved Solids	208
Carbonate (CO3)	<u>-0-</u> 2	Specific Conductance (micromhos at 25%)	320
Bicarbonate (HCO3).	293	Appearance When Analyzed	Clear
Hydroxide (OH)	<u> </u>		iectionable
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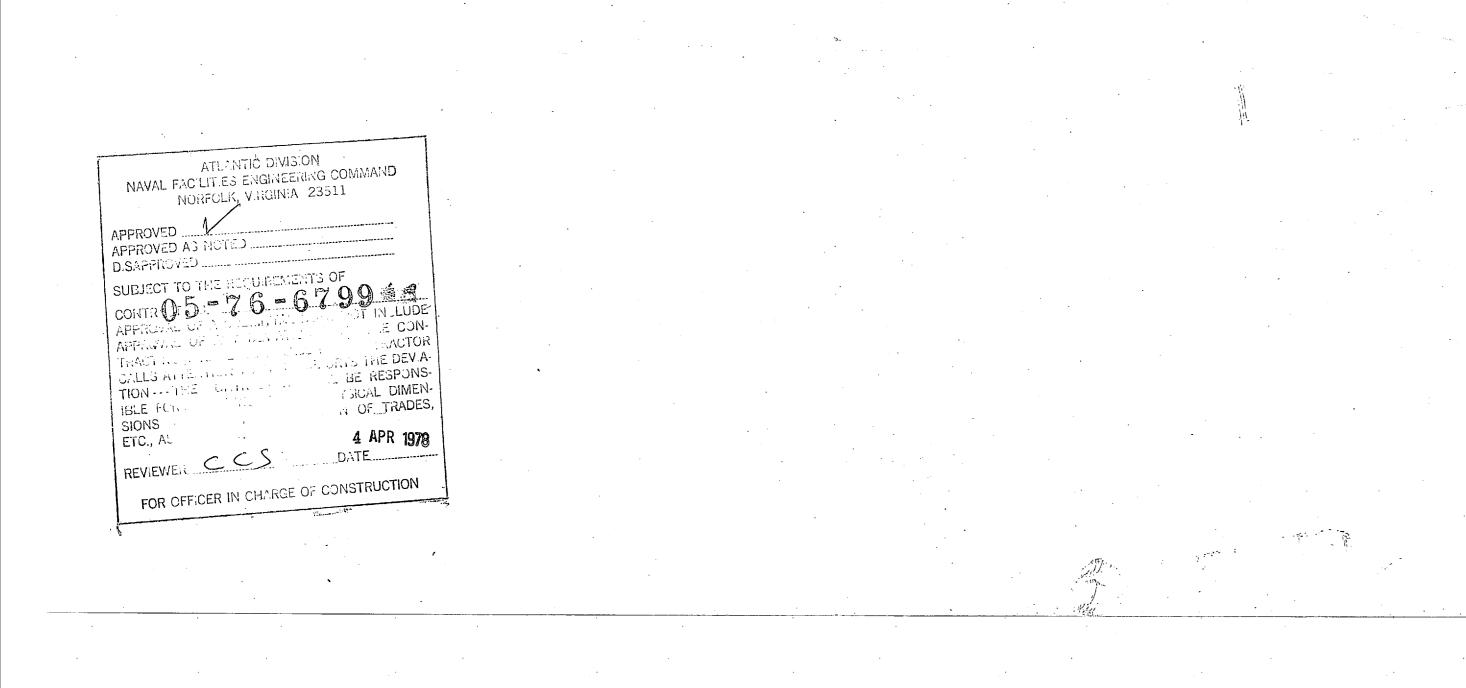
Water Analysis Laborator 102 Hamlet Highway

Bennettsville, South Carolina 29512

ANALYTICAL METHODS REFERENCES: "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WATER APHA. AWWA AND WECK AND METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES. SUPPLY PAPER 1484 (1980), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

	ATLANTIC DIVIS NAVAL FACILITIES ENGINEE NORFOLK, VIRGINIA APPROVED	RING COMMAND 23511
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	SUBJECT TO THE REGULAME. CONTROL OF THE CALL APPROVED OF THE CALL CALLS ACCEPTION TO TION THE DOMERNER BLE FOR SIONS	THE CON- TRACTOR DEPONTS THE DEVIA- TALL BE RESPONS-
1.	ETC., A3	4 APR 1978
	REV.EWEL CCS	DATE
	FOR OFFICER IN CHARGE	OF CONSTRUCTION





ENVIRONMENTAL PRODUCTS, INC

P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

SUBMITTAL DATA

PROJECT:

N62470-76-B-6799, Replace Water Wells

LOCATION:

Marine Corp Base, Camp Lejeune, North Carolina

ENGINEER: CONTRACTOR: Naval Facilities Engineering Command, Norfolk, Virginia East Coast Construction, Jacksonville, North Carolina

SUBJECT:

(Well 619)

CONDITIONS:

225 GPM @ 105' TDH. 1800 RPM

DESCRIPTION:

One (1) Crane Deming 5-stage, size L-8, Fig. 4700, vertical turbine bowl assembly, for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 5" threaded suction, and including the following:

One (1) H16DL 16½" x 6" type "C" surface discharge head, fitted for 5" column and 1" water lubricated shafting, for a 6" above ground discharge.

One (1) foundation plate (baseplate) for the above discharge head.

Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water well column pipe, threaded and coupled with couplings, zinc coated. One to be installed at the top of the bowl assembly, one to connect to bottom of discharge head.

D. Seven (7) 10' sections, same as above, for use as "intermediate column". E. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze retainer and rubber bearing (for 5" column).

Seven (7) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers

and rubber bearings (intermediate shaft).

One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top column, head, gear and motor used.
One (1) 10' section of 4" zinc coated pipe (suction pipe).

I. One (1) 4" galvanized cornucopia type strainer.

At. One (Vi) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 NAVAL FAC LITES VOIDENEVER TO COMMINANDOW shaft motor, NEMA desing "B" rated for high thrust, NONFOLK, with N.A15235 envice factor, class "B" insulated, 40° C. ambient, in a L215TP10 frame in a NEMA weather protected type one enclosure.

APPROVED AS NOTECNote 1. TDH is based on 56' pumping level 20 PSI @ ground level, and column and shaft friction loss of 2.50.

SUBJECT TO THE REQUIREMENT \$5 + 46.2 + 2 5= 105)

Note 2. Please confirm overall setting.

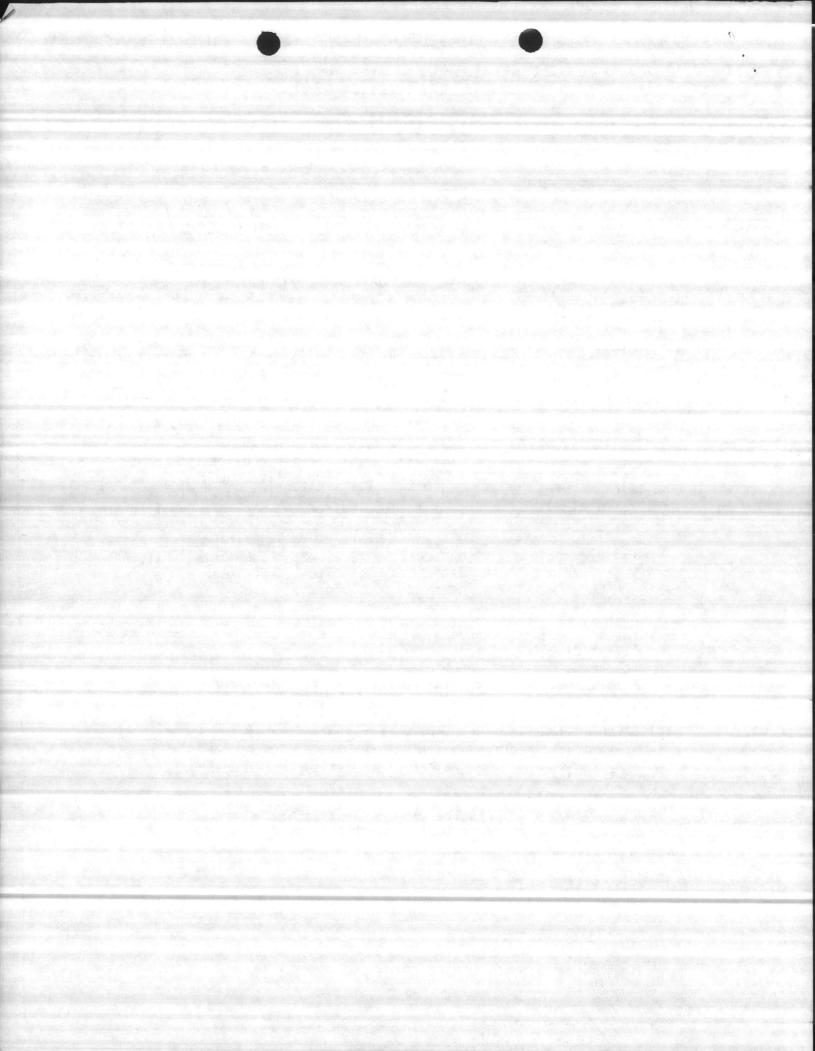
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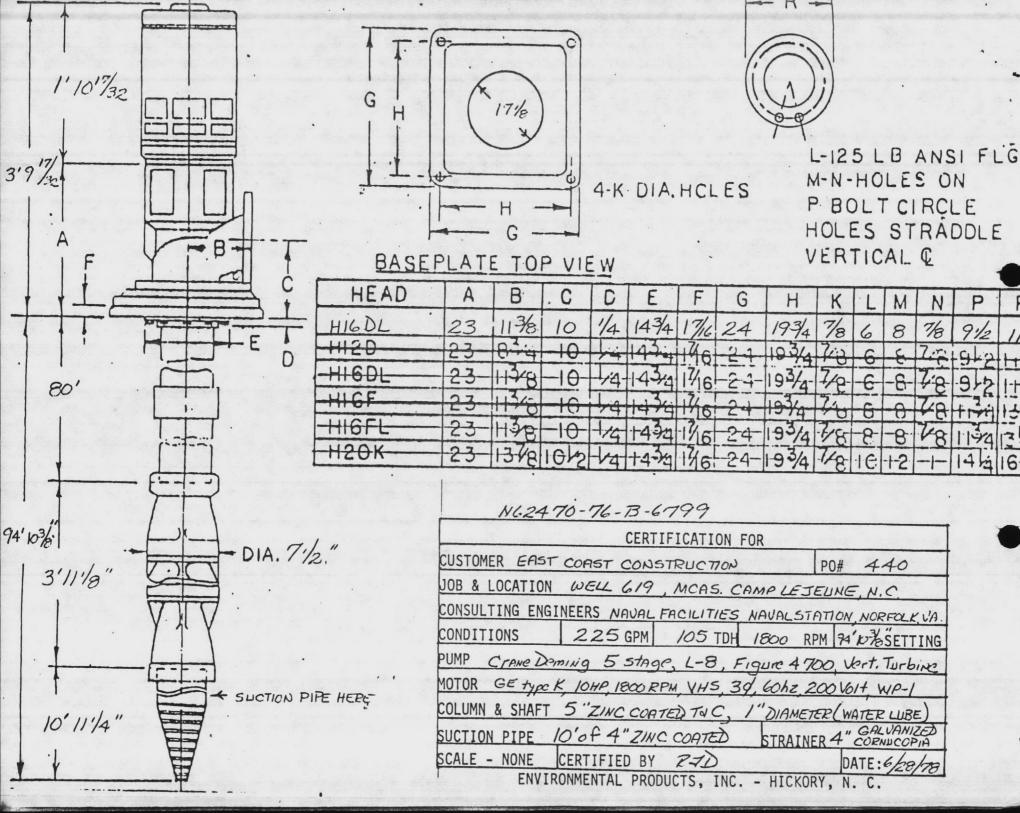
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ETC., AS IN

17 JUL 1978

JUNE 30, 1978







EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

(403) 479-4639

"Hella Analysis, Goodbye Horry"

WATER ANALYSIS LABORATORY

BENNETTSVILLE SOUTH CAROLINA

EONSULTANTS FOR ENDUSTRY MUNICIPALITIES HOME OWNERS DEVELOPERS IRRIGATION OTHERS

DATE: 3/22/78

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 3/22/78
Sample Number: 105 Feet

Analysis Results -- Parts Per Million

<u>Determination</u>		<u>Determination</u>	
apfi	· 7.0	Carbon Dioxide (CO ₂)	2
Imon (Fe)	_0.3	Total Acidity (CaCO3)	6
Nitrate, (NO ₃)	Trace-	Calcium Hardness (CaCO3)	170
Fluoride (F)	0.35	Magnesium Hardness (CaCO3))	17
Manganese (Mn)		Carbonate Hardness (CaOO3)	100
Total Hardness (CaCO3)	187	Noncarbonate Hardness (CaOO3)	87
Chlorides (C1)	12 ;	Alkalinity (Phenolphthalein) (CaCO3)	0
Sulfate (SO4)	7.2	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)	0	Bicarbonate Alkalinity (CaCO3)	100
Magnesium (Mg)	_3.5_	Total Alkalinity (CaCO3)	100
Calcium (Ca)	<u>68</u>	Total Dissolved Solids	195
Carbonate (CO ₃)	0 20,000 (30.500)	Specific Conductance (micromhos at 25%)	300_
*Birarbonate (HCO3)	122	Appearance When Analyzed	Clear
Hydroxide (OH)	_0	Odor When Analyzed Not Co	jectionab]

Water Analysis Laboretry

802 Haralet Highway

SIGNED:

Bennettsville, South Carolina 29512

LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE. WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PARER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

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FOR OFFICER IN CHARGE OF CONSTRUCTION

EAST COAST CONSTRUCTION CO., INC
CONTRACT N62470 -C-8889 6799
REPLACE WATER WELPSIMPING TEST DATA

MARINE CORPS BASE Test conducted by: Cano lama Killing

Well Owner: 415 Pumped Well No .: Observation Well Location:

Location: PINEY GREEN

County: OMSLOW

Airline Lengths: Pumped Well

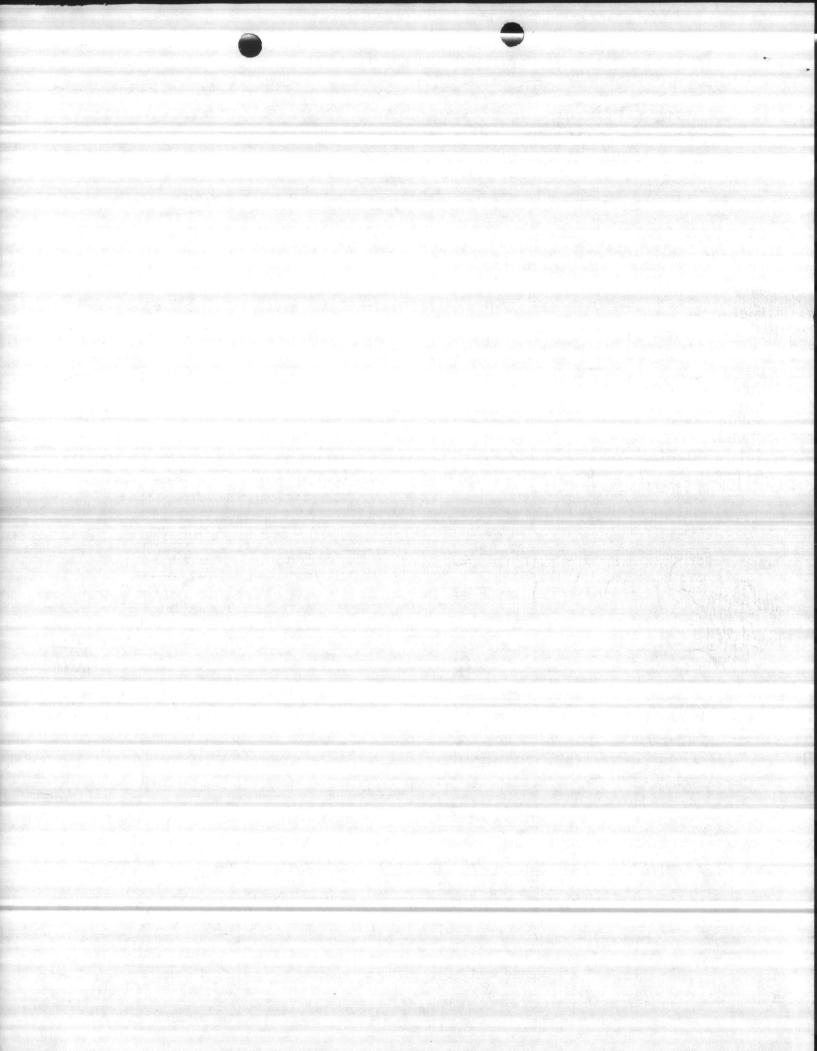
Observation Wells _

Pumping rate measured with:

Water levels measured with: Electric Rape

Pump Well Data

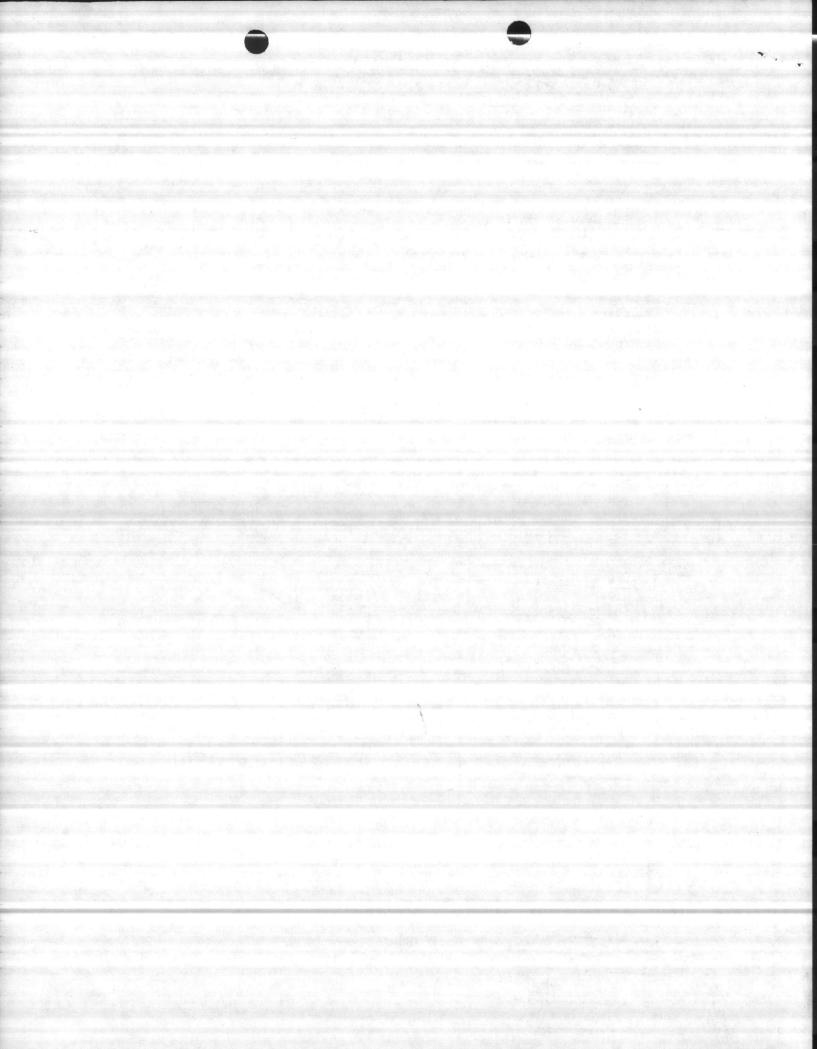
-	7 - 77 (7.2)	The state of the s	ı wı	ip well Data			
Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
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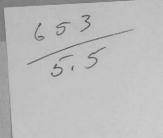


PUMPING TEST DATA

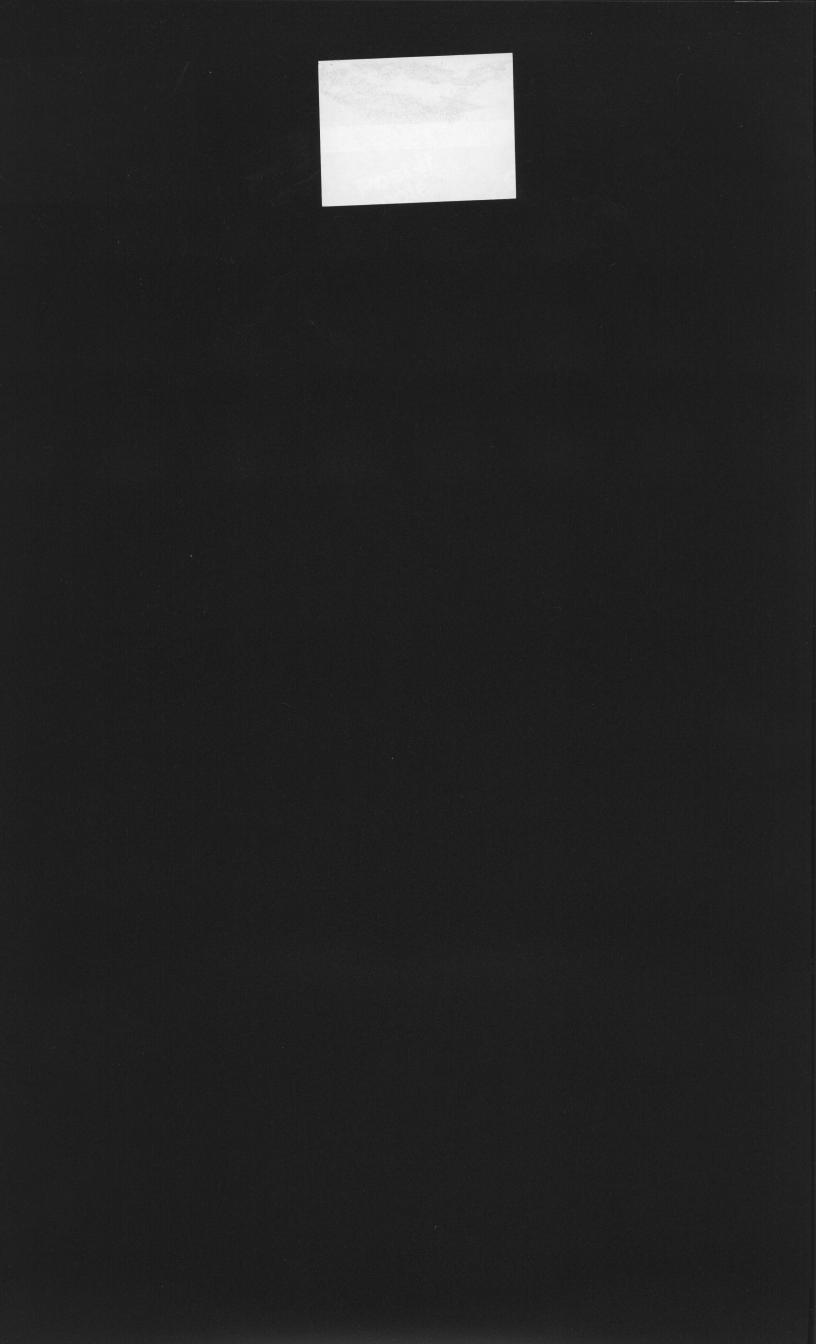
conducted by: Caral	Address:	P. County: Ohulow
ell Owner Age of	Location: Ginny Address:	E.J. County.
bservation Well Location: irline Lengths: Pumped Well	79 Observation Wells	
emarks:	数据数据 · · · · · · · · · · · · · · · · · ·	sured with: Electric tape

			Pump	Well Data			
Date and	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remark
Time						89'4'	
			450		- 1	89'7"	
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10 . 50	The state of the s	4	COMP CONST	MU. THOM CO. IN	IC.	47 2 4 4 2	
10 25	100 CHO./HA.275	Comment of the control of the contro	CONTRACT N62 REPLACE WAT MARINE COR	170-75 C-55-1	22-	1117	- Sec.
10 .30	- 4 - 4	Live West Control	REPLACE WAT	EL WELLS	7		
10:30	14.50 第二次	Section 44	MARINE COP	PS BASE	122	25' 4	,1
10:40	Access to the Control of the Control	Salaries Salaries views	CAMP IEU	NO DHOE		25'0	
10:45		CONTRACTOR OF THE PARTY OF THE	- LEJU	INE, NO	1.0%	25' 4 25' 0 24' 9	7
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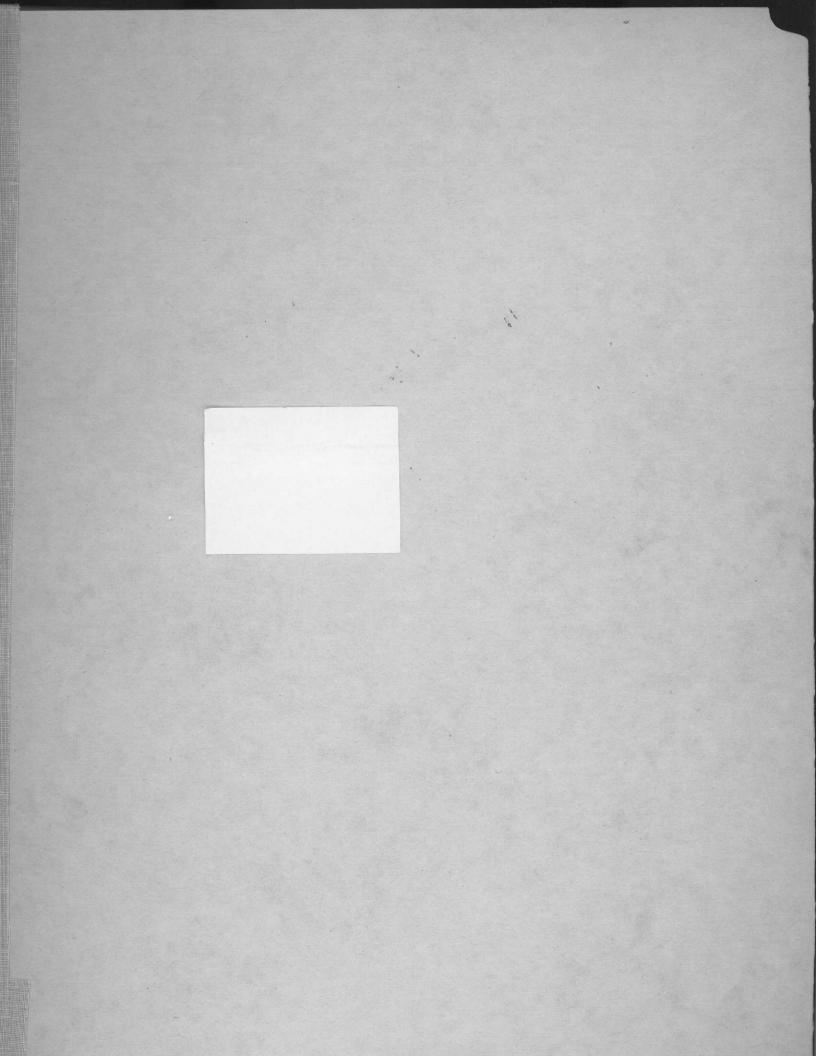


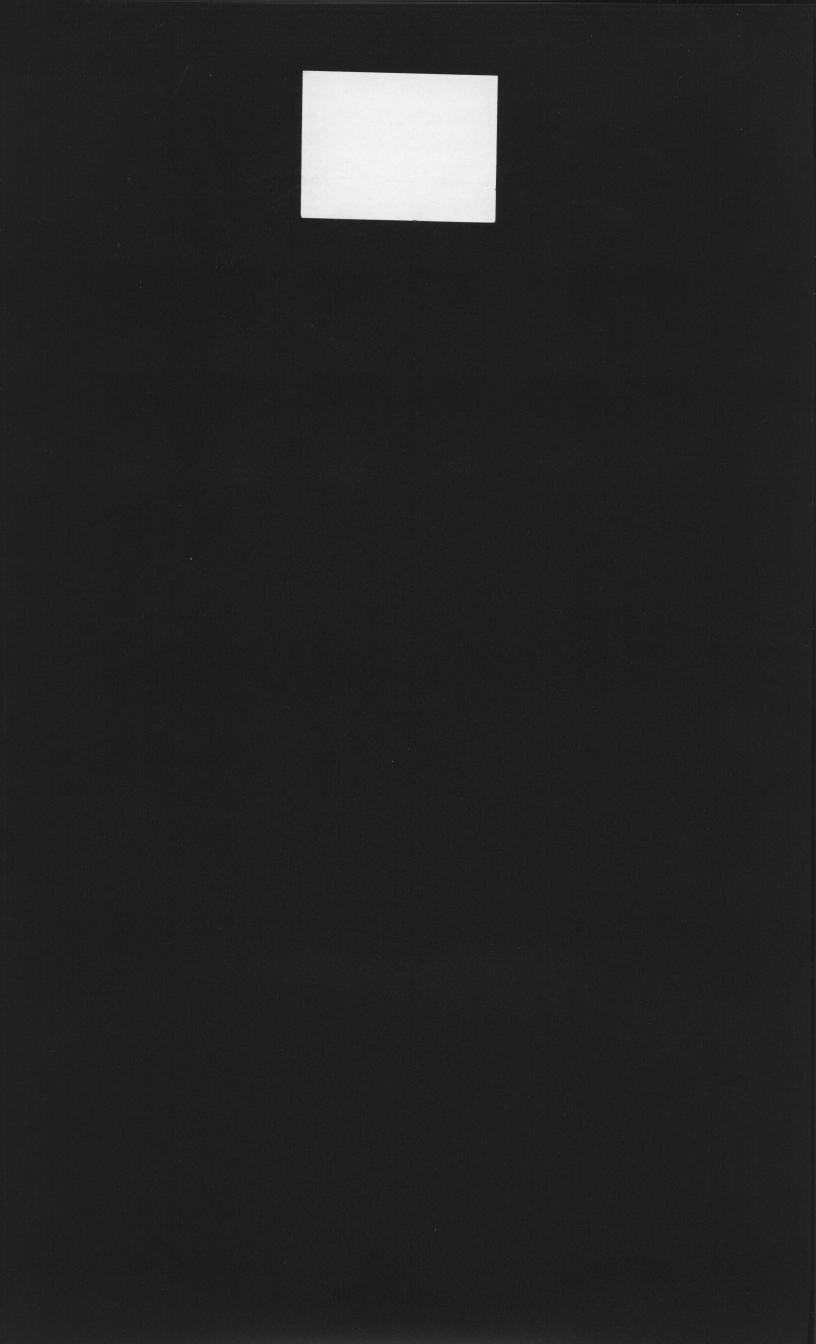


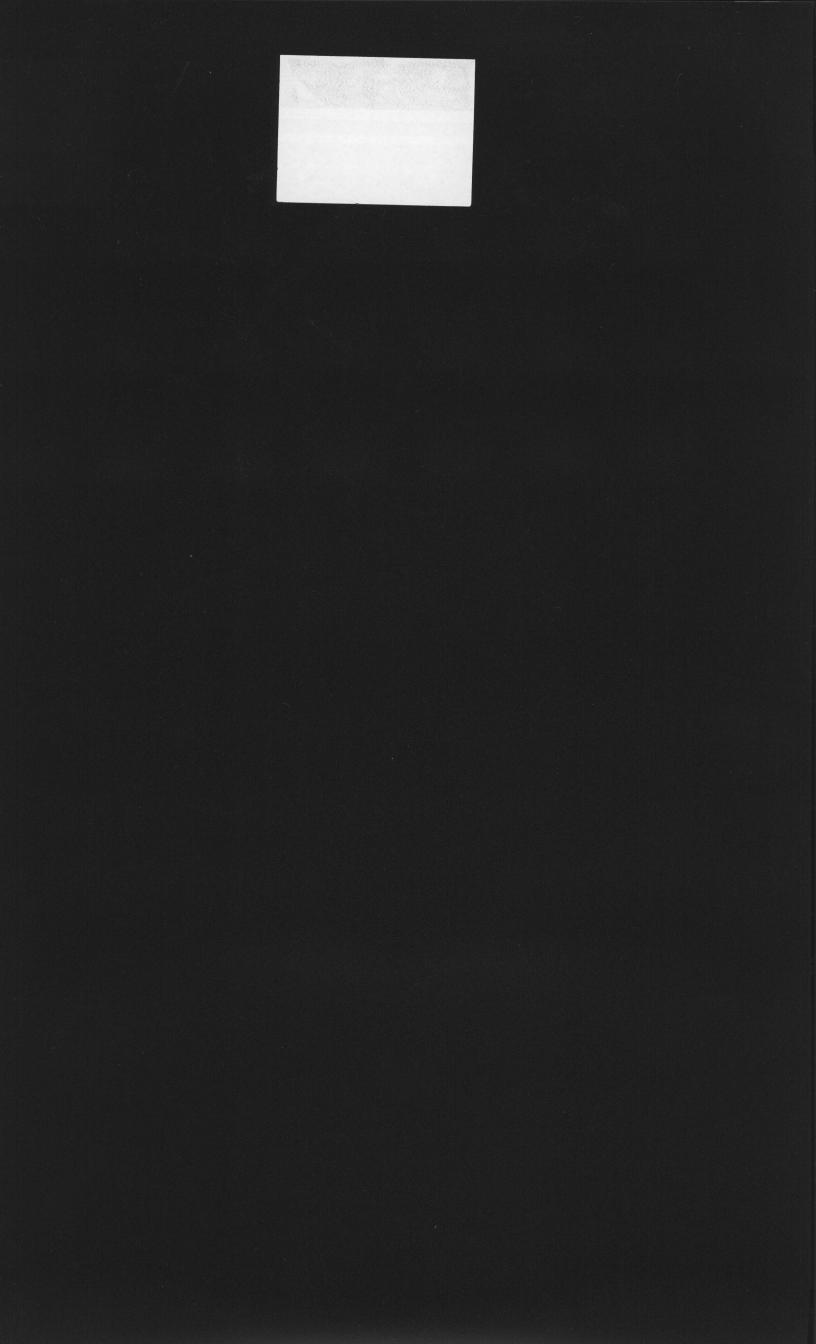


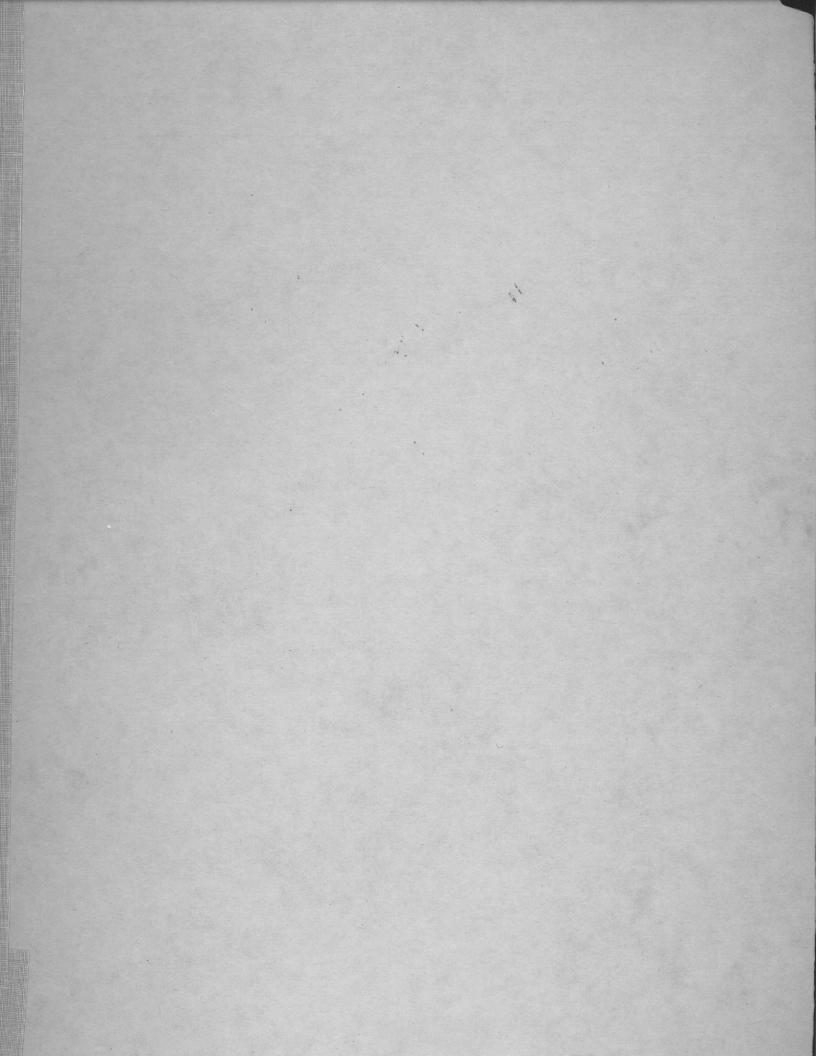


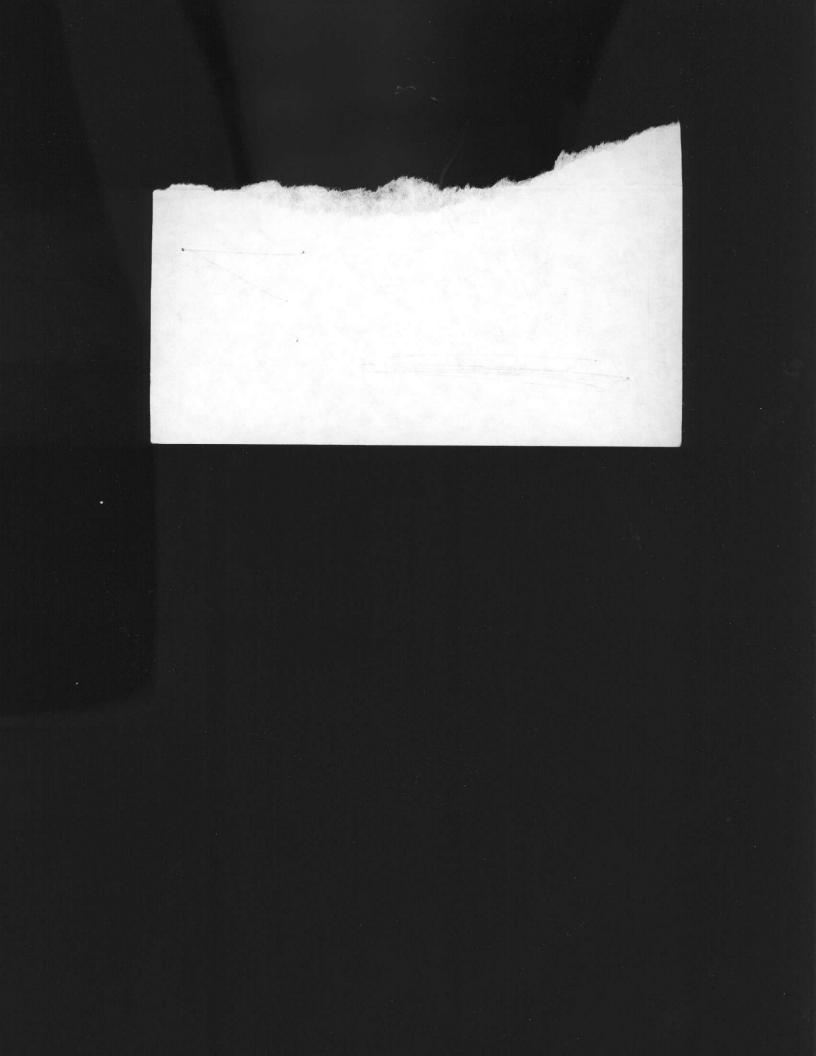






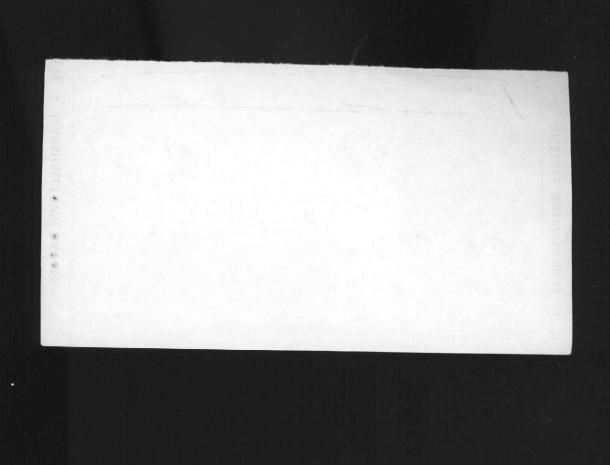


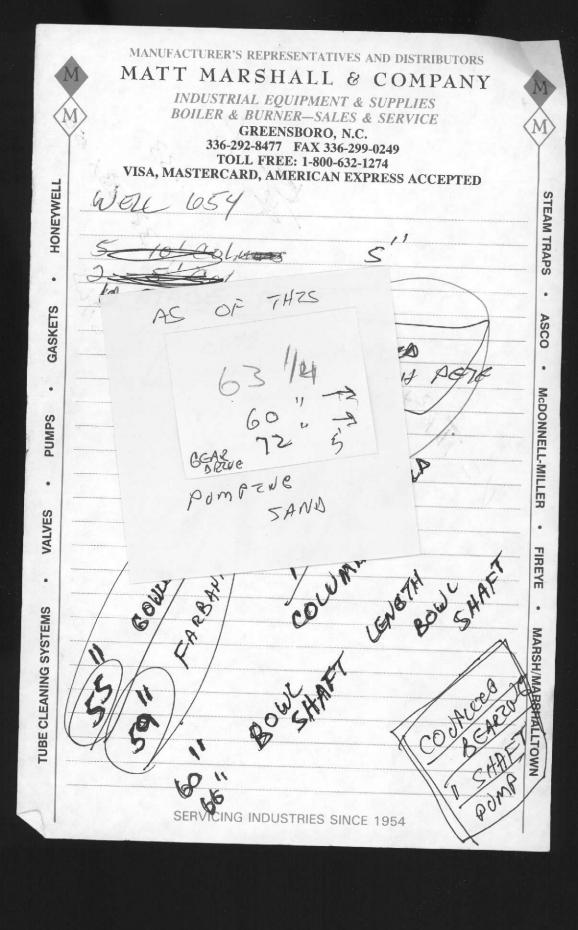




FRAME: 256TPN HEAD-21/3"
MODEL: AC 43B MOTOR-2434"
Phase: 3 Conside Base - 12"
H. P.: 20
RPM: 1770

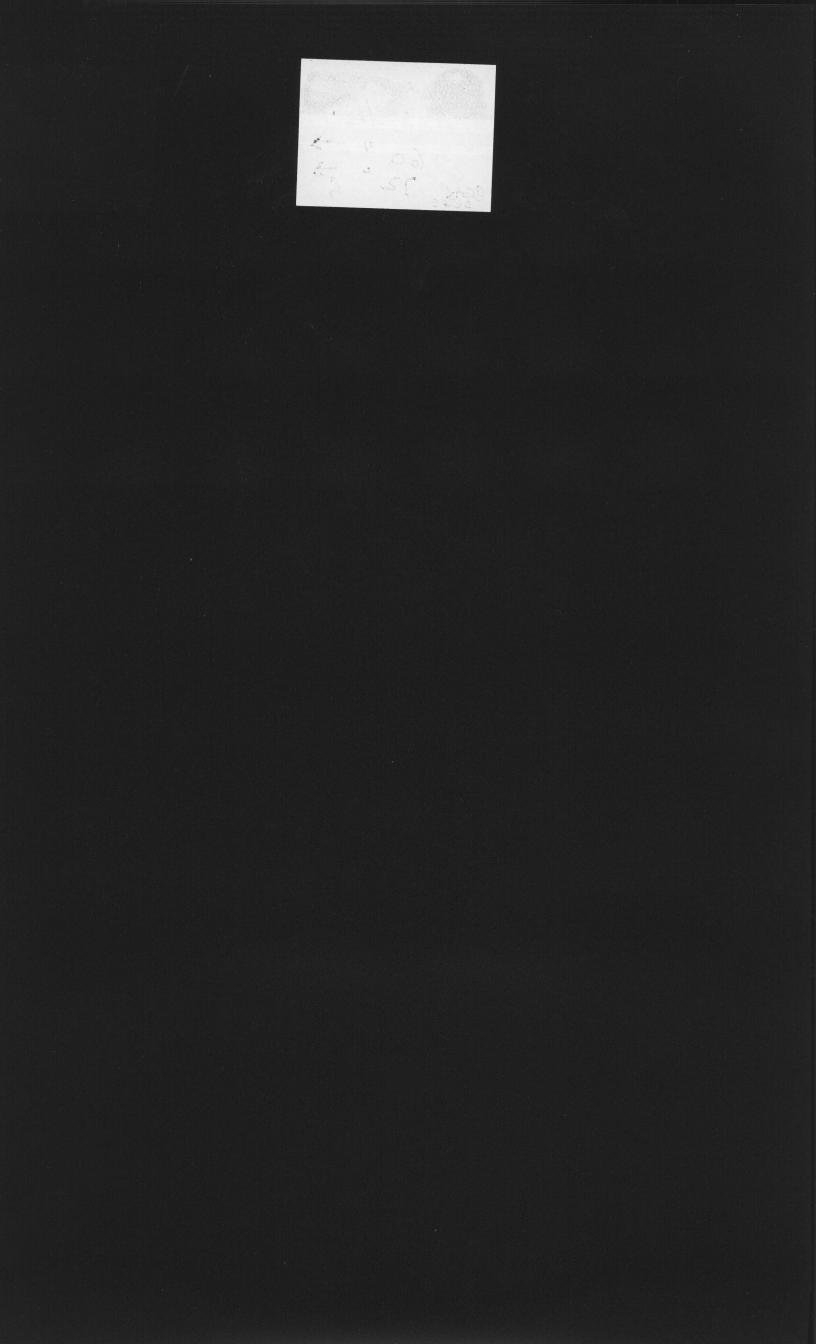
SERVICING INDUSTRIES SINCE 1954

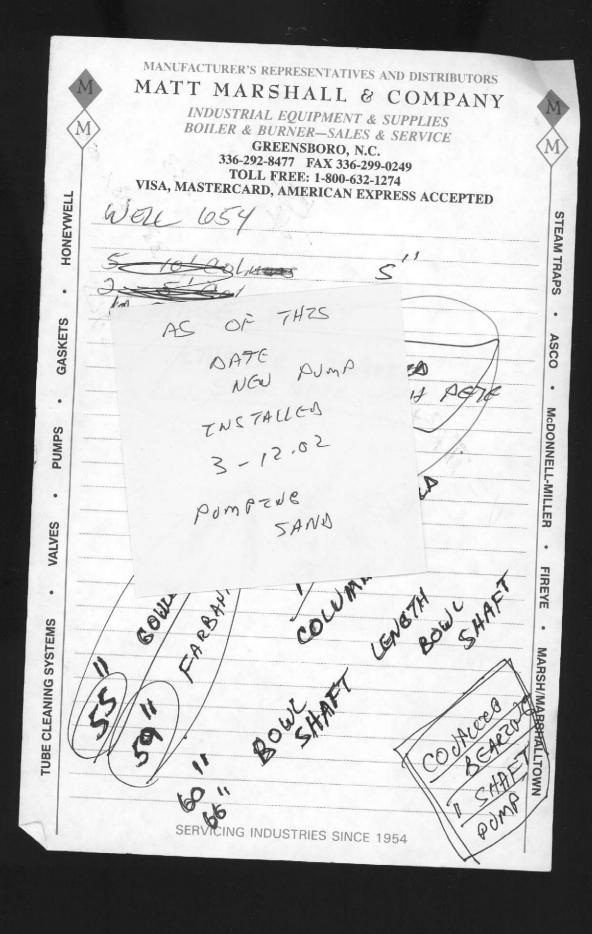




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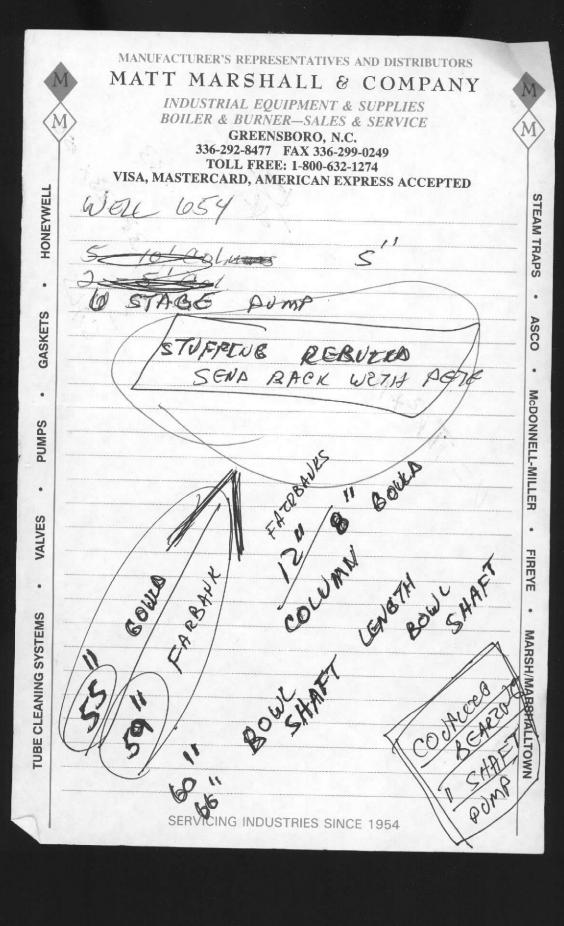
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(919) 799-8800 Fax: (919) 799-8801

P.O. Box 3407 Wilmington, N.C. 28406-0407 Shipping Address

108 N. Kerr Ave., Suite A1 Wilmington, N.C. 28405-3406

January 18, 1989

Mr. Stan Miller
Water & Wastewater Treatment
Bldg. 670
Marine Corps Base
Camp LeJeune, N. C. 28542

Subject: Order M67001-89M-2005 Well Pump at Bldg. 654

Dear Stan:

We are pleased to furnish information on the bowl assembly being furnished on the subject order. We will be furnishing:

1 Goulds Model 8R-JLO/6 stage Deep Well Turbine Pump, standard bronze fitted bowl assembly to accept your 5" x 1" column and shafting.

We attach information further describing this well pump, along with performance curves and dimensions to show that it should adapt to your existing column pipe.

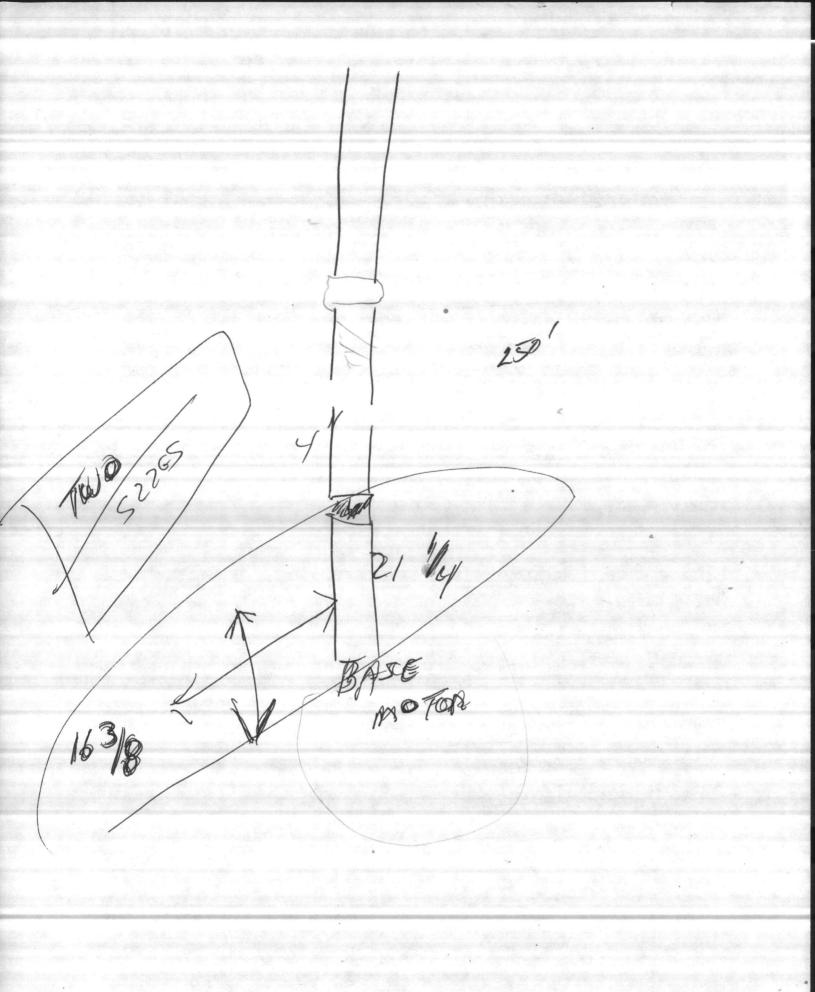
We thank you for the opportunity to furnish this pump and remain

	Very truly yours,
10 HP	R. W. Tayloe
Attachment 5" Co	
5 - 10	COCONN
2 - 5	COLUMN
STUFFTUB Knowille TN • Nochville TN • Chat	"/ COI

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DATE 7-25-00,
PWSID 04-67-04/

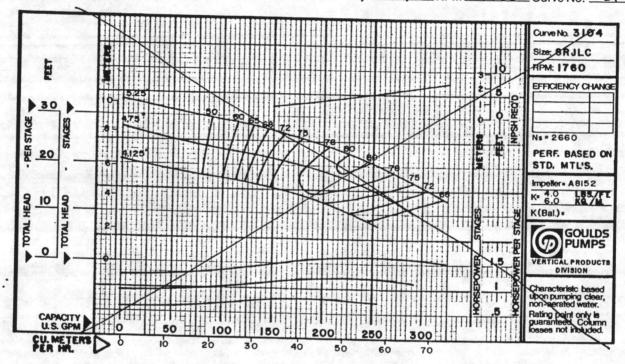
WELL # HO 6	54
WELL NAME HAD	NOT POWN HOS
BLDG. HP 6	
CODE 6.	
AVAILABILITY P.	
LOCATION _ SACE	MILL ROOM
LATITUDE	34.70809
LONGITUDE	77. 32916
WELL DIAMETER	
WELL DEPTH	183
SCREEN INTERVAL	
AIETD	100
STATIC LEVEL	
PUMPING LEVEL	<i>5s′</i>
PUMP TYPE VERTIC	AL TURBINE
MOTOR HP	
INTAKE DEPTH	70
DESIGN CAPACITY	200
ACTUAL GPM	
SIZE OF CONCRETE SL	
HEIGHT OF CASING	2"

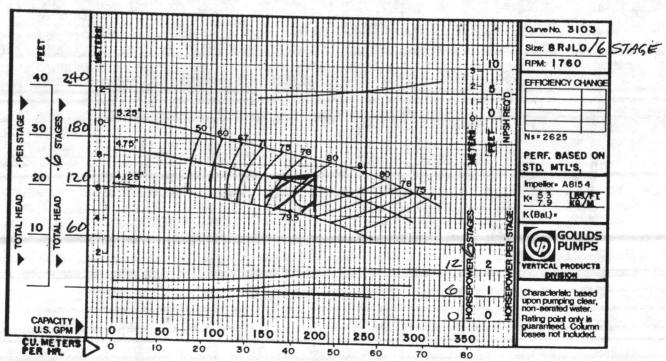


Customer MCB - CAMP LEJEUNE, N.C. Project REPLACEMENT BOWL

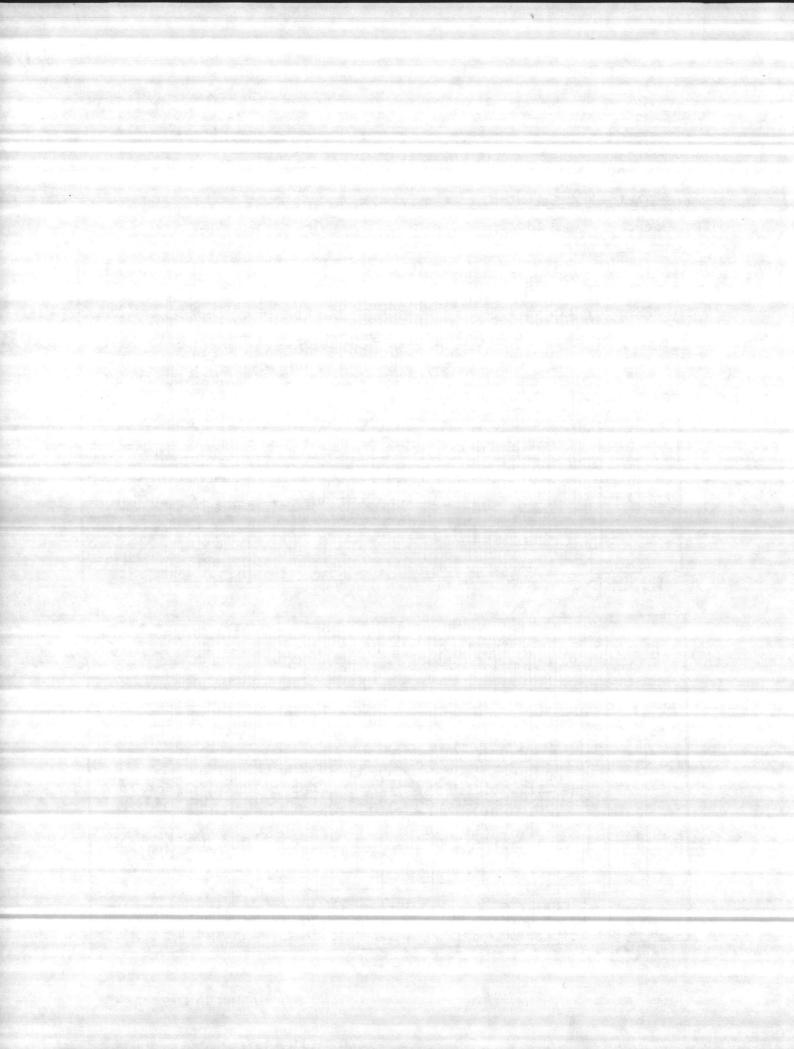
Goulds Proposal No. Inquiry No. Inquiry No. Inquiry No. Date 1-11-89

Service WATEN Capacity 2006/M TDH 137' Efficiency 80% RPM 1760 Curve No. 3103





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



PRODUCTS, INC

P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

SUBMITTAL DATA

PROJECT:

N62470-76-B-6799, Replace Water Wells

LOCATION: ENGINEER:

Marine Corp Base, Camp Lejeune, North Carolina

CONTRACTOR:

Naval Facilities Engineering Command, Norfolk, Virginia East Coast Construction, Jacksonville, North Carolina

SUBJECT:

Well 677/654

CONDITIONS: DESCRIPTION: 200 GPM @ 136.5'TDH, 1800 RPM

One (1) Crane Deming 6-stage, size L-8, Fig. 4700, vertical turbine bowl assembly for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 4" threaded suction, and including the following:

One (1) H16DL 16½" x 6" type "C" surface discharge head, fitted for 5" (and 1" water lubricated shafting, for a 6" above ground discharge.

One (1) foundation plate (baseplate) for the above discharge head.

Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water w column pipe, threaded and coupled with couplings, zinc coated. One to installed at the top of the bowl assembly, one to connect to bottom of discharge head.

Five (5) 10' sections, same as above, for use as "intermediate column" D. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze

retainer and rubber bearing (for 5" column).
Five (5) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers and rubber bearings (intermediate shaft).

One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top

column, head, gear and motor used.

One (1) 10' section of 4" zinc coated pipe (suction pipe). H.

One (1) 4" galvanized cornucopia type strainer.

One (1) Johnson model CH-20, combination, right angle, hollow shaft gear,

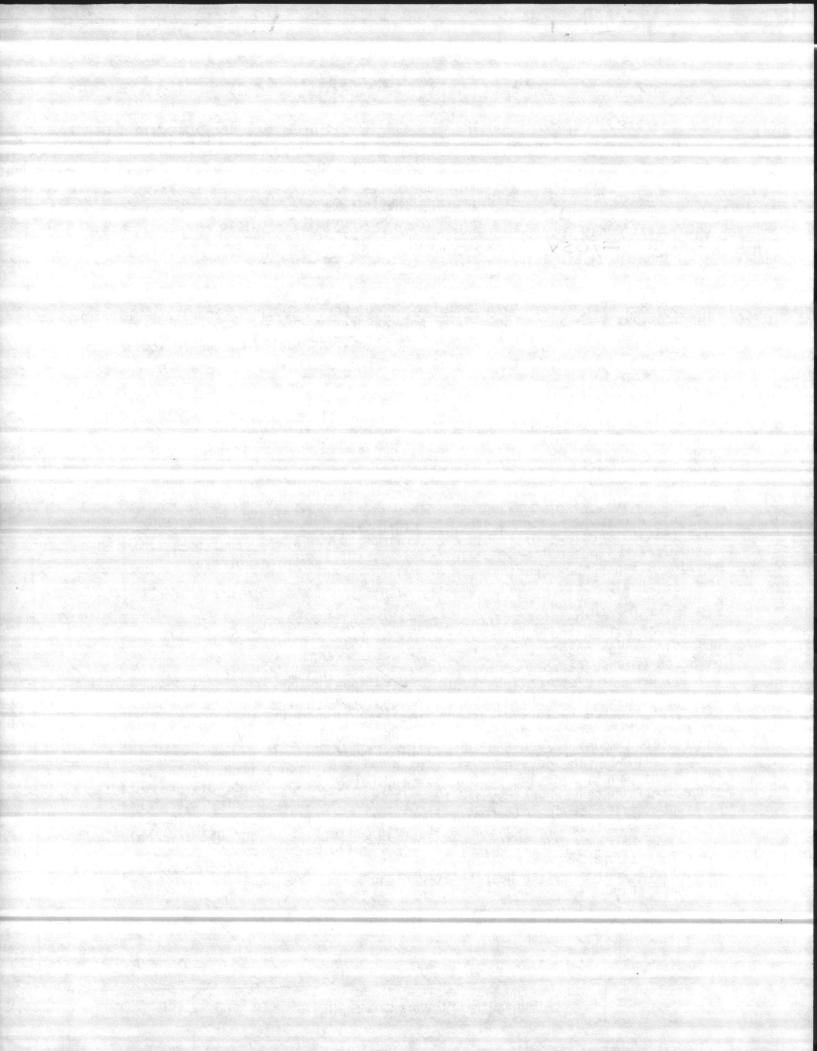
with non-reverse ratchet, one to one ratio, figure one rotation.

One (1) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 volt, vertical hollow shaft motor, NEMA design "B" rated for high thrust, K. with 1.15 service factor, class "B" insulated, 40° C. ambient, in a L213TP10 frame in a NEMA weather protected type one enclosure.

One (1) Ford model 172-DF-6002-GR, four cylinder, 172 CID diesel power unit, with four blade fan, governor, air cleaner assembly, fuel tank, wiring harness, instrument panel, ignition switch, starter button, amp. light, oil pressure gauge, top mounted exhaust system hood, 12 volt electric starter, starter relay, battery charging alternator, radiator, SAE standard flywheel housing, power take-off assembly, foot mounted, with battery, rack and battery cables.

One (1) La Marche A18J-12V-A1, 1/60/120 automatic battery charger.

One (1) section of Parrish #31 drive shafting either 8 3/4" long or 24" long, (your choice), with gear shaft and engine shaft connecting flanges and shaft guard.



Charles R. Underwood, Inc.

Municipal Pump Sales & Service

83-190

2189 Everett Dowdy Road Sanford, North Carolina 27330 Phone (919) 775-2463 Fax (919) 708-7232

November 20, 2001

Quote # 01301

Commanding General Att: Base Maintenance Division Bin 1-83 Marine Corps Base Camp LeJeune, NC 28542-0004

Att: Danny Hill

Ref: Well # 654

Dear Mr. Hill

We are pleased to offer the following proposal for the parts for the above project. This would be as follows.

- 1 ea. Goulds Model 8RJLO Bowl Assembly designed for the conditions of this well.
- 1 ea. I" X 60" Stainless Steel Bottom Shaft
- 5 ea. 1" X 120" Stainless Steel Intermediate Shaft
- 1 ea. 1" X 72" Stainless Steel Top Shaft (to fit existing discharge head)
- 6 ea. 5" X 1" Bearing Retainers with Bearings
- 1 ea. Rebuilt Packing Box

Your cost

\$3,819.00

PRTMENORLY VENONLY SUBST

Price includes freight. Price does not include any taxes, anchor bolts, gauges or other accessories not listed above. Trust this meets with your approval. If you have any questions please give us a call.

Best regards,

N. F. "Pete Lowe L

General Manager

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· : Charles Underwood, Inc. N.F. "Pete" Lowe Camp LeJeune, Well # 654

3103

Goulds Turbine Pump Selection ver: 6.042 11/20/01

PUMP DATA SHEET

Goulds Turbine 60 Hz

Selection file: (untitled)

Catalog: TURB60.MPC v 1.6.4

Design Point:

Curve:

Pump:

Flow: 200 US gpm

Head: 137 ft

Fluid: Water

Temperature: 60 °F

SG: 1

TURBINE - 1800 Speed: 1760 rpm

Size: 8RJLO (6 stages)

Viscosity: 1.122 cP

Limits: Temperature: --- °F Dia: 4.9375 in

Sphere size: 0.43 in

Vapor pressure: 0.2568 psia Atm pressure: 14.7 psia

Pressure: 425 psiq

Power: --- bhp

NPSHa: --- ft

Specific Speed:

Ns: 2625

Nss: ---

Piping:

System: ---

Vertical Turbine:

Bowl Size: 7.5 in

Max Lateral: 0.63 in

Thrust K Factor: 5.3

Suction: --- in Discharge: --- in

Motor: 15 hp

Speed: 1800

Frame: 254

NEMA Standard

WPI Enclosure

sized for Max Power on Design Curve

Suction Size-5" Discharge Sizes-5",6"



Flow: 200 US gpm

Head: 136 ft

Eff: 80.1%

Power: 8.55 bhp

NPSHr: 4.22 ft

-- Design Curve --

Shutoff Head: 175 ft

Shutoff dP: 75.7 psi

Min Flow: - US gpm

BEP: 80.6% eff

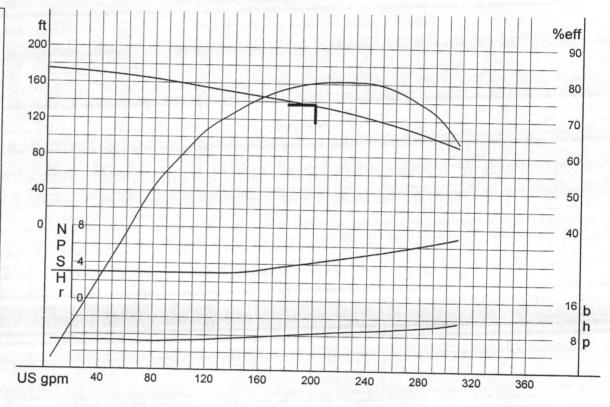
@ 225 US gpm

NOL Pwr: 11.1 bhp

@ 308 US gpm

-- Max Curve --

Max Pwr: 13.1 bhp @ 324 US gpm



--- PERFORMANCE EVALUATION ---

Flow US gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Motor kW	Hrs/yr	Cost /kWh
200	1760	136	80.1	8.55	4.22	90.5	7.04	1500	0.08
160	1760	146	75.9	7.75	3.35	90.5	6.39	3000	0.08
120	1760	155	67.2	6.98	3	89.7	5.81	1000	0.06

Total Annual Power Consumption: 35,532 kWh Annual Operating Cost: \$2,726

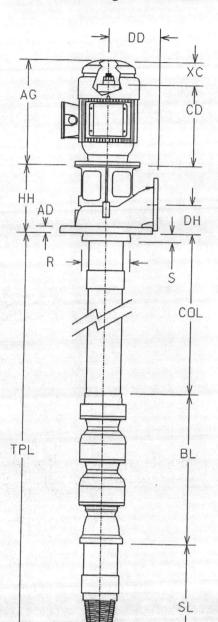
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Goulds Turbine Hydraulic Analysis of **DWT-CATM** Pump Date: 11-20-2001 Version: 2.01P

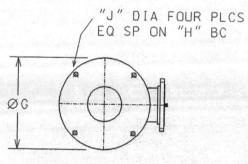
6 Stage 6x8RJLO





Pump Data

AD		Pump Data	
AD:			
AG:	21.25	Size:	8RJLO
BD:	10.00	Stages:	6
BL:	47.63	Impellers:	Bronze
CAN:	N/A	Bowl:	Cast Iron
CD:	17.56		
CL:	N/A	Bearing:	Rubber
COL:	720.00	Basket:	No
DD:	0.00	LineShaft Type:	Open
		Column:	Steel
DH:	0.00	Column:	5" Threaded
G:	0.00	Bearing Spacing:	10 feet
H:	0.00	Section Length:	10 feet
HH:	0.00	Head:	A:Cast
J:	0.00	Flange (Disch.):	6" 125#
R:		Inlet:	
S:		Coupling:	416SS
SL:	133.00	Seal:	Packing
TPL:	900.63	LineShaft:	416SS 1"
UG:	N/A	SubBase:	None
V:			
W:			
X:			
XC:	3.34		

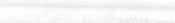


Y: Z:

DISC HEAD

Hydraulic Data		Miscellaneous		Motor Dat	ล
Flow (gpm):	200	Thrust At Design:	906	Model Number:	B401
Pump Head (ft):	105.0	Thrust At Shutoff:	1113	Make:	USEM
TDH (ft):	136.0	Min Water Level(in):	360	HP:	10
Speed (rpm):	1760			RPM:	1800
Fluid:	Water	Weight		Type:	AUE
Temperature (F):	60	Pump:	1465	Efficiency:	91.0
Viscosity:	1.122	Motor:	172	Frame:	215TP
Spec.Grav:	1	Total:	1637	Ratchet:	NRR





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Goulds Turbine Hydraulic Analysis of **DWT-CATM** Pump Date: 11-20-2001 Version: 2.01P

6 Stage 6x8RJLO



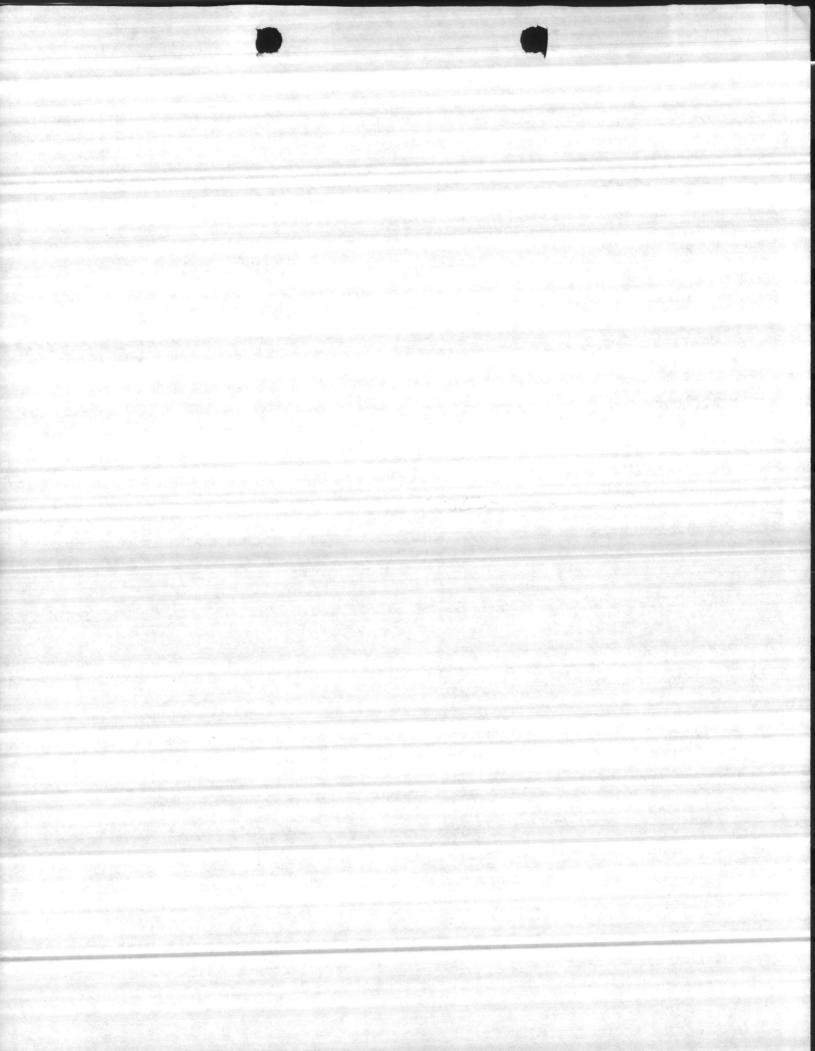
Overall Pump Parameters

Size and Model:	8RJLO	Pump Operating Speed, RPM:	1760
Capacity, GPM:	200	Total Dynamic Head, Ft.:	136.0
Total Pump Length, In.:	900.6	Impeller Trim, In.:	The second section is a second section of the sectio
Pump Type:	OpenSump	Head Type:	4.9
Pump K-Factor:	5.3	Number of Stages:	A:Cast
		Pumping Level, In.:	6
LineShaft-Related Data		r umping Level, III.:	360.0
Shaft Diameter, In.:	1	Shaft Limit, HP:	
Shaft Material:	416SS	Matl Correction Fact:	70
LineShaft Length, In.:	720.00		1.18
	720.00	Shaft Elongation, w/o Adder: LineShaft Type:	0.02
Bowl Data		Emeshart Type:	Open
Total Bowl Length, In.:	47.63	Bowl Diameter, In.:	
	17.03	Bowl Shaft Limit, HP:	7.5
Column Data		Bowl Shart Limit, HP:	124
Column Diameter, In.:	5	Column Load, Lb.:	
Wall Thickness, In:	Standard	Column Elongation, In.:	75.4 0.00
HorsePower Data			
Shaft Friction Loss, Hp.:	0.32	Thrust Load Loss, Hp.:	
Bowl HP At Design, Hp.:	8.55	Motor HorsePower, Hp.:	0.12 10
Head Data			
Column Loss, Ft.:	0.95	Discharge Head Loss, Ft.:	
	0.23	Total Loss, Ft.:	0.06
Other Data		Total Loss, Ft.:	1.01
Hydraulic Thrust, Lb.:	720.8	Thrust at Design, Lb.:	0060
Thrust at Shutoff, Lb.:	1112.6	Design NPSH, Ft.:	906.0
Max Lateral, In.:	0.63	Min. Lateral Required, In.:	4.2
		Actual Head above Grade, Ft.:	0.02 104.99
Efficiency Data (Efficiencies es	stimated not guarante	eed)	
Bowl Efficiency:	80.10	Pump Efficiency:	76.00
Motor Efficiency:	91.00	Overall Efficiency:	76.20
	71.00	KWH/1000 gallons:	69.34
Component Weights		K W15 1000 ganons.	0.62
Bowl Weight, Lbs.:	265	Column Weight, Lbs.:	1000
Head Weight, Lbs.:	0	Can Weight, Lbs.:	1200
Motor Weight, Lbs.:	172	Total Pump Weight, Lbs.:	0
	172	rotar rump weight, LDS.:	1637

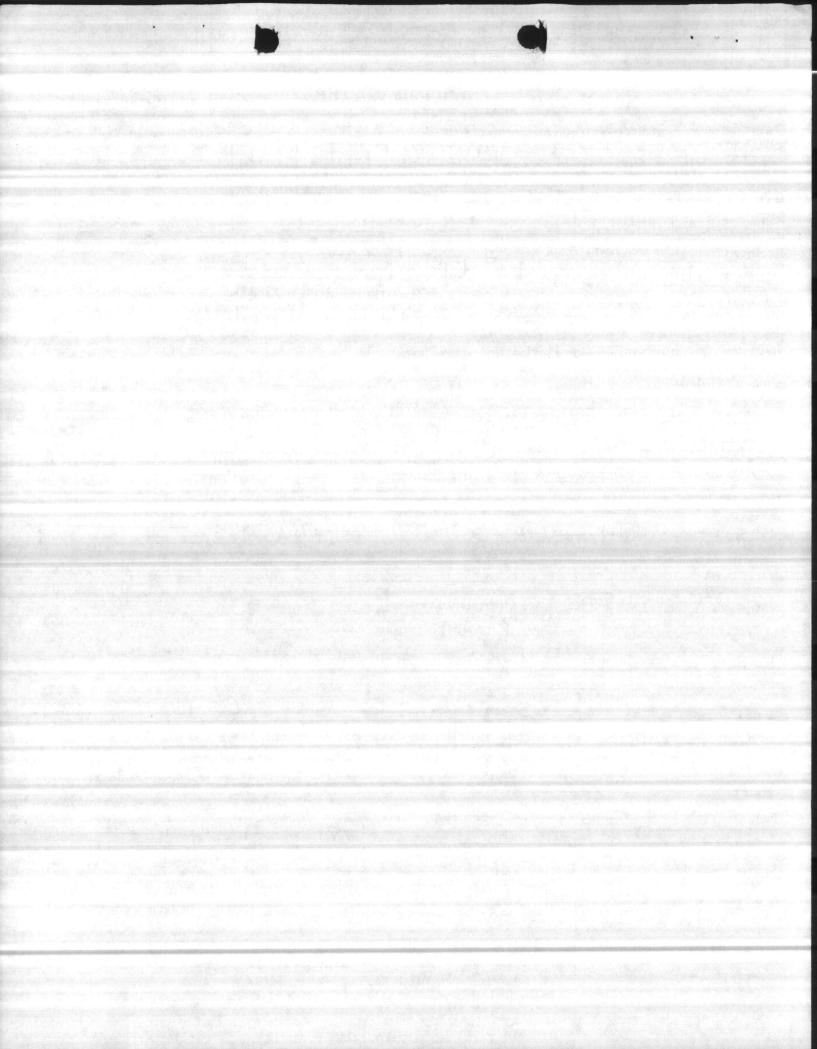


DATE 7-25-00,
PWSID 04-67-04/

WELL # HD 654
WELL NAME HAD NOT POUL HOZO
BLDG HP 654
CODE 6.
AVAILABILITY P.
LOCATION SAW MILL ROAD
LATITUDE34. 70809v
LONGITUDE7). 32916
WELL DIAMETER8"
WELL DEPTH
SCREEN INTERVAL
YIELD
STATIC LEVEL30'
PUMPING LEVELSS'
PUMP TYPE VERTICAL TURBINE
MOTOR HP/O
NTAKE DEPTH
ESIGN CAPACITY 200
CTUAL GPMX
IZE OF CONCRETE SLAB
EIGHT OF CASING2"



	GROUND WATER	Date Form Completed
Owner Assigned Well Name (If purchase,	name of system)	Code G=Ground O
654 HADNOTIPOL	NT 654	Y=0 w/direct influence Z=W w/direct influence
If Purchase, seller ID# Source Begin Date	Source exempt— Direct Influence Date	Availability P=Permanent
	N N	E=Emergency I=Interim S=Seasonal O=Other
Location of well within the system (If purchas	ie, location of master meter)	75 Agazeta act
SAW MILL ROAD	13 - Diversity of	GPS Data No. of Sats. Locked on
Latitude (N) Longitude (W)	G=GPS	Q# or Y
34422886 07719	4 74 # S=Surveyed	Ø3 DOP#
(If purchase, use seller's primary source lat/lo Vulnerable (VOCs) YN	Assessment Date	Y Y
ENTRY POINT INFORMAT	TON Use Code C C Ground/Permanent	Availability P=Year-round S=Seasonal
Owner Assigned	D=Ground/non-permanent	E-Emergency I-Interim O=Other
Entry Point Code Entry Point Name	MEB HADUST PT	WTP
Location:		
Surface water within 200'? N Adequate slope? Y (Y,N) Flooding? Well House: Free of stored materials? Y ((Y,N) Maintenance: (Y,N) Properly drained? (Y,N) Loc	f yes, bact. samples collected?(Y,N) ked?(Y,N)
Candidan of houses	Type of freeze protection:	
Well: Diameter: 8" Type: Properly vented? N (Y,N) Casing depti	ft. (lf unknown, Well depth:	m): 200 Properly sealed? Y (Y,N) /83' Meter available? Y (Y,N) Size:
Size of blow-off: 4 (V)	Sample tap: Before treatment	? (Y,N) After treatment? (Y,N) 70 Auxiliary Power? (Y,N)
Size of blow-off: 4 70 Pumps: Capacity: GPM: 70	HP: 10 Pump intake depth:	land (nump/casing): 2"
Type pump: VERTICAL TURB	NE Height above f	Ground:
Storage at well site: Elev:	Hÿdro:	
If hydroautomatic, air volume control?	(Y,N) Safety valves?(Y,N) Cod	led?(Y,N)
High service pumps: 1gpml	p 2 gpm hp 3 gpm	hp Auxiliary Power?(Y,N
	-l-se b-ale of form	
If other wells are treated here, which ones?	If treated else	ewhere, where:
If other wells are treated here, which ones! If purchase, retreat? Y If yes, complete	back of form. D No Casina V.	eat
DEHNR 3803 (Revised 12/93)	NOT CO UTAMINATED	*

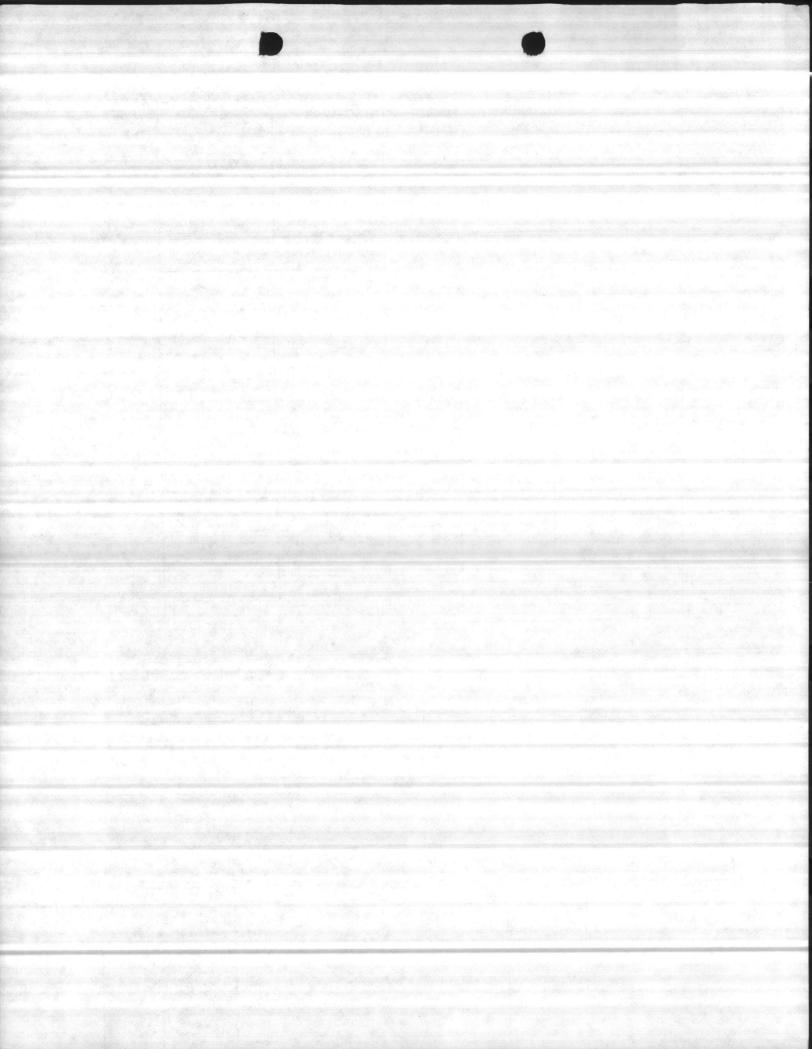


WELL NUMBER	654	BY 57e	iensord	Peterson	DATE 2	211-97
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
60	32	55	23	3/5	100	15
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REMARKS

D/H 63

ANUFACTURER	STAGE	S.N.	Imoma v	
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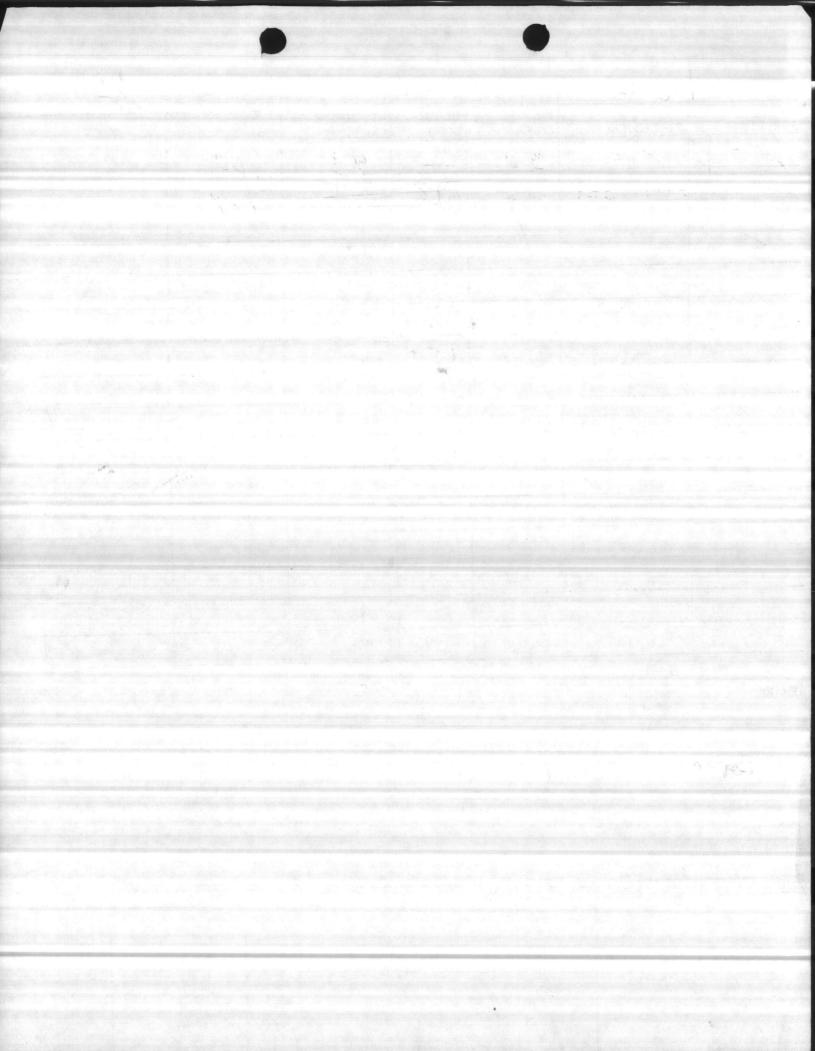
WELL NUMBER	654	BY Steus	n + Pet	ersen	DATE 3-	16-95
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
60	32	52	20	43	100	10
	Left set	56	24	35	119	
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MARKS		DIA	620	252		

15PSF - 178 GPM

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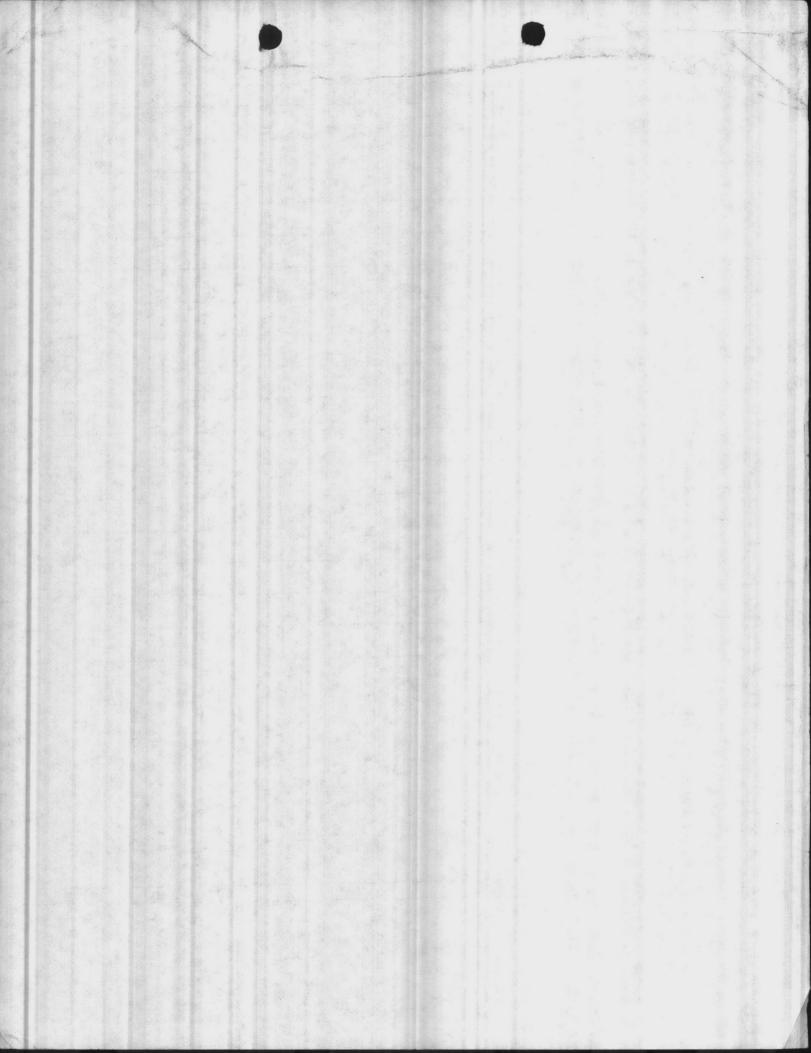
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WELL NUMBER	654	BY THON		EVENSON	DATE //-/	DATE 11-16-93		
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START		
70	32	en e						
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REMARKS Dead Head 63 PSZ

NUFACTURER	STAGE S.N.		TOTAL HEAD	SIZE	
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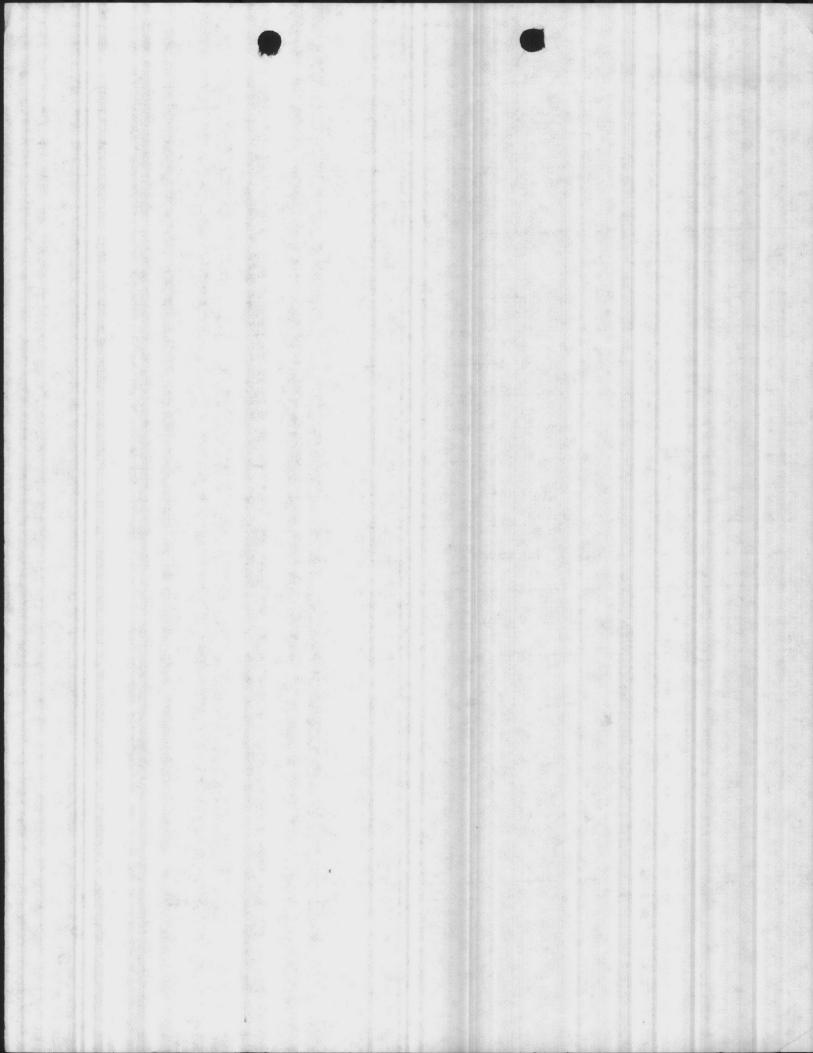


VELL NUMBER	654.	BY Thom	13/18	Rown	DATE Sep	t. 4-92
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
70'	30	45	15	15	104	05
		55	25	10	115	10
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LEMARKS

Deadhead @ 64 Psi

ANUFACTURER	STAGE	S.N.	Images	
		- Jane	TOTAL HEAD	SIZE



AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START
70	30	35	15	42	1118.	457
		43	13	35	122	55
		50	20	30	137	10
		52	122	25	149	20
		55	25	20	162	30
	15	60	30	15	175	40
		· · · · · · · · · · · · · · · · · · ·				
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EMARKS						

MANUFACTURER STAGE S.N. TOTAL HEAD SIZE

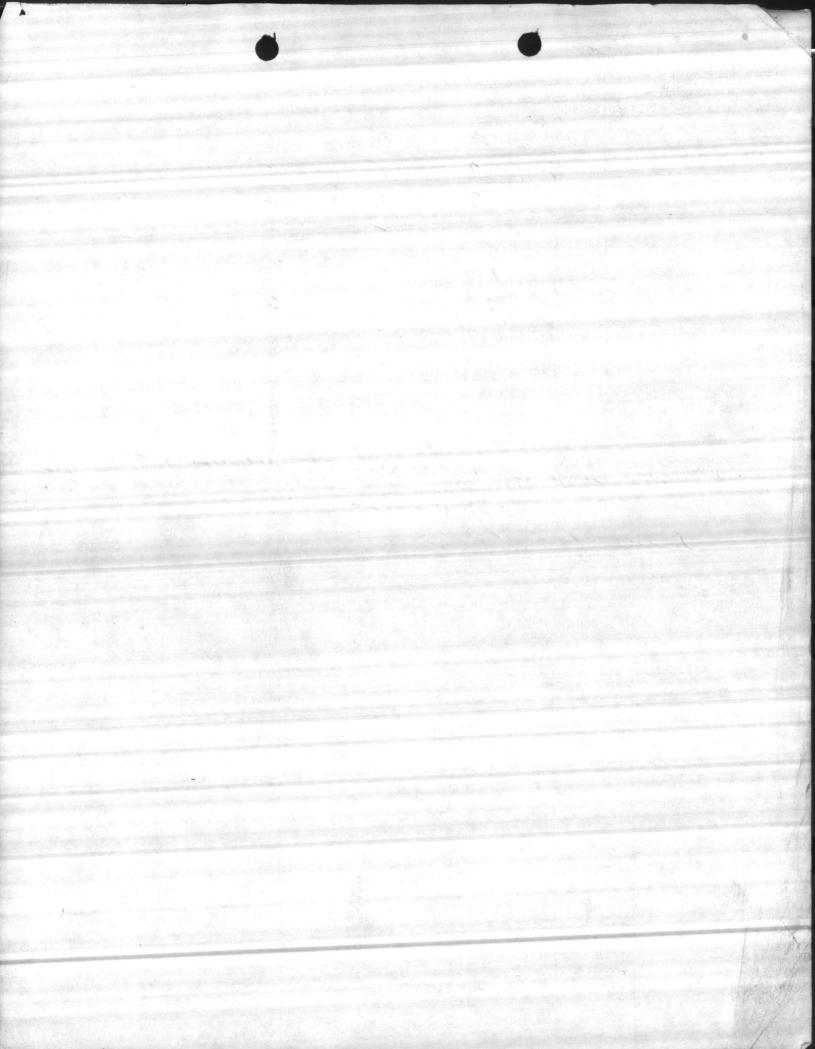


NUMBER	654		omas/9	ARDINAS	DATE 2-	9-89
LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
20	32	40	8	48	104	. 36
		42	10	44	115	40
		15	13	40	128	50
		48	16	35	143	00
		50	18	30	159	03
		53	21	25	170	09
	100 mg	55	13	20	187	12
		56	24	15	203	18
	1					

Pulled well pump, cleaned well blind quater letter added 10 RB HTH, cleaned pump 9 invalled selled 70' with 35 Tubing and line 4 70' PSI

lest 203 6PM 15 852

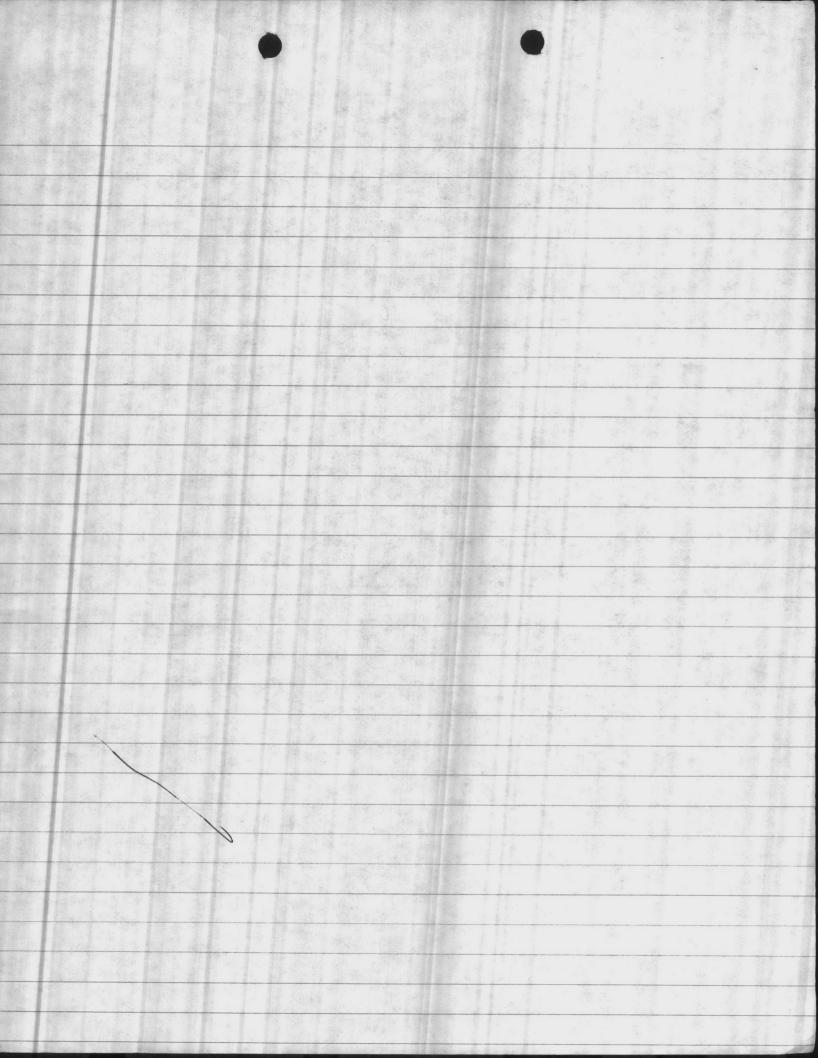
ACTURER	STAGE	S.N.	TOTAL HEAD	SIZE
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HP 654 10-18-85

AL	54	P2	PP	PSI	GPM	TIME
70'	26	35	9	57	104	1,-
		38	12	54	111	15
		43	17	50	130	15
		45	19	45	164	15
		52	26	40	195	15
		35	29	35	214	15
lest so	1-5	58	31	30	230	15
		61	35	25	246	15
		45	39	20	267	15
			1			

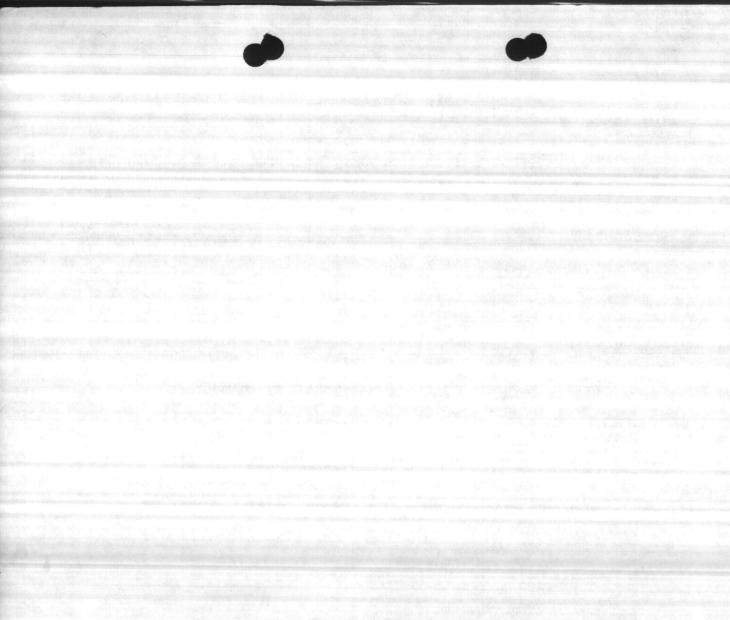
light set at 20' with 70' ailling



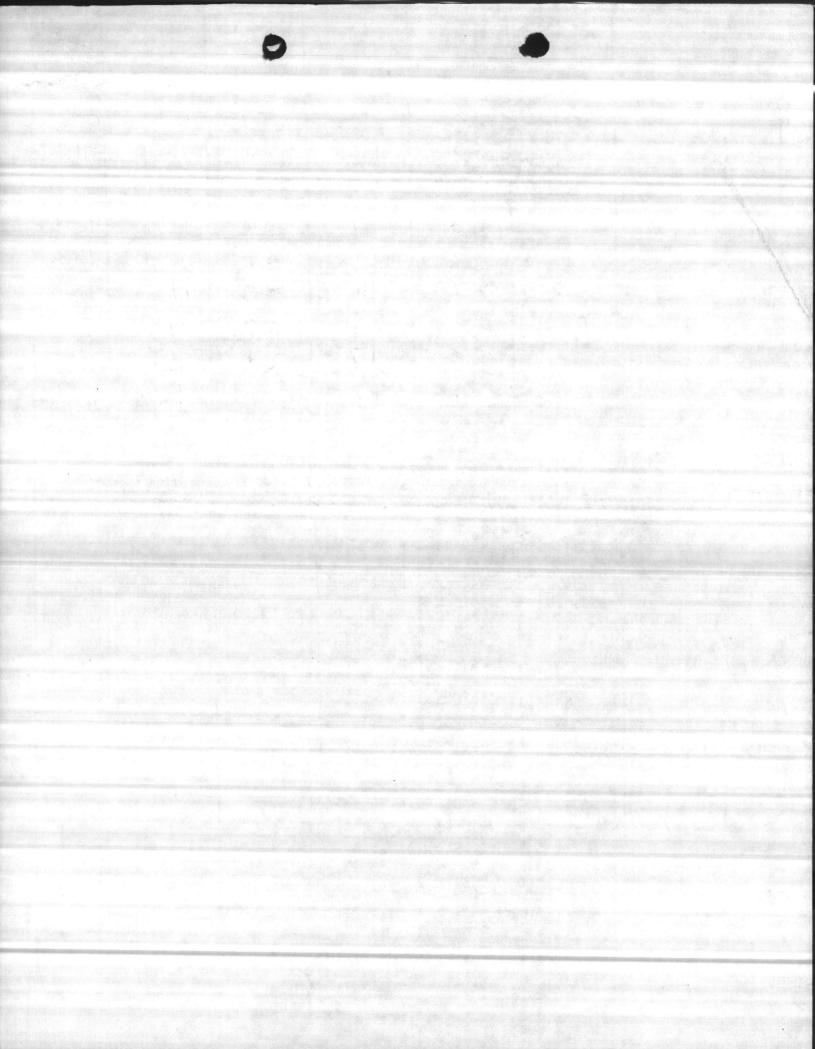
WELL NUMBER	654	BY THOM	1AS / 1	CAYNOR	DATE 9-1	13-83
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRA'IN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1350
103	28	42	14	31	100	1400
		43	15	28	104	1413
	2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	44	16	24	108	1423
		45	17	20	119	1433
		46	18	15	122	1445
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	LENGTH OF	STATIC	PUNPING	DRAW	DISCTARGE	CAP. PER	Time	
<u> </u>	ATR LINE	LEVEL	LEVEL	DOWN	PRESSURE	rodela.	,	1
3-82	163	38	50	127	start To	100	0935	
			53	14	39	104	1000	
	to the same		52	14	34	104	1015	
			54	14	33	111	1030	
			54	16	30	115	1045	- 1. - 4. K.
			54	1.6	27	119	1100	
			55	17	24	125:	1115	
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		Well # 6 / Owner Camp Lyone, N. C Location 2500 F West OF PINEY GREEN Rd. Date 2-9-78 Borehole depth 150 ft. dia. # in. Casing depth 34 ft. dia. # in. Mud resistivity temperature F Viscosity sec weight Ib/gal type
		Measuring point ft. above/below ground level Fluid level in hole _// ft. Other logs Driller _ \(\mathcal{Brinkh}\) \(\mathcal{Brinkh}\
•		Spontaneous Potential Depth (millivolts) Resistivity (ohm-ft)
		-400 -200
		-400 -200
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ENVIRONMENTAL PRODUCTS, INC

P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

SUBMITTAL DATA

PROJECT:

N62470-76-B-6799, Replace Water Wells

LOCATION:

Marine Corp Base, Camp Lejeune, North Carolina

ENGINEER: CONTRACTOR: Naval Facilities Engineering Command, Norfolk, Virginia East Coast Construction, Jacksonville, North Carolina

SUBJECT:

Well 617/654

CONDITIONS: **DESCRIPTION:**

200 GPM @ 136.5'TDH, 1800 RPM

One (1) Crane Deming 6-stage, size L-8, Fig. 4700, vertical turbine bowl assembly for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 4" threaded suction, and including the following:

One (1) H16DL $16\frac{1}{2}$ " x 6" type "C" surface discharge head, fitted for 5" column and 1" water lubricated shafting, for a 6" above ground discharge.

One (1) foundation plate (baseplate) for the above discharge head.

Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water well column pipe, threaded and coupled with couplings, zinc coated. One to be installed at the top of the bowl assembly, one to connect to bottom of discharge head.

Five (5) 10' sections, same as above, for use as "intermediate column".

E. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze retainer and rubber bearing (for 5" column).

Five (5) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers and rubber bearings (intermediate shaft).

One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top

column, head, gear and motor used.
One (1) 10' section of 4" zinc coated pipe (suction pipe).

One (1) 4" galvanized cornucopia type strainer. Ι.

One (1) Johnson model CH-20, combination, right angle, hollow shaft gear, with non-reverse ratchet, one to one ratio, figure one rotation.

K. One (1) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 volt, vertical hollow shaft motor, NEMA design "B" rated for high thrust, with 1.15 service factor, class "B" insulated, 40° C. ambient, in a L213TP10 frame in a NEMA weather protected type one enclosure.

One (1) Ford model 172-DF-6002-GR, four cylinder, 172 CID diesel power unit, with four blade fan, governor, air cleaner assembly, fuel tank, wiring harness, instrument panel, ignition switch, starter button, amp. light, oil pressure gauge, top mounted exhaust system hood, 12 volt electric starter, starter relay, battery charging alternator, radiator, SAE standard flywheel housing, power take-off assembly, foot mounted, with battery, rack and battery cables.

One (1) La Marche A18J-12V-A1, 1/60/120 automatic battery charger.

One (1) section of Parrish #31 drive shafting either 8 3/4" long or 24" long, (your choice), with gear shaft and engine shaft connecting flanges and shaft quard.

ATLANTIC DIVISION NAVAL FACLITIES ENGINEERING COMMAND NORFOLK, VIRGINIA 23511 PPROVED APPROVED AS NOTED US PPROVED SUBJECT TO THE REQUIREMENTS OF CONTRACT NO 05 - 76 - 6799

APPROVAL OF STAY DEVATION STATE CON-The STANDORDE HELD STUDIES THE CONTRACTOR CALLS ATTENTION TO AND SUPPORTS THE DEV.A-TION --- THE CONTRACTOR SHALL BE RESPONS-IBLE FOR ANY DING PAUPER PHYSICAL DIMEN-SIONS & THIS, COORDINATION OF TRADES, ETC., AS .. RED. 27 JUN 1978 REVIEWER C.C.S FOR OFFICER IN CHARGE OF CONSTRUCTION

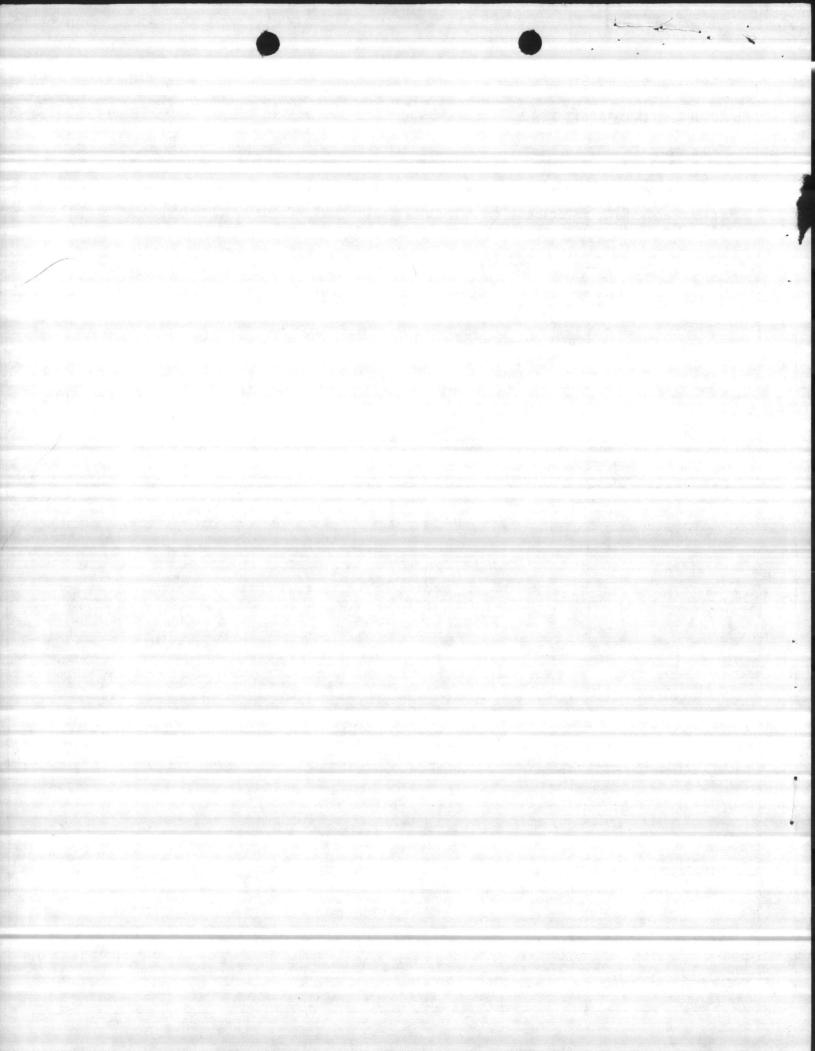
SUBJECT: Well 617

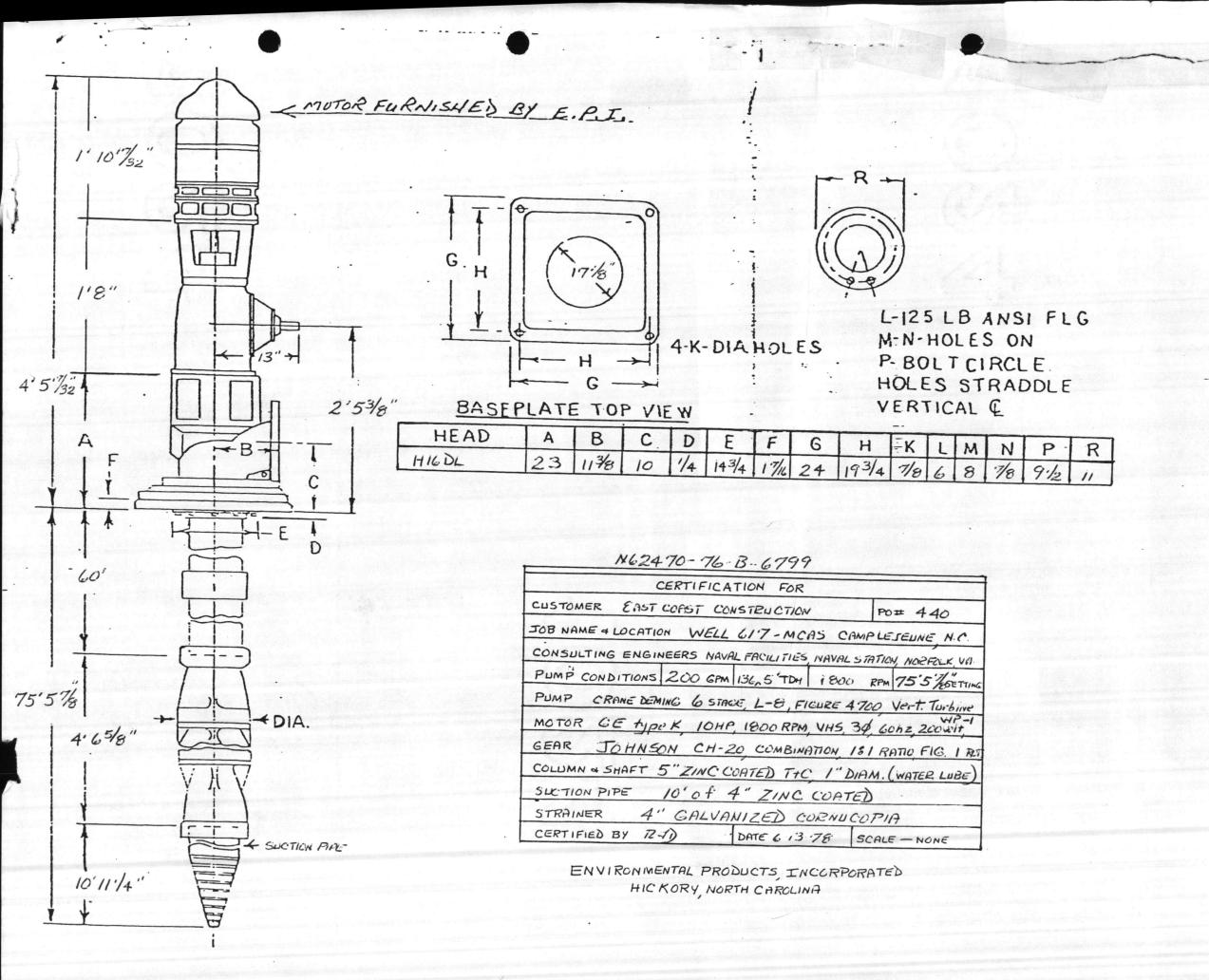
Page Two

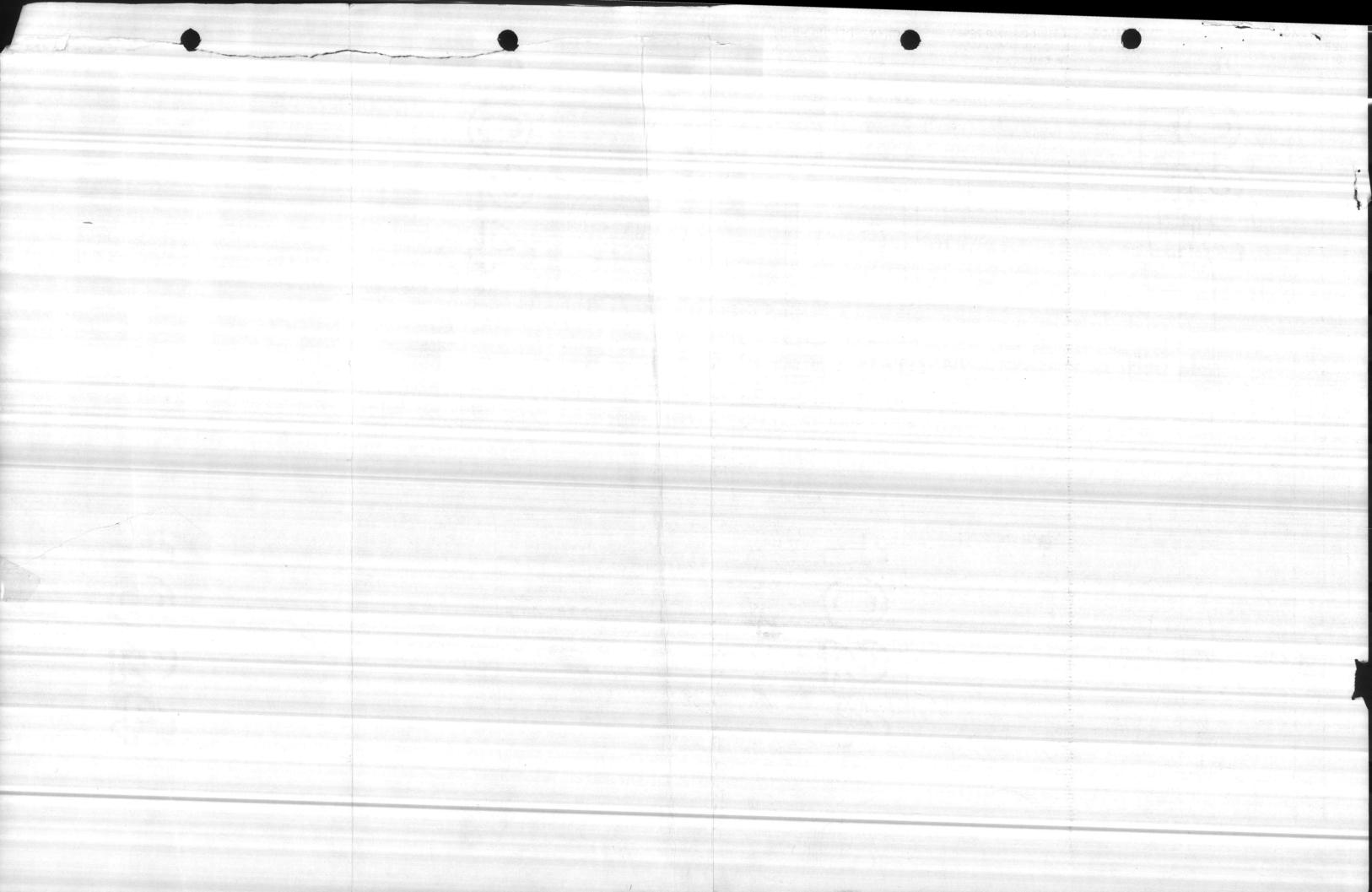
Note 1. TDH is based on 41'6" pumping level 40 PSI @ ground level, and column and shaft friction loss of 2.30'. (41.50 + 92.40 + 2.30 = 136.2) used 136.5

Note 2. Please confirm overall setting.

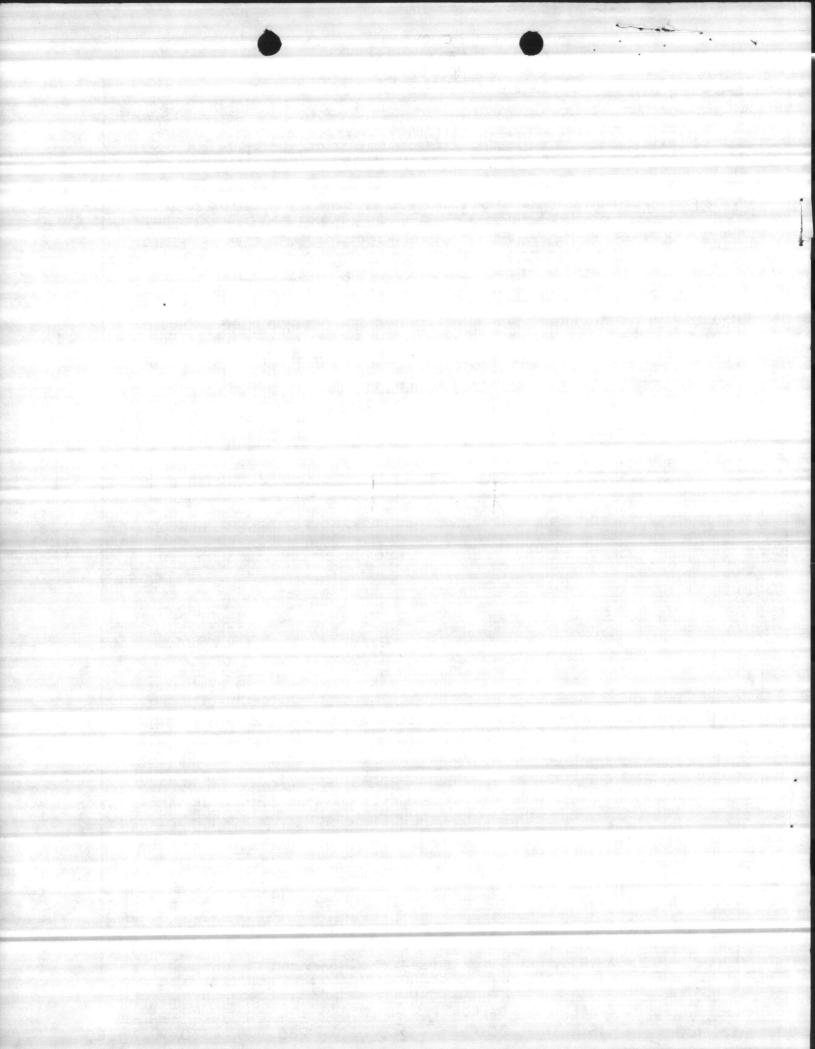
JUNE 8, 1978







CURVE PAGE 78 ALOG - SECTION C - 1750 RPM CRANE-DEMING PUMPS TS C CAL TURBINE PUMP CURVES CRANE CO. SIZE L8 P.C.3188 PERFORMANCE PER STAGE SALEM, OHIO, U.S.A. **SUPERSEDES P.C. 2572** SINGLE STAGE PERFORMANCE SIZE L-B 1770 R.P.M. EFFICIENCY CHANGE: FIG. 4700 FIG. 4750/ DIMENSIONS POINTS BOWL DIAMETER
IMPELLER SHAFT DIA.
LENGTH FIRST STAGE _ STAGE DEDUCT STAGE DEDUCT POINTS STAGE DEDUCT **POINTS** ADDITIONAL STAGE STAGE DEDUCT POINTS ENAMELED BOWLS THRUST FACTOR -SUCTION - I.D. PIPE SIZE 4 " SIZE COLUMN ADAPTER SEMI-ENC, IMPELLER 5 "非年" 令 STAGES CHECK BOWL LIMITATION ENGINEERING SECTION NO. 22640 SHUT OFF HEAD PER STACE CURVE IMPELLER DIAMETER B 5 % B . 27 FT C #25,4 FT GPM @ 136,5 12H 16 8 0 0 GPM @ 136,517DH BIND PER STAGE BASED ON 6 DRIMORE STAGES 1.0 B. H. REQUIRED O NPSH U.S. GALLONS PER MINUTE 120 160 200 80 240 280 320 360



GENERAL 3 ELECTRIC

Refer to G E Reg'n No. In Correspondence

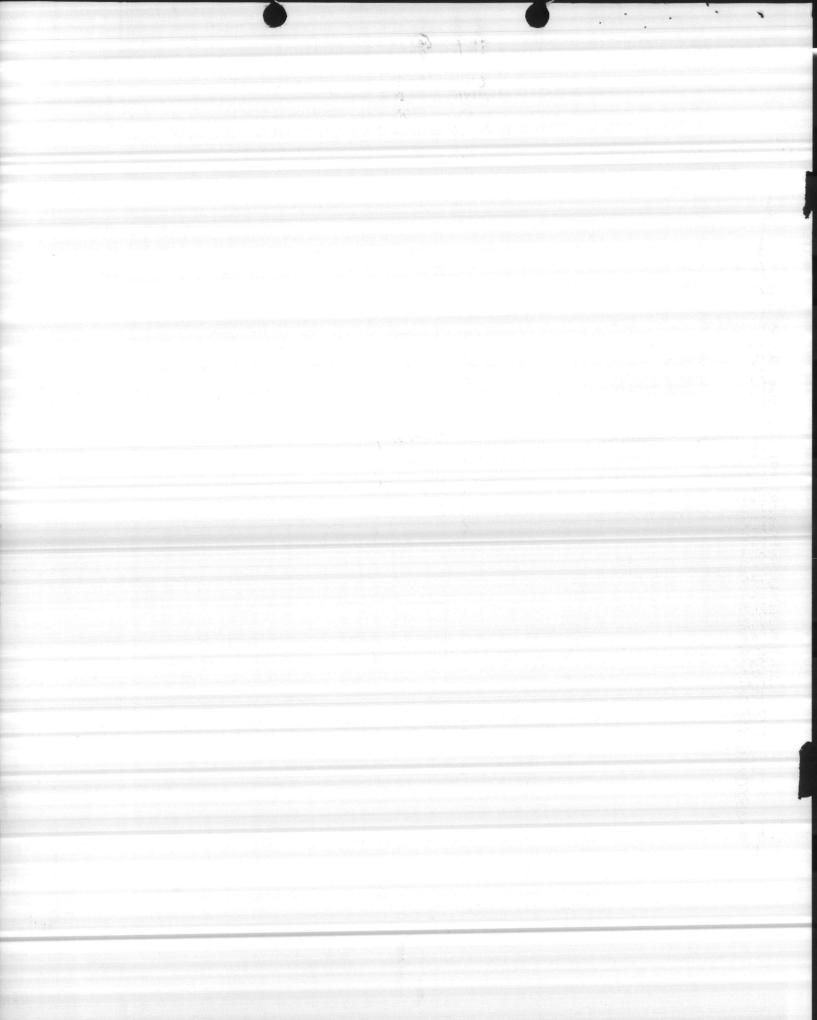
SMALL AC MOTOR & GENERATOR DEPARTMENT NASHVILLE MOTOR PLANT

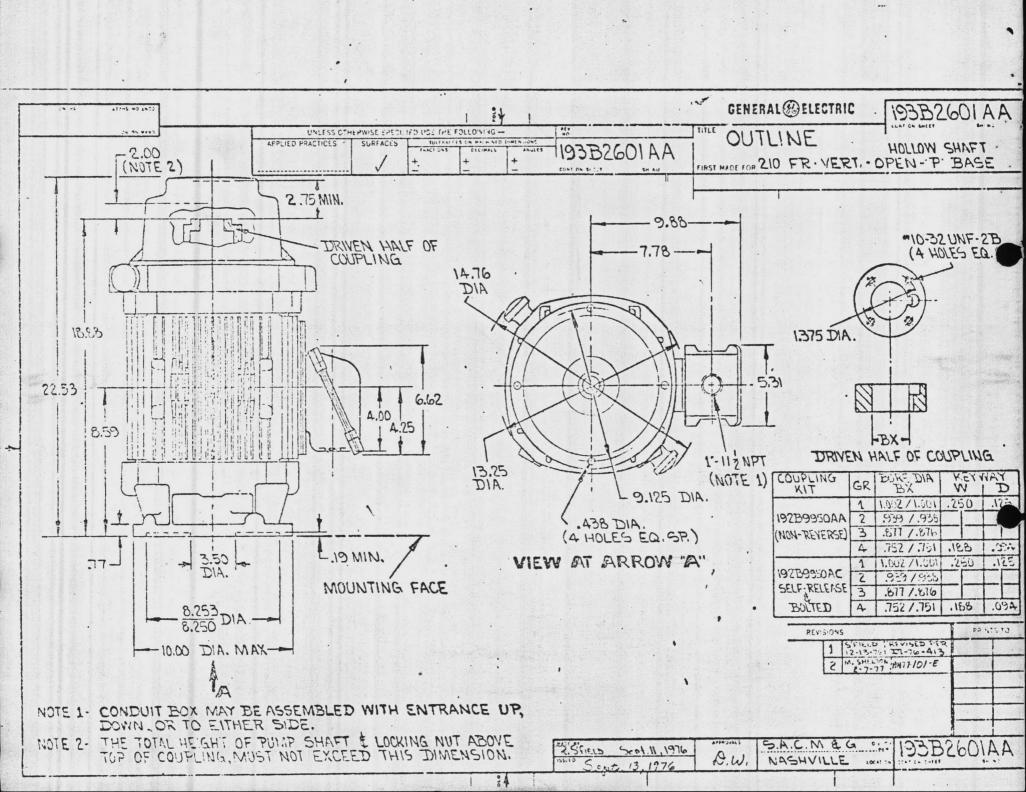
250 E. MAIN . HENDERSONVILLE, TENNESSEE 37075

P.O. Box 1407 Hickory, N.C. 28601

	OMER ORDER NUMBER		G. E.	REQUISITION 340-23284	
FORWARDED:	11/16/77	First C	lass Mail	COMPLETE	BALANCE TO FOLLOW
PRINTS ARE: X FOR APPROVAL	APPROVED FO	OR	FOR REFERENCE		
193B2601A	A - Outline				

Item 1 - New Model to be rated: K-L215TP10, 10 hp, 1800 RPM, 200 V, 3 ph, 60 hz, S.F. 1.15, CONT, B ins, 40oC amb, DRIPPROOF, VERTICAL HOLLOW SHAFT, HIGH THRUST









(919) 799-8800 Fax: (919) 799-8801 P.O. Box 3407 Wilmington, N.C. 28406-0407 Shipping Address:

108 N. Kerr Ave., Suite A1 Wilmington, N.C. 28405-3406

January 18, 1989

Mr. Stan Miller
Water & Wastewater Treatment
Bldg. 670
Marine Corps Base
Camp LeJeune, N. C. 28542

Subject: Order M67001-89M-2005 Well Pump at Bldg. 654

Dear Stan:

We are pleased to furnish information on the bowl assembly being furnished on the subject order. We will be furnishing:

1 Goulds Model 8R-JLO/6 stage Deep Well Turbine Pump, standard bronze fitted bowl assembly to accept your 5" x 1" column and shafting.

We attach information further describing this well pump, along with performance curves and dimensions to show that it should adapt to your existing column pipe.

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

Very truly yours,

R. W. Tayloe

RWT/md Attachment

Danuery 16, 1989 M. Stanton Tuesdasti istavedasW a i ' ' 670 - 670 Marine Corps Base Camp Defenne, M. C. 28542 see . Sie de quit list Dear Stan: Te are pleased to fundso information to the bowl associly being furnished on the sumject titet. Its will be for the 1 Coulde inder Seatto/6 stage Deep Well Fulline Pump, standard brones fire on bowl assembly to accept your La 18 column and shafting. We actaon information further descripting this well pump, along with performance curves and dimensions to show that it should adapt to your elisting column pipe. We thank you for the opportunity to turnish this pump and remain Vary violy yours. r. W. Tayloe



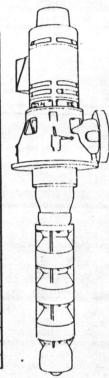
3A.2B1

December 1, 1981

BCD9. 654 BRJLO/6 STAGE

Bowl Assembly

DESCRIPTION	MATERIAL (A)	STANDARD
BOWLS— INTERMEDIATE	CAST IRON (B)	ASTM A48 CL. 30B
IMPELLERS	BRONZE (D)	ASTM B145-4A
LOCK COLLET (Impeller) (B)	MILD STEEL	AISI C1018/EQ
SHAFT	STAINLESS STEEL	AISI 416
COUPLING (Shaft)	MILD STEEL	AISI C1018/EQ
BEARINGS (Intermediate Bowl)	BRONZE OR RUBBER	ASTM B-144-3B
SUCTION BOWL	CAST IRON	ASTM A48 CL. 30B
BEARING (Suction Bowl)	BRONZE (C)	ASTM B-144-3B
DISCHARGE BOWL	CAST IRON	ASTM A48 CL. 30B
BEARING (Discharge Bowl)	BRONZE (C)	ASTM B-144-3B
BEARING (Tube Adapter)	BRONZE (C)	ASTM B-144-3B
CAP SCREWS	MILD STEEL	AISI C1018/EQ
BOLTING	MILD STEEL	AISI C1018/EQ
SAND COLLAR	BRONZE	ASTM B-62
COLUMN	MILD STEEL	ASTM 120



OIL OR WATER

Discharge Head Assembly

Over 20' TPL, SAE 1045 shaft with permanent hard chrome overlay at bearing journals. SAE 1045 shaft coupling, bronze bearing retainer, rubber bearing and threaded steel column, ALTERNATE 416SS shafting

SAE 1045 shaft and couplings, bronze tube connector bearing, steel enclosing tube and threaded steel outer column and couplings. Rubber tube centering spider

Column Assembly
OIL LUBRICATED

supplied at 40 ft. intervals.

throughout.

WATER LUBRICATED

OIL LUBRICATED

Cast Iron Discharge Head Casting ASTM A48-CL308*
Steel Column Nipple — 12" Long
Malleable Iron Lock Ring Nut
Cast Iron Tube Tension Plate
Cast Iron Tube Nut W/Bronze Brg.
416 Stainless Headshaft
Steel Adjusting Nut & Gib Key
Steel Tube Tension Nipple
Manual Lubricator Assembly (Electric Solenoid
Furnished if Electric Motor Purchased)

WATER LUBRICATED

Cast Iron Discharge Head Casting ASTM A48-CL30B Steel Column Nipple - 12" Long Malleable Iron Lock Ring Nut Cast Iron Packing Box Bronze Packing Gland W/Studs & Nuts 416 Stainless Steel Head Shaft Steel Adjusting Nut & Gib Key No Prelube Tank and Fittings

14x24½ is Fabricated Steel Plate—ASTM 283 GR.D Pipe—ASTM 120

ENGINEERING LIMITATIONS

- Semi-open impellers are limited to 200 ft, setting since shaft stretch variation due to changing pumping conditions (varying water table and/or discharge pressure) will affect the critical impeller running clearance.
- Semi-open impellers are limited to a maximum of 10 stages. If these impellers require keyed construction, only a maximum of 3 stages are allowed.
- Semi-open impellers must not be used when more than one flow condition is to be met, or on pumps that operate in parallel, causing variable flow rates.
- 4. All applications over 500 ft. setting must be referred to the factory.
- Prelubrication is recommended for water lubricated rubber bearings when distance between grade and static liquid level is more than 50 ft.
- Non-reverse ratchets (NRR) are recommended on drivers for all applications where the setting is over 100 ft. For settings of 400 ft. or more the driver manufacturer must be consulted for availability of NRR.
- For other than 50 and 60 cycle speeds refer to the factory to check on critical speeds. Otherwise bearing spacings indicated in notes 8 and 9 apply.
- On all water lubricated pumps 5 ft. bearing spacing is required for operation over 2200 RPM. Speeds less than 2200 RPM requires 10 ft. bearing spacing.
- All pumps with enclosed lineshaft construction are supplied with 5 ft. bearing spacings for all speeds.

NOTE:

- (A) Alternate materials available. Contact nearest sales office or factory.
- (B) 18B and 18H have keyed impellers, bowls are lined with Heresite or equal.
- (C) Suction bowl and discharge bowl bearings not available in rubber.
- (D) 18B and 18H have iron impellers. See VIT bowl price page for bronze impellers.

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

F. O. BOX 3407 WILMINGTON, NC 28406-0407 PHONE (919) 799-8800

(P)

60 Here Turbine Curves 1800 RPM



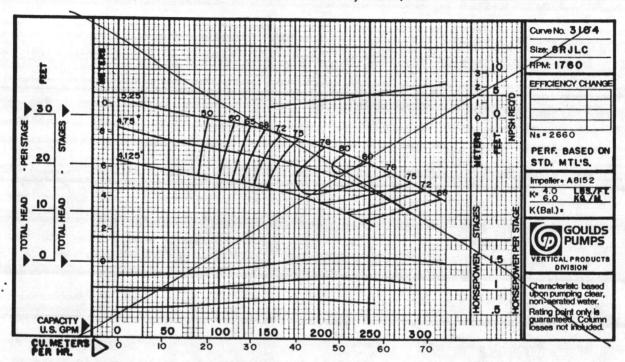
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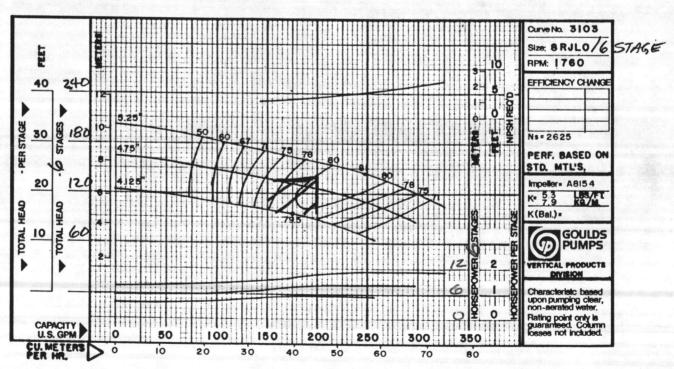
May 1, 1988 (NEW) Page 1

Customer MCB - CAMP LEJEUNE, N.C. Project REPLACEMENT BOWL

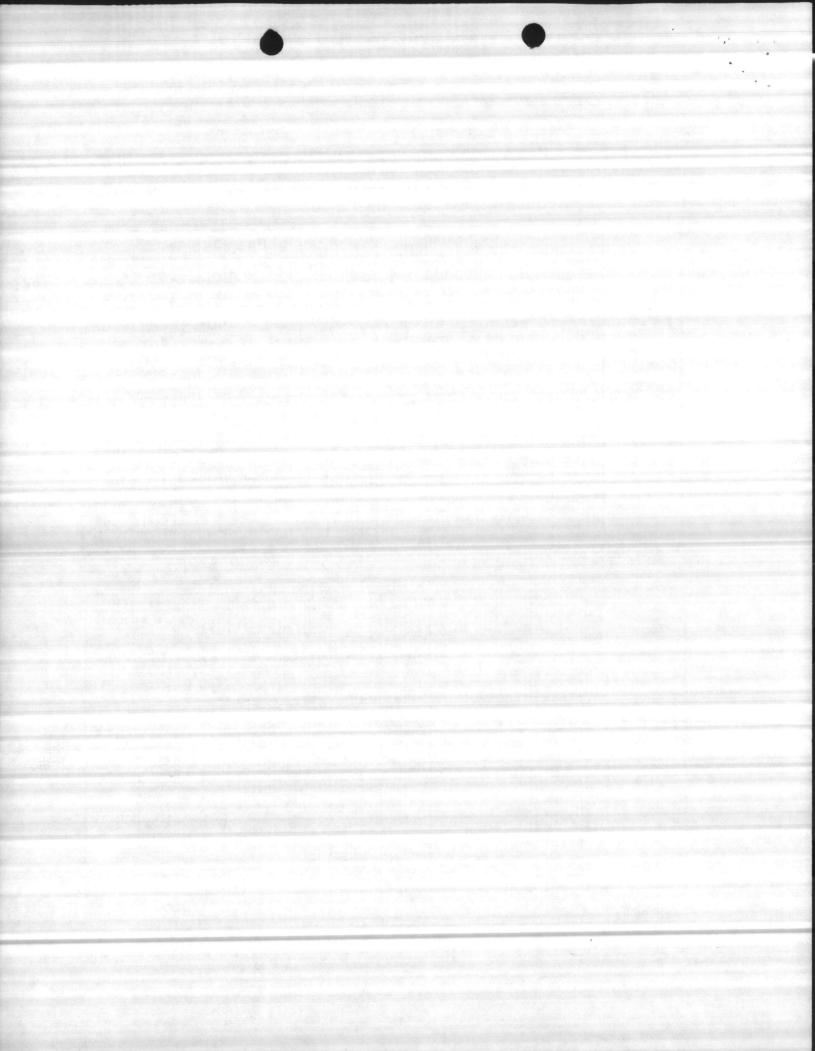
Goulds Proposal No. Inquiry No. Inquiry No. Item No. BLOG . 654 Customer P.O. No.MG7001-89M-2005 P.O. Date 1-11-89

Service WATEN Capacity 2006/M TDH 137' Efficiency 80% RPM 1760 Curve No. 3103

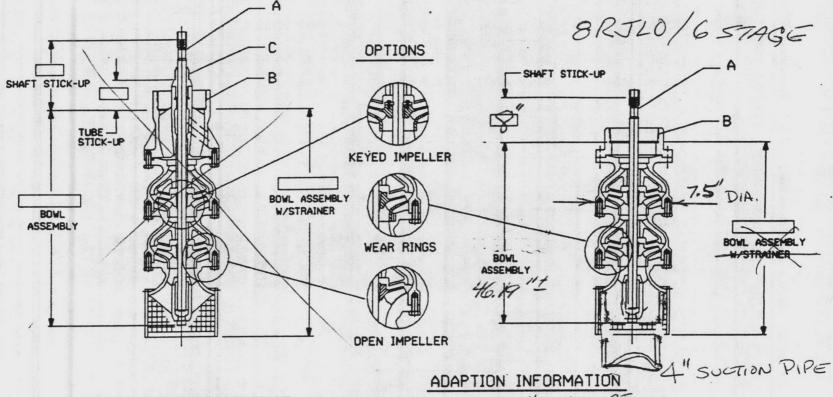




TENCARVA MACHINERY CO. P. O. BOX 3407 WILMINGTON, NC 28406-0407 PHONE (919) 799-8800



PRINTED IN U.S.A



CUSTOMER MCB CAMP LEJONE , N.C SERVICE WELL WATER 200 TOH 137 PUMP SIZE SRJLO STOS GOULDS S.O. NO.

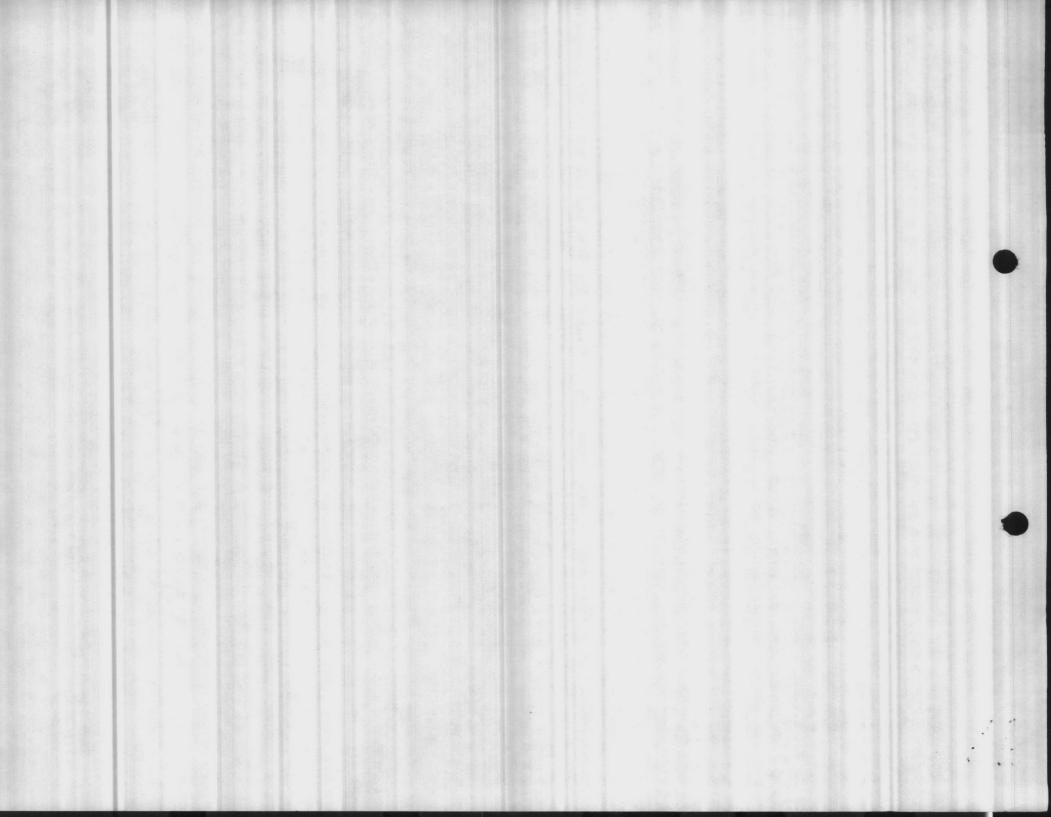
1-17-89- 12WI TENCARVA MACHINERY CO. P. O. BOX 3407 WILMINGTON, NC 28406-0407 PHONE (919) 799-8800

A - SHAFT: DIAMETER LEFT HAND THREAD 8TPI STRAIGHT, B - COLUMN PIPE SIZE:

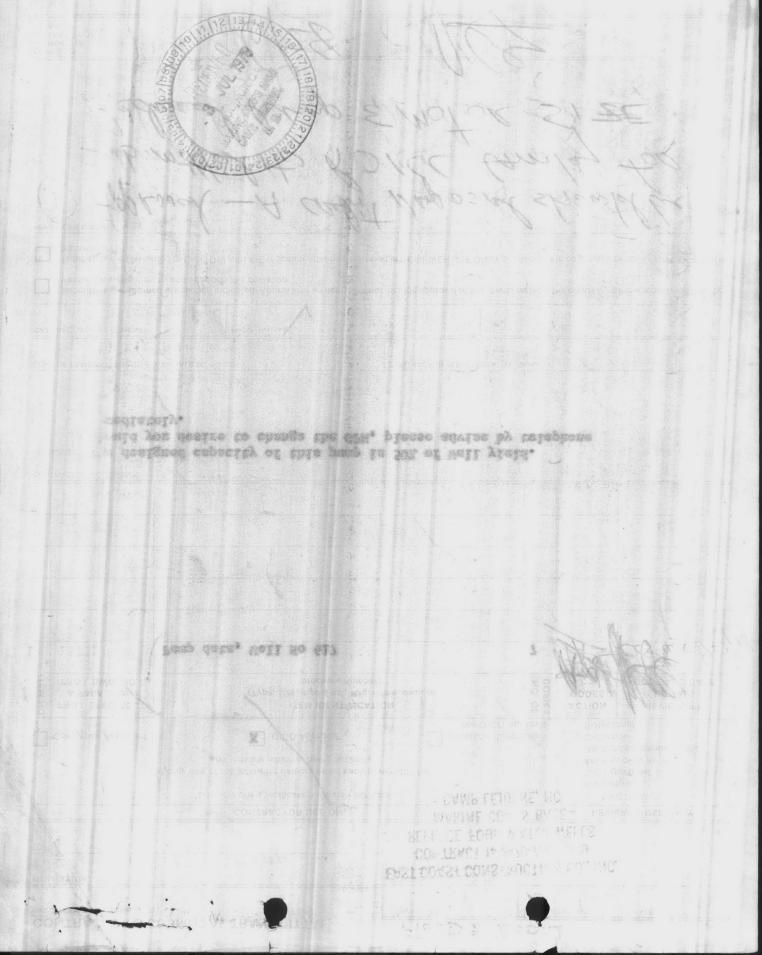
C - TUBE: DIAMETER ☐ LEFT HAND THREAD ☐ RIGHT HAND THREAD

DRIGINAL PUMP MFG. CRANE-DEMING FIG 4700 L-8

FILL IN APPROPRIATE DIMENSIONS IN BOXES ABOVE.



CONTRACTORS SUBMITTAL TRANSMITTAL		FIELD &	FIELD & BOOTH					
D LANTO - 55/8 (Rev. 6/7			CONTRACT NO.	T	MITTAL NO.	DATE		
OM CONTRACTOR			N6 470=76=0=679	ATION	16	6/13/78		
	atruction	Company, Inc.	EAST COAST CO	STRUCTION	on to. INC			
	NA AND STANSON SHOWS AND AND ADDRESS.	Manufatrage & write &	CUN11KAC1	14.2470-10-	-3799			
Commander NAVFAC			REPLACE FO	REPLACE FOUR WATLE WELLS				
		CONTRACTOR USE ONLY	MARINE	CORPS BA	TE REV	IEWER USE ONLY		
	*List o	only one specification division p	per form. CAMP	LEJUENE, N		ACTION CODES		
	List only one of	the following categories on eac	ch transmittal form		A-App D-Disa	roved approved		
		nd indicate which is being subm			AN-Ap	proved as noted		
Contractor Approved		OICC Approval	Deviatio	n/Substitution		ceipt acknowledged. nments		
				ICC Approval	R-Resi	ubmit		
PROJ. SPEC. SECT.		ITEM IDENTIFIC		NO. OF	ACTION	REVIEWER'S		
& PARA. and/or PROJ. DWG. NO. *		(Type, size, model no., M brochure nun		NO S	GODES	CODE AND DATE		
					HW			
15221	Pump da	ta, Well No 617		7	A	CCS 405 /27		
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' 'EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540 353-4479 or 353-6044

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC
DRILLERS LOG

WELL # 617

0 - 10Sand 10 - 20 Sand 20 - 30Sand 30 - 40 Sand 40 - 50 Sand 50 - 60Sand 60 - 70 Sand 70 - 80 Sand 80 - 90 Sand 90 - 100 Sand 100 - 110 Sand 110 - 120 Sand 120 - 130 Sand 130 - 140 Sand 140 - 150 Sand 150 - 160 Sand 160 - 170 Sand Marrow 170 - 180 Sand 180 - 190 Sand 190 - 200 Sand 200 - 210 Sand 210 - 220 Sand 220 - 230 Sand 230 - 240 Sand 240 - 250 Sand



EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540 353-4479 or 353-6044

March 17, 1978

Commander, Atlantic Division Naval Facilities Engineering Command Norfolk, Virginia 23511

Re: Contract N62470-76-C-6799
Replace Four Water Wells, MCB
Camp Lejeune, N. C.

Gentlemen:

We are enclosing four (4) copies of the following information on well No. 617 located on the old logging road 2500' + West of Piney Green Road.

Drillers log Electric log Water analysis from 3 levels

We estimate this well will produce approximately 175-200 gpm by taking the water from the 75-90 foot level, the 120-130 foot level, and the 150-185 foot level. Please advise us of your decision promptly so we may begin developing the permanet well.

Yours very truly,	ATLANTIC DIVISION
EAST COAST CONSTRUCTION C	OMPANY, INCOLITIES ENGINEERING COMMAND HORFOLK, VIRGINIA 23511
WATThe	APPROVED
W. H. Myers	D.SAPPROVED
WHM/sb	SUBJECT TO THE REQUIREMENTS OF
	CONTRACT NO 2001 LAPROVAL OF A SUBMITTAL DOES NOT INCLUDE APPROVAL OF ANY DEVIATION FROM THE CONTRACTOR
enclosure: 1 copy of wel	TRACE REQUIREMENTS UNLESS THE CONTRACTOR CALLS ATTENTION TO AND SUPPORTS THE DEVIA- TON THE CONTRACTOR SHALL BE RESPONS- FOR PROVIDING PROPER PHYSICAL DIMEN- WEIGHTS, COORDINATION OF TRADES,
	DATE

IN RGE OF CONSTRUCTION



NEOT TO THE REQUISENESS OF

MARINE CORPS BASE CAMP LEJUENE, NO MATERIAL PIECENTAL SON

(803) 479-4639

REVIEWER

FOR OFFICER IN CHARGE OF CONSTRUCTION

BOZ HAMLET HIGHWAY
BENNETTSVILLE SOUTH CAROLINA
29512

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME DWNERS
DEVELOPERS
IRRIGATION

DATE May 29, 1978

Report To: Carolina Well & Pump Co. Date Analyzed: 5/29/78 _Sanford. N. C. Sample Number: __ Cold Logging Road Analysis Results--Parts Per Million Determination Determination pH 7.1 Carbon Dioxide (CO2) Iron (Fe) 0.25 Total Acidity (CaCO₂) Nitrate (NO2) 104 Calcium Hardness (CaCO3) fluoride (F) Magnesium Hardness (CaOO2)) Manganese (Mn) Trace 120 Carbonate Hardness (CaOD2) Total Hardness (CaCO2) Noncarbonate Hardness (CaCO3) Chlorides (C1) Alkalinity (Phenolphthalein) (CaCO2). Sulfate (SOA) 8.2 0 Carbonate Alkalinity (CaCO₃) Phosphate (POA) Bicarbonate Alkalinity (CaCO3) 140 Magnesium (Mg) 140 Total Alkalinity (CaCO2) 41.6 Calcium (Ca) Total Dissolved Solids 754 Specific Conductance (micromhos at 25%) Carbonate (CO₂) 220 Sicarbonate Williamic Division 171 Clear Appearance When Analyzed H. JAYAL FACHITIES ENGINEERING COMMAND Not Objectionable Odor When Analyzed NORFOLK, V.RGIMA 23511 APPROVED APPROVED AS NOTED Harry The Care D SAFPROVED Same BOS Handed Highest, SUBJECT TO THE REPUIRE HTS OF Personal South Carolina 20012 SIGNED APPROVA ANALYTICAL METHODS REFERENCES STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE. TOMPER APHA AWWA AND WEST HETHERS TON COLLECTION AND ANALYSIS OF WATER SAMPLES. WATER BEEFFOR PAPER 1454 (1980). U. SHESTERSISON ENRICH WASHINGTON, D. C. S, OUCADALTION OF TRADES. SIONS & ETC., AS I. 26 JUN 1978

BENNETTSVILLE, SOUTH CAROLINA

DEVELOPERS IRRIGATION OTHERS

617 well.

DATE:

REPLACE FOUR WATER WELLS MARINE CORPS BASE

EAST COAST CONSTRUCTION CO., INC. CONTRACT N62470-76-C-6799

CAMP LEJUENE, NC
Report To: Carolina Well & Pump Co.

Sanford, N. C.

(883) 479-4639

2/9/78 Date Analyzed: 60 Feet (?) Sample Number:

Analysis Results -- Parts Per Million

<u>Determination</u>		<u>Determination</u>	
pll	6.7	Carbon Dioxide (CO ₂)	8
Iron (Fe)	0.4	Total Acidity (CaCO ₃)	_12
Nitrate (NO ₃)	Trace	Calcium Hardness (CaCO ₃)	_72
Fluoride (F)	0.6	Magnesium Hardness (CaOO3))	11
Manganese (Mn)	Trace	Carbonate Hardness (CaCC3)	20
Total Hardness (CaCO3)	<u>83</u>	Noncarbonate Hardness (CaCO3)	_63
Chlorides (C1)	6	Alkalinity (Phenolphthalein) (CaCO3)	0
Sulfate (SO ₄)	12.8	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)	<u> </u>	Bicarbonate Alkalinity (CaCO3)	20
Magnesium (Mg)	<u>2.6</u>	Total Alkalinity (CaCO3)	_ 20
Calcium (Ca)	28.8	Total Dissolved Solids	90
Carbonate (CO ₃)		Specific Conductance (micromhos at 25%)	140
Bicarbonate (HCO3)	- 24	Appearance When Analyzed	Clear
Hydroxide (OH)	<u> </u>	Odor When Analyzed Not O	b <u>jection</u> ab]
	SIGNE	Mater Analysis Lateratory 1002 Hamiet Highway 1002 Becontinuite South Carolina 29512	

ANALYTICAL METHODS REFERENCES: STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE. WATER, APHA, AWWA AND WPCF AND METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES. WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

BENNETTSVILLE, SOUTH CAROLINA

(803) 47 EAST COAST CONSTRUCT N CO., INC. CONTRACT N62470-76-C-6799 REPLACE FOUR WATER WELLS



DEVELOPERS
IRRIGATION
OTHERS

WEIL No. 617

DATE 2/9/78

MARINE CORPS BASE CAMP LEJUENE, NC

Report To: Carolina Well & Pump Co.

Sanford, N. C.

Date Analyzed: 2/9/78 Sample Number: __ 125 Feet

Analysis Results--Parts Per Million

<u>Determination</u>		Determination
pH	7.5	Carbon Dioxide (CO ₂)
Iron (Fe)	0.25	Total Acidity (CaCO ₃)
Nitrate (NO ₃)	Trace	Calcium Hardness (CaCO ₃)
Fluoride (F)	0.25	Magnesium Hardness (CaOO3))
Manganese (Mn)	Trace	Carbonate Hardness (CaCO ₃) 140
Total Hardness (CaCO ₃)	147	Noncarbonate Hardness (CaOO ₃) 7
Chlorides (C1)	10	Alkalinity (Phenolphthalein) (CaCO3)
Sulfate (SO ₄)	7.4	Carbonate Alkalinity (CaCO ₃)
Phosphate (PO ₄)	0	Bicarbonate Alkalinity (CaCO3) 140
Magnesium (Mg)	2.2	Total Alkalinity (CaCO ₃) 140
Calcium (Ca)	55.2	Total Dissolved Solids 156
Carbonate (CO ₃)		Specific Conductance 220
Bicarbonate (HCO ₃)	<u> 171</u>	Appearance When AnalyzedClear
Hydroxide (OH)	-0	Odor When Analyzed Not Objectionalbe
		Water Analysis Lakeretory
		Signed:
		LABORATORY DIRECTOR South Corolling 29512

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER, APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

BENNETTSVILLE, SOUTH CAROLIN

EAST COAST CONST. CTION CO., INC.

DEVELOPERS IRRIGATION OTHERS

	2/9	172		
DATE	617	7//0		

CONTRACT N62470-76-C-6799 REPLACE FOUR WATER WELLS

MARINE CORPS BASE CAMP LEJUENE, NC

WELL No. 617

Report To: Carolina Well & Pump Co. Sanford, N. C.

Date Analyzed: 2/9/78 Sample Number: 170 Feet

Analysis Results--Parts Per Million

<u>Determination</u>		Determination	
pH	7.7	Carbon Dioxide (CO ₂)	0
Iron (Fe)	0.6	Total Acidity (CaCO3)	2
Nitrate (NO ₃)	Trace	Calcium Hardness (CaCO3)	173
Fluoride (F)	0.35	Magnesium Hardness (CaOO ₂))	12
Manganese (Mn)	Trace	Carbonate Hardness (C_0O_2)	185 .
Total Hardness (CaCO ₃)	185	Noncarbonate Hardness (CaOO3)	0
Chlorides (C1)	10	Alkalinity (Phenolphthalein) (CaCO3).	0
Sulfate (SO ₄)	14.6	Carbonate Alkalinity (CaCO3)	0
Phosphate (PO ₄)		Bicarbonate Alkalinity (CaCO3)	200
Magnesium (Mg)	2.9	Total Alkalinity (CaCO3)	200
Calcium (Ca)	69.2	Total Dissolved Solids	189
Carbonate (CO ₃)		Specific Conductance (micromhos at 25%)	290
Bicarbonate (HCO ₃)	5/1/4	Appearance When Analyzed	Clear
Hydroxide (OH)		Odor When Analyzed Not Ob	jectionable
		Water Stralysic Del	

ANALYTICAL METHODS REFERENCES: STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER. APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES.' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

LABORATORY DIRECTOR

SIGNED:

Bernetisville, South Carolina 25.12



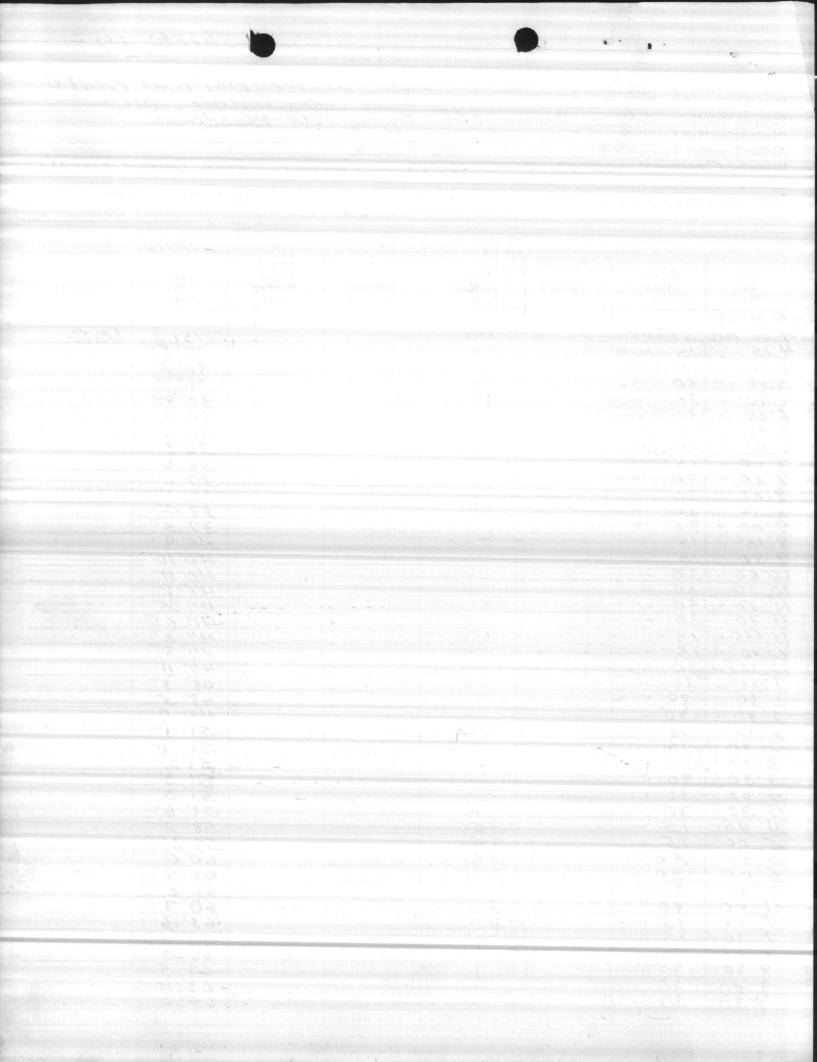
PUMPING TEST DATA

Sheet 192

Well Owner: U.S na	ese-	Address.	amo,	Legeure MC
Pumped Well No.: 617	Location: Ola	Lagging	road	Mainaid County:
Observation Well Location: Airline Lengths: Pumped Well	0	bservation Wells		
Remarks: Commet HGZ	424-76-6-6	799 RE	FLACE	Fin LATER Wells

Pumping rate measured with: 5" 16" orfice Water levels measured with: Electric tape

Pump Well Data STI							15'
Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
5-16.78	A Production Committee	The state of the s					
1:00 AM	START		100			15'	Static.
1:15 "	15 MIN					2911"	
:30 .	15 MIH		41	er company		30'0"	
5:00 "	30 "		••			30"	12.00
:30 "	30 "					30'3"	Land Section
:00 "	30 "	on the second	**			30.4	
:30 "	30					30'5"	
:45 "	15		150	E-following the second		36'3'	
2:00 "	15 .					36'6"	
7.30 "	30 "					32'0"	
9:00 "	30 "					32.5	Service Spage Services
3:30 "	30 11					37'4"	
7:00 "	30 "				110	37'5"	
7:15	15	and the land to	200	· Andrews		40'9"	
7.30 "	15 11					40'10"	
0:00 "	30					40'11"	
0:30 "	30 "		,,			41'2"	
1.00 "	30 "		11			41'5"	
1:30 .	30 .	4	1			41'6'	
1.45 "	15 "	7	250			47.5"	
2'00 "	15 "		230			47'8"	Victoria (Control
2:50 P.M			.,			47' 11"	
1:00 :	30 .					48' 3"	
1 30 "	20 11					48.5	
2:06 "	30					48.7	
2:15 "	15		300			51' 1"	
2:30"	15			M. Sarrier, Pare	Elizabeth Communication	51' 1"	
3.00 "	30 "					51'2"	
3:30 "	30 "		u .			61.3"	
4.00 "	30 .					51'5'	
7:30 "	30						
11: 116	15 "		250			50' 2"	100000
F 20:	15 "		340			50' 1"	
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0 00	30 "	and the second second		. 3		42 8	A CAMPBELL WAS IN
8:30	30 "	AG.	***			43,7	
9:00	30					58' 2" 59' 6" 60' 0" 60' 4" 60' 4" 63' 3" 63' 6" 63' 8' 63' 9	81 80 308 30 75 40
4.30	30 "		14			64'0	



PUMPING TEST DATA

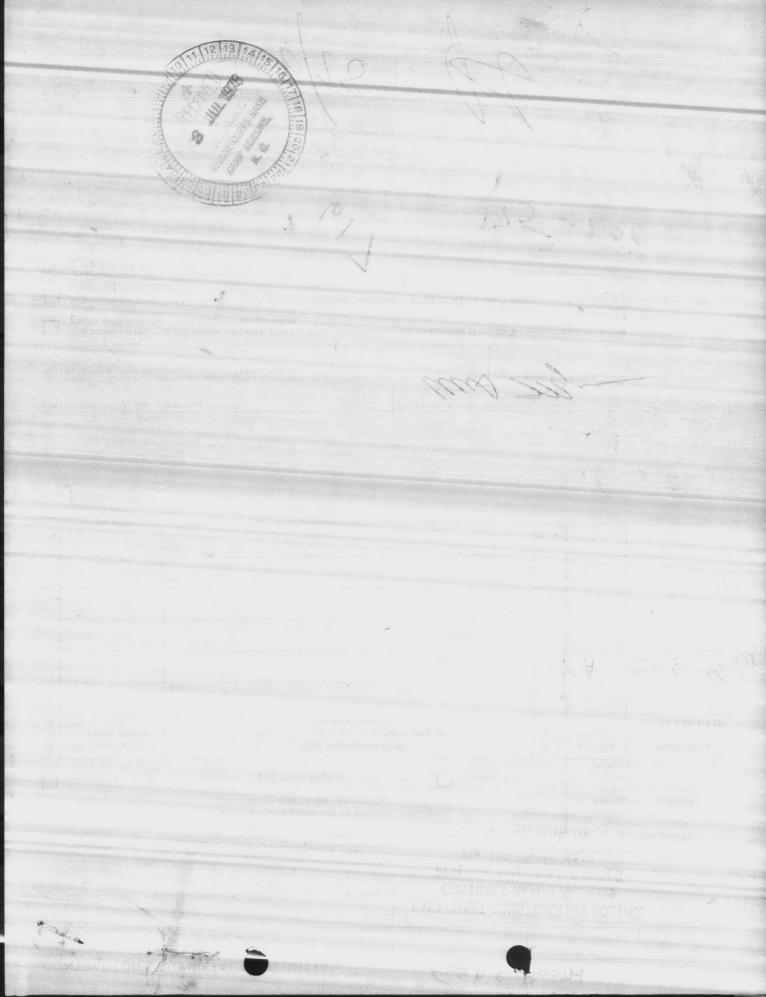
book 5 2 5

Test conducted by: Carolia W.	Address: Orne lejan (ors) Const cold Lacque Road - MAINSI County: Ores Cou
Pumped Well No.: 617 Location	: Old LOGGING ROAD - MAINSIDE County: Opeshin
Observation Well Location: Airline Lengths: Pumped Well Remarks:	Observation Wells
Pumping rate measured with 5 16" Ong	Water levels measured with: Electric Tape

			Pum	p 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
	GO MIN		700				To an a State of the second
10:30PM	4-7han		393			6412"	
11:30 "	A section of the		393			64'2"	
12:30 AN						24'3"	1.00
1:30	7 1 232 C		. 46			643"	
2:30	11	Harris Andrew Constitution				64'3"	The second second
3:30	• •		**			64'2"	Angel Charles
7:30	4.		••			64'3"	
5:30	1000					64'3"	
6:30	14		1			64:5-	
7:30			,,			64'3"	
8:30						1.4.3"	50.50.000000000000000000000000000000000
9:30						64'4"	
0:30	<i>'</i>		••			64.51	part of the second
1:30			•	Acres Comments		64' 4"	
2:30	23.		41			145	
1:30			**			646	
2.30						64'7"	Alter - Adams
3:30	.,					64'8"	
4:30	h			400		64'7'	
5:30	••		Section and Section			64'7"	
6.30						64'8'	
7:30			• • • • • • • • • • • • • • • • • • • •			64'7"	
				The state of the s			
		Rec	overy	DATA		40 W 25 W	
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8:25	The second		and the medicines			111 7	Villagenes sixens
0:50						10	The second second second

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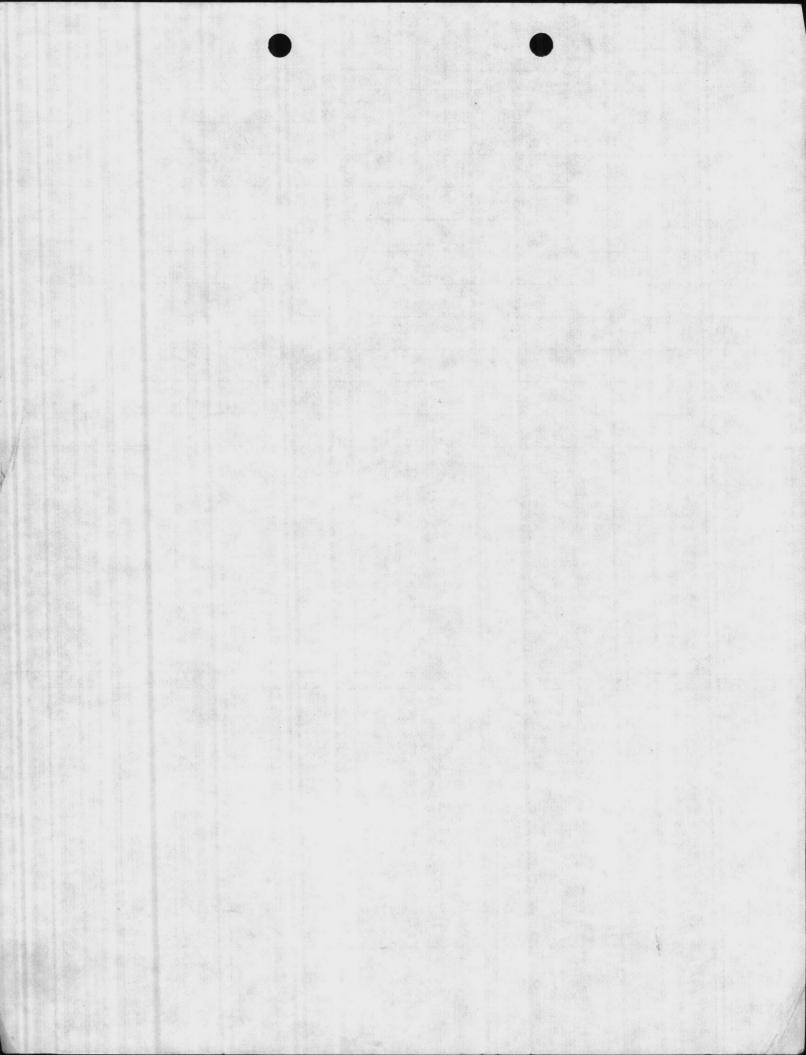
List only one of the following categories on each transmittal form, and indicate which is being submitted Contractor Approved OICC Approval Deviation/Substitution	O., INC. 799 ELLS REVIEWER USE ONLY "ACTION CODES -Approved Disapproved N-Approved as noted A-Receipt acknowledged. C-Comments -Resubmit ION REVIEWER'S INITIALS
PROJECT TITLE AND LOCATION C EAST COAST CONSTRUCTION C CONTRACT No.2470-76-C-67 REPLACE FOUR WATER WE CONTRACTOR USE ONLY *List only one specification division per form. List only one of the following categories on each transmittal form, and indicate which is being submitted Contractor Approved OICC Approval PROJ. SPEC. SECT. **PROJ. SPEC. SECT. **PROJ. DWG. NO.** PROJ. DWG. NO.** PROJ. DWG. NO.** PROJ. DWG. NO.** **A **Deviation/Substitution For OICC Approval CODE **A **A **A **CODE **CODE **CODE **A **CODE **CODE **A **CODE **CODE **CODE **A **CODE **CODE **CODE **CODE **CODE **CODE **CODE **CODE **A **A **CODE *	O., INC. 799 CLLS REVIEWER USE ONLY "ACTION CODES -Approved -Disapproved N-Approved as noted A-Receipt acknowledgedComments -Resubmit ION REVIEWER'S INITIALS CODE AND DATE
CONTRACT N62470-76-C-00 REPLACE FOUR WATER WE CONTRACTOR USE ONLY MARINE CORPS BASE *List only one specification division per form. List only one of the following categories on each transmittal form, and indicate which is being submitted Contractor Approved OICC Approval PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. * ITEM IDENTIFICATION & PARA. and/or PROJ. DWG. NO. * OUTPROJ. DWG. NO. * CONTRACT N62470-76-C-00 REPLACE FOUR WATER WE MATINE CORPS BASE CAMP LEJUENE OF DEVIATION FOR OICC Approval R OUTPROJ. DWG. NO. * OUTPROJ. DWG. NO. * CAMP LEJUENE OUTPROJ. Deviation/Substitution For OICC Approval R OUTPROJ. DWG. NO. * OUTPRO	REVIEWER USE ONLY "ACTION CODES -Approved -Disapproved N-Approved as noted A-Receipt acknowledgedComments -Resubmit ION REVIEWER'S INITIALS CODE AND DATE
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CONTRACTOR USE ONLY *List only one specification division per form. List only one of the following categories on each transmittal form, and indicate which is being submitted Contractor Approved OICC Approval PROJ. SPEC. SECT. *A PARA. and/or PROJ. DWG. NO.* Deviation/Substitution For OICC Approval CODE PROJ. SPEC. SECT. *A CTICATION (Type, size, model no., Mfg. name, dwg. or brochure number) A CTICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	**ACTION CODES -Approved Disapproved N-Approved as noted A-Receipt acknowledgedComments -Resubmit ION REVIEWER'S INITIALS CODE AND DATE
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& PARA. and/or PROJ. DWG. NO. * (Type, size, model no., Mfg. name, dwg. or brochure number)	DES INITIALS CODE AND DATE
15201 Draw Down Test Well No. 617 7	CODE AND DATE
+ A	CCS 405 926,
+ A	CCS 405 926,
15201 Chemical Analysis Well 617 7 A	CCS 405 426,
Chemical Analysis well SI7	,
[2] (ATTICLE TO TAKE TEXTS FOR THE PROPERTY CONTROL OF THE PROPERTY CONTROL	
OPY OF TRANSMITTAL AND SUBMITTALS TO ROICC CONTRACTOR REPRESENTATIVE (Signature)	***************************************
One (1) (111A 776~	- Alexander
ATE RECEIVED BY REVIEWER FROM (Reviewer) TO	
Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contr	act requirements unless the con-
tractor calls attention to and supports the deviation.	
Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comm	nents below on ONE COPY of the
transmittal form.	
EVIEWER'S COMMENTS	
	A-A
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17)	
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OPIES TO: ROICC (2) DATE SIGNATURE	
ROICC (2) LANTDIV (1)	
ROICC (2)	



WELL NUMBER	655 HP	BY THOM!	15/RAYNO	R / SUMNEX	DATE 10-2	20-83
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DOWN	DISCHARGE PRESSURE	GPM	START TIME 08 5 5
70	16	51-	37	3/	100	0910
		45	79	37	104	030
100		48	32	24	708	0947
		49	33	91	115	1000
		51	35	18	119	1010
		52	34	16	122	1024
		55	39	12	128	1030
		56	46	10	130	1040
		de la companya de la				

REMARKS LOT NOT AT 10 PSI 130 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE
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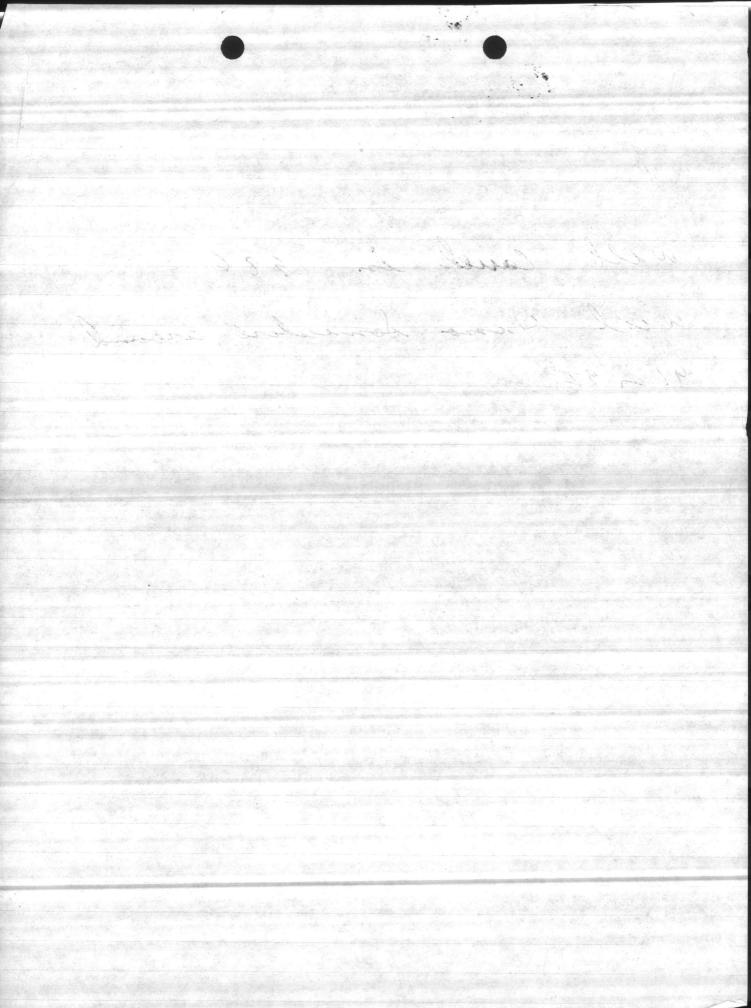


Air Line- (655) 70'

will land in 1986

will Dino Somewhere around

91 on 92



Law & Company

Consulting and Analytical Chomists

ESTABLISHED 1903

Main Office 1711 Castle St. Wilmington, N.C. 28402 919-762-7082 TWX 510-937-0280

DATE OF REPORT 12/12/80 DATE LOGGED IN 12/12/80 Branch Office 4736 Spruill Ave. North Charleston, S.C. 803-747-1589

273 GROUNDWATER DEV. CO P.O.BOX, 419

EAST COAST CONSTRUCTION CO. INC.
P. O. BOX 5004

LAB ID / INVOICE # EW4893

DATE & TIME COLLECTED 11/21/80

DATE & TIME REC IN LAB 11/26/80

COLLECTED BY CUSTOMER

NEW BERN, N. C. 28560

JACKSONVILLE, N. C. 28540

ATTN:

MAGNESIUM EPA 242.1

SAMPLE DESCRIPTION: WELL WATER TESTS / SAMPLES	(UNITS)	HADNOT PT	77 25 11	N-62470-79-C-4476 REPLACE WATER WELLS MCB, CAMP LEJEUNEINC
PH EPA 150.1	2	7.7	8.1	
TURBIDITY EPA 180.1	NTU	C1	8.0	
TOTAL HARDNESS EPA 130.2	PPH	178.0	116.0	
ALKALINITY TOTAL (AS CaCO3) EPA 310.1	PPN	163.5	209.8	
ALK, HYDROXIDE AS CaCO3 SM403	PPM	0.0	0.0	
ALK, BICARBONATE AS CaCO3 SM403	PPH	163.5	195.2	
ALK, CARBONATE AS CaCO3 SM403	PPR	0.0	14.6	
CARBON DIOXIDE \$M407B	PPIL	6.5	3.1	
CHLORIDE S.M. 408A	PPM	15.0	9.0	
SULFIDES EPA 376.1	PPM	0.0	0.0	
IRON EPA 236.1	PPM	C.1	0.5	
MANGANESE EPA 243.1	PPM	C.015	C.015	
CADMIUM EPA-213.1	PPM	67	37	

6.1

TOTAL CHARGES \$184

2.1

LABORATORY SUPERVISOR

Eranch Office s

LOCK AND A

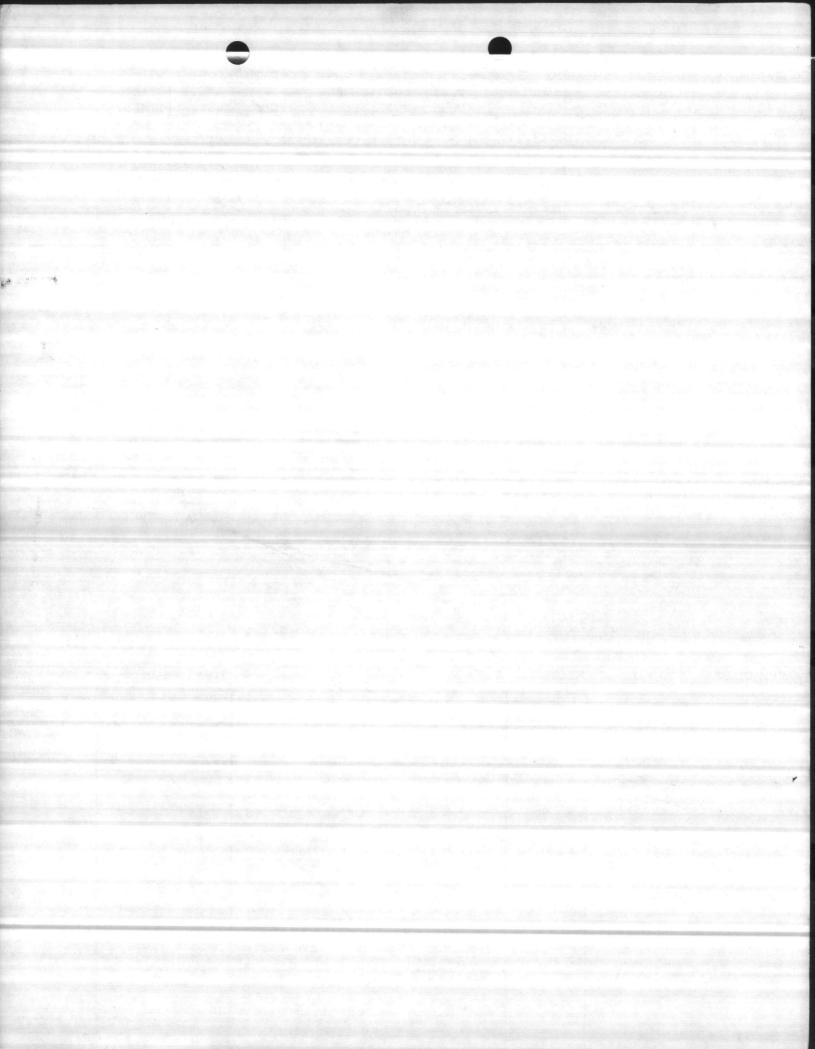
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WELL NUMBER	655	BY THO	MAS /B	Ronn	DATE 0-	9-84
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME /3/10
70	20	40	20	28	104	1320
		43	23	25	108	1330
		44	26	72	115	1340
		45	37	19	119	1350
		46	28	16	175	1400
		48	30	/3	178	1410
		50	32	10	130	1420
		51	33	7	133	1420

REMARKS leggt net at 10 PSI 130 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE
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EAST COAST CONSTRUCTION COMPANY, INC. GENERAL CONTRACTORS Post Office Box 5004 JACKSONVILLE, NORTH CAROLINA 28540 ROUTING ORDER

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RETURN TO

COMMENTS

June 26, 1981

Officer in Charge of Construction Building 1005, Marine Corps Base Camp LeJeune, N.C. 28542

Ref: Contract N62470-79-C-4476 Replace Water Wells, MCB Camp LeJeune, N.C.

Gentlemen:

We are enclosing five (5) copies of the 24-hour pumping test on Well No. HP655 (Hadnot Point). This well will produce 17 GPM at a pumping level of 51'-2" and a drawdown of 23'-0". The well has a specific capacity of 3.21 GPM per foot of drawdown. The first screen on this well is set at 60'-0" and to maintain an approximate 10'-0" drawdown level above the screens, the capacity will be 117 GPM. You can obtain 3.21 GPM per foot of additional drawdown. With stainless screens you are allowed to pump to the top of the screen which will result in a capacity of 145 GPM.

We are ready to proceed with the completion of the well base, well house, and supporting features. Please advise if you concur in this matter.

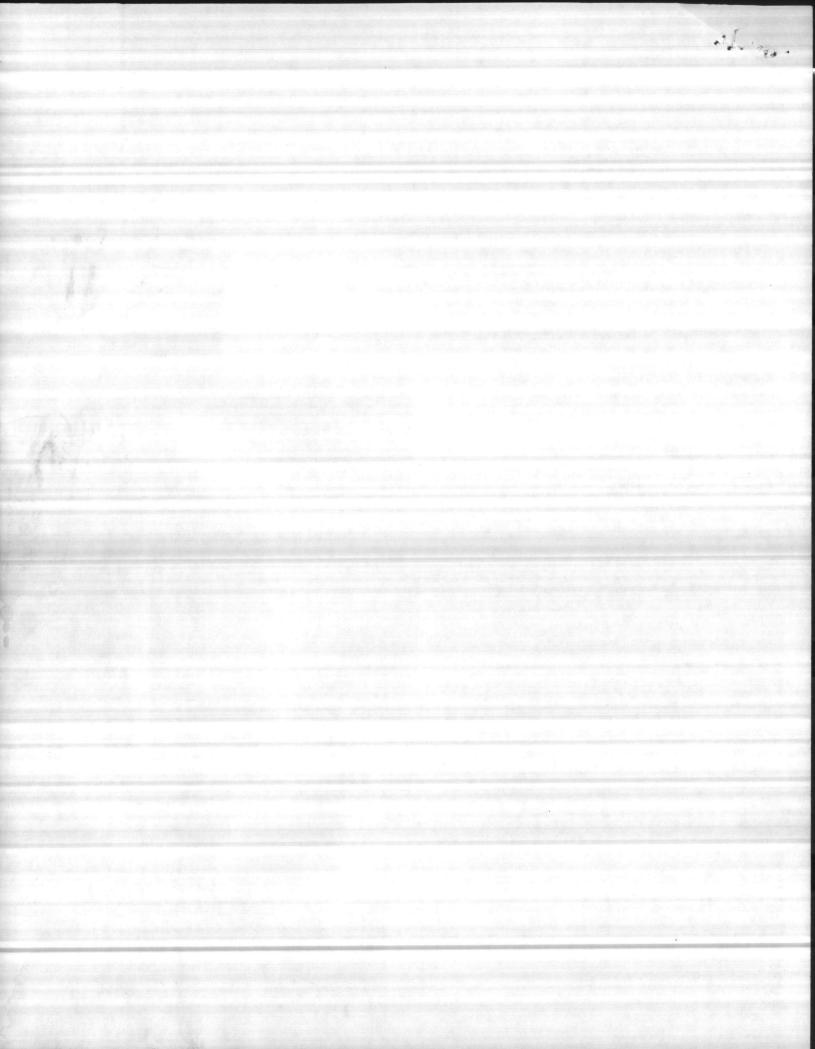
Yours very truly,

EAST COAST CONSTRUCTION CD., INC.

W. H. Myers

WIM/ck

Enclosures



CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085

N.C.W.W.A.

TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330



Job Camp Lejeune	Well No.	625A	Date Tested May 7-8, 1981
Location Hadnot Point			Tested By Andrews - Galloway
Dia. of Well 18 X 8			Pump Used. Grundfos sub.
Depth of Well 145			Driver Franklin 20 hp elect.
Water Levels by: 🔯 Electric Dropline	- Militar		Specific Capacity 3.21 GPM per ft . dd.
Air Line, Length	_		Quality
Non-Pumping Level 14' 9" / 14' 4" Orifice Size 2" meter 1 X 4 X 3 orifi	_ .ce _		Temperature

t- t ₁	Piezometer Reading (in.)	G.P.M.	Air Gauge Reading (feet)	Pumping Level	Drawdown	Prod.	Оъ.1	REMARKS
0		1 0				14'9"	14'4"	Static 5-8-81
15		100 - 2GPM				42'7.5"	18'1"	
30		100 ±2GPM				43'2"	19'0"	
45		100 - 2GPM				43'8"	19'7"	
60		100 - 2GPM				44'1"	20'4"	Stable
90		100 - 2GPM				44'4.5"	20'4"	
120		100 + 2GPM					20'4"	
150		100 - 2GPM				44'8"	20'7"	
		100 ± 2GPM				45'0"	20'9"	Increase to 117
180 195		117 - 2GPM				50'1"	21'9"	
		117 ± 2GPM				50'3"	22'1"	
210 225		117 - 2GPM				50'5"	22'0"	
		117 + 2GPM				50'7"	22'2"	
240 255		117 r 2GPM 117 - 2GPM				50'7.5"	The same of the sa	
		117 + 2GPM				50'8"	22'7"	Stable
300		117 - 2GPM 117 - 2GPM				50'8"	22'4.5"	Scante
330 345		117 - 2GPM 117 - 2GPM	+			50'9.5"	22'5"	
360		117 + 2GPM 117 - 2GPM				50'9.5"		Start Cont.tes
420					+			
480 .		117 - 2GPM 117 - 2GPM		1		51'0"	22'6"	
540						51'1"	22'6"	
600		117 ± 2GPM				51'1"	22'6"	
660		117 - 2GPM				51'1"	22'6"	



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CAROLINA WELL AND PUMP COMPANY, INC.



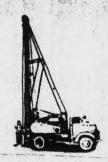
Complete Well and Pump Service

P. O. BOX 1085

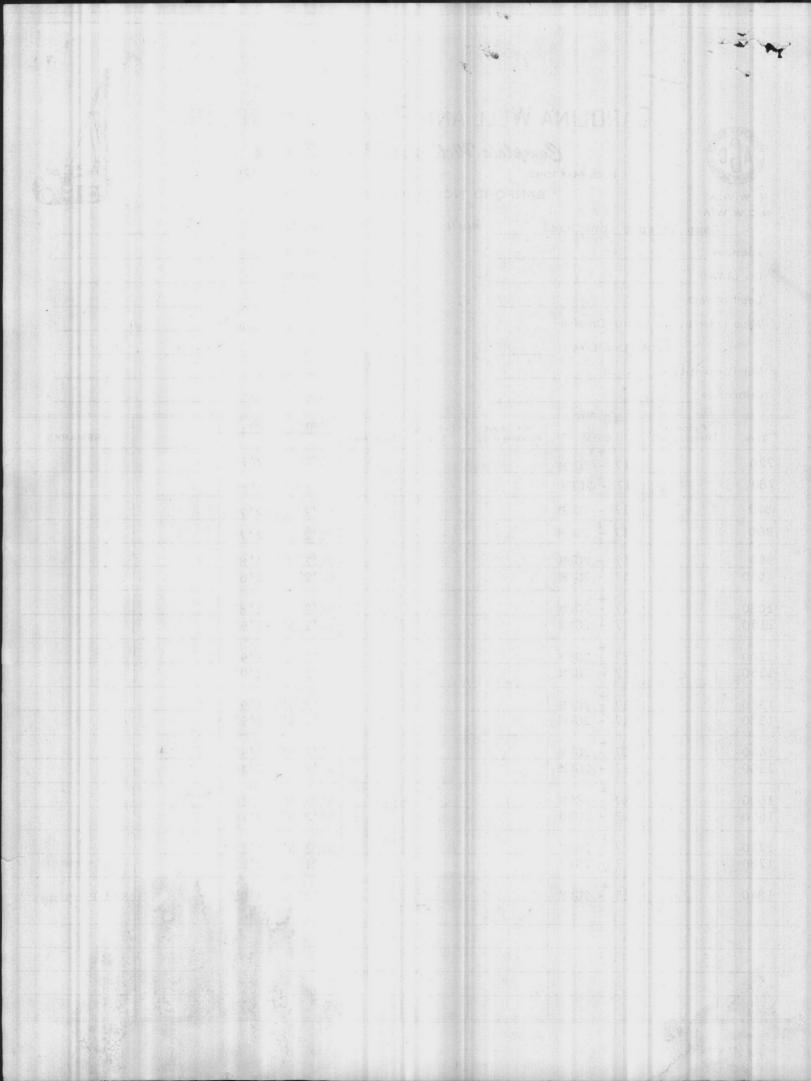
TELEPHONE 776-3415

N.W.W.A.

SANFORD. NORTH CAROLINA 27330

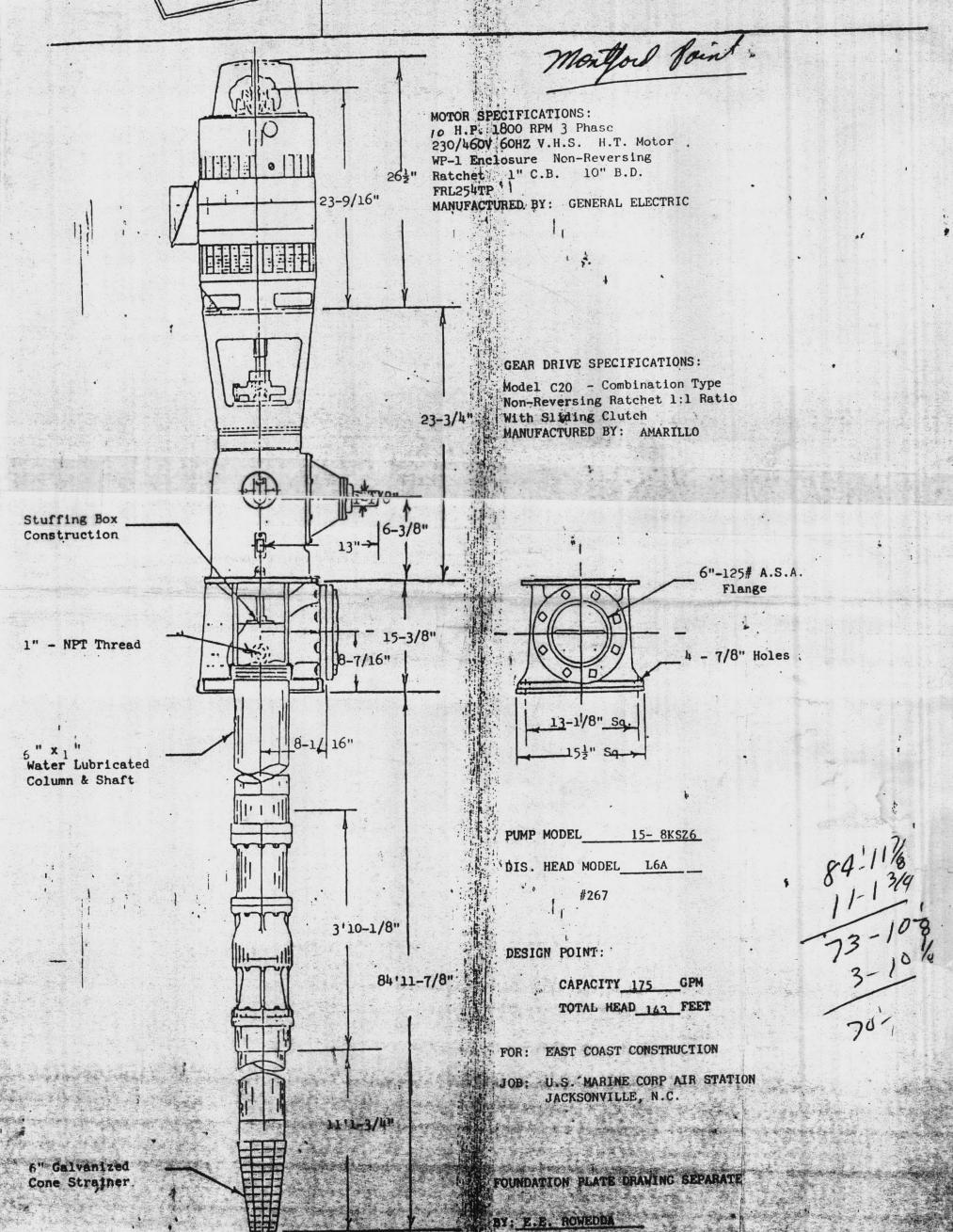


		une concinae				Tested By	,		
	of Well								
		Electric Dropline							
Water		Air Line, Length	K-1**						
Non Pi		an Eme, Length						·	
					T				
Time	Piezometer Reading (in.)	G.P.M.	Air Gauge Reading (feet)	Pumping Level	Drawdown	Prod.	0ь.1		REMARKS
720		+ 117 - 2GPM				51 '2"	22'7"		
780		117 - 2GPM				51'2"	22'7"		
840		117 - 2GPM				51'2"	22'7"		
900		117 ± 2GPM				51'2"	22'7"		
960		117 - 2GPM				51'2"	22'8"		
1 0 20		117 - 2GPM				51'2"	22'8"		
1080		117 + 2GPM				51'2"	22'8"		
1140		117 - 2GPM				51'2.5"	22'9"		
1200		117 + 2GPM				51'2.5"	22'9"		
1260		117 - 2GPM				51'2"			
1320		117 + 2GPM				51'2.5"	22'9"	•	
1380		117 - 2GPM				51 '2 .5"			
1440		117 + 2GPM				51'2.5"	22'9"		
1500		117 - 2GPM				51'2"	22'10"		
1600		117 + 2GPM				51'2.5"	22'10"		
1660		117 - 2GPM				51'2.5"			
1720		117 + 2GPM				51'2.5"	22'11"	The control of the co	
1780	7	117 - 2GPM				51'1"	22'11"		
1840		117 ⁺ 2GPM				51'2"	23'0"	// // / / / / / / / / / / / / / / / /	End Pumping
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	3					1.0		mark to the the	





Turbine Pumps



Turbine Pumps "91\Eu 11

East Coast Construction Co. For:

U. S. Marine Corp Air Station Job:

Jacksonville, N. C.

36

32

28

24

20

12

TOTAL HEAD IN FEET

Pun #267

TURBINE PUMP CURVE

SECTION 2120

200 GPM @ 132' TDH 81% EFF. = 8.23 BHP (A) 6.5/16 X 18P (B) 6 X 180 (C) 5-3/4 X 180 (D) 5-1/2 X 180 BRAKE HORSEPOWER 2.0

CHANGE EFFICIENCY BOWLS AS FOLLOWS -2-Change in efficiency may affect both head and horsepower Bowl Dia. 7-1/2 In. Bowl No. 3591-S, C.I. ENAM. Impeller No. 3693. BRONZE Eye Area 6.60 Sq. In. SEMI-OPEN K - 4.42 Imp. Type STAC PERFORM ANCE Curve No. HK,5 760 R. P. M. BKS Bowl

Performance based on pumping clear, fresh water at a temperature not over 85°F., and free of gas, air or abrasives, and with bowls proper ly adjusted and sub

GALLONS PER MINUTE

TURBINE PUMP CURVE Jack sinville. N.

D LANTON 4- 18673 (Rev. 8/76	UBMITTAL TRANSMITT	CONTRACT NO.	TRANSM	ITTAL NO	DATE
IOM CONTRACTOR		79-C-4476	CONTRACTOR OF THE PROPERTY OF	-R 3	09/28/61
	truction Co., Inc.		ater Wells		
			Camp Lajeun	e, Horth	Carol Gro
ROICC					
	*List only one specification			and the same of the last of th	ewer uge only Chon codes
e juli kanti.	ist only one of the following categor		Charles To the	A-Appr	toved .
	and indicate which is b			AN-Ap	pproved proved as named
Contractor Approved	OICC Ap		ation/Substitution or OICC Approval	C-Com R-Reg	ceipt acknowledged Impeta Omle
PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO.*	(Type, size, mo	IDENTIFICATION odel no., Mfg. name, dwg. or ochure number)	50 00 00 00 00 00 00 00 00 00 00 00 00 0	ACTION CODES	REVIRWERY INTRIALS CODE AND D
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	Well nos.: HP 655	L. L.			
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Please Hote the	t pumps are designed	to be 80% efficient	cy per spec		3
		13	ESENTATIVE (Signature		4
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PROJECT ON

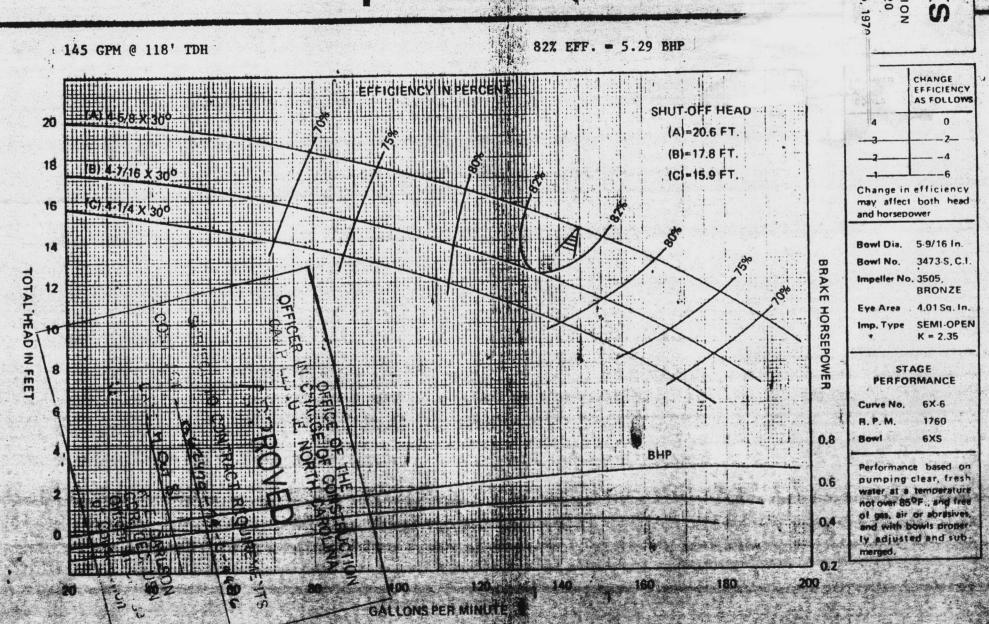
For: East Coast Construction Co.

Job: U. S. Marine Corp Air Station

Jacksonville, N. C.

Pump # 655

TURBINE PUMP CURVE



ob: U. S. Merine Corp Air Station

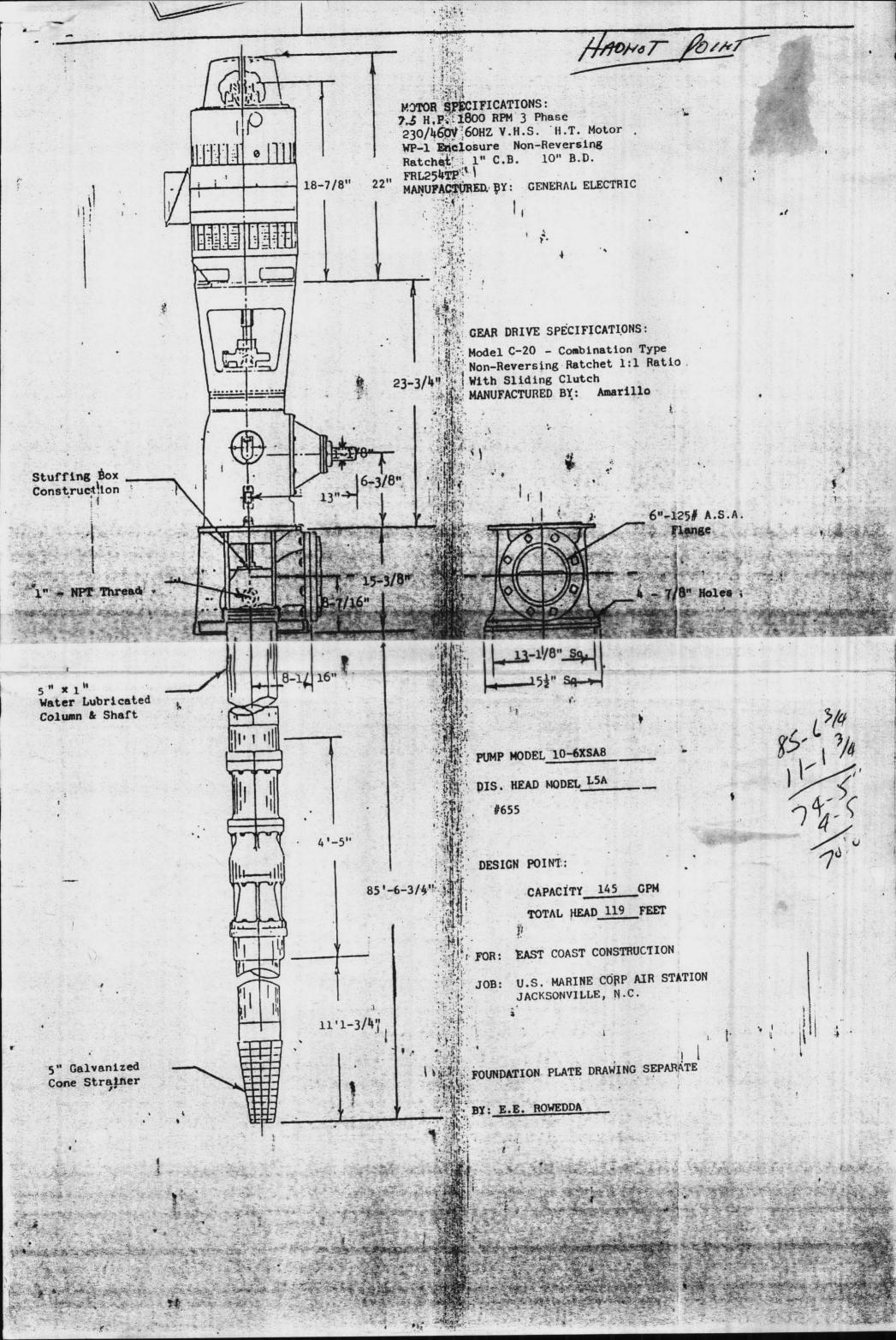
TURBINE PUMP CURVE

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HASHOT BE 100

DRILLER'S LOG Hadnot Point, Camp Lejeune Jacksonville, North Carolina 11/15/80 Well HP-655 N62470-79-C-4476

Test hole diameter: 9 7/8"

Bit- Medium Formation - 3 cone roller tooth

Drill Rig: Failing 1500

Drill Speed: 2nd Gear - 150 rpm

3rd Gear - 200 rpm

Driller: Frank Quidley, Groundwater Development Company, Inc.

<u>Sample</u>	Depth .	Drill Time	<u>Description</u> <u>Dr</u>	ill Speed
0-10	0-5	5 min	Grey sand w/ silt and roots	2nd
	5-10	5 min	Brown sand with silt	2nd
10-20	10-20	5 min	Tan silty sand	2nd
20-30	20-30	5 min	Tan silty sand	2nd
30-40	30-36	5 min	Tan silty sand	2nd
,	36-40	5 min	Tan medium sand	2nd
40-50	40-50	10 min	Tan fine-medium sand	2nd
50-60	50-60 . /	10 min	Tan fine med sand w/(Fe)& cement at 58'	2nd
60-70	60-70	10 min	Grey medium sand	2nd
70-80	70-77	10 min	Grey medium sand	2nd
	77-80	15 min	Grey sand with shell	2nd
80-90	80-90	30 min	Grey shell w/streaks of med. sand	2nd
90-100	90-100	30 min	Grey shell with sand cement	2nd
100-110	100-106	20 min	Grey shell with sand	2nd
	106-110	10 min	Grey shell w/streaks of sand	2nd
110-120	110-116	10/min	Grey sand w/streaks of shell	2nd
	116-120	10 min	Grey fine sand w/streaks of shell	2nd
120-130	120-130	10\min	Grey fine sand w/streaks of shell	2nd
130-140	130-140	10 min	Grey fine sand w/ streaks of shell	2nd
140-150	140-150	10 min	Grey fine sand w/streaks of shell	2nd
150-160	150-160	10 min	Grey very fine sand w/streaks of shell	
			and clay	2nd
160-170	160-170	10 min	Grey-green fine sand w/clay	2nd
170-180	170-175	10 min	Grey sandy clay	2nd
	175-180	5 min	Grey green sand with shell & glauconite	2nd
180-190	180-190	10 min	Grey green sandy clay with shell	2nd
190-200	190-200	20 min	Grey sandy clay with shell hash	2nd
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EAST COAST CONSTRUCTION CO. INC.

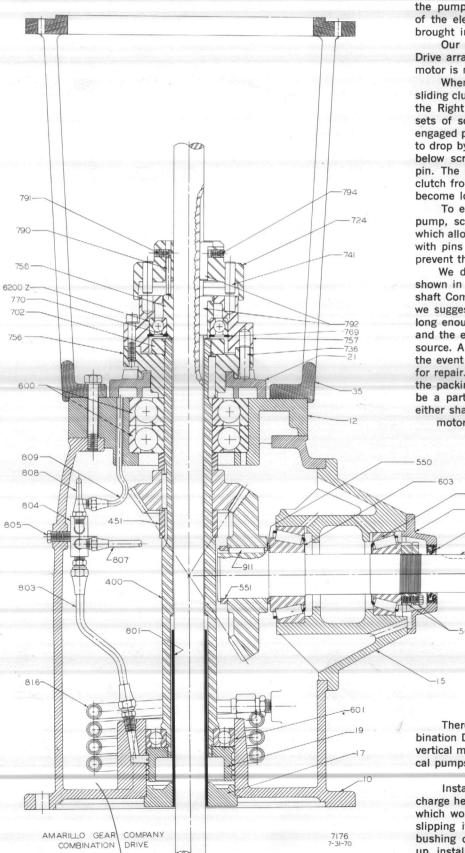
P. O. BOX 5004

JACKSONVILLE, N. C. 28540

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COMBINATION DRIVE with Manually Operated Sliding Clutch



On some pumping installations it is desirable to provide alternate power for driving a turbine or vertical pump: (1) by equipping the installation with a Right Angle Gear Drive and an internal combustion engine, and (2) by using a Right Angle Gear Drive with a stand on which a vertical electric motor is mounted above the drive. This arrangement is referred to as a "combination drive."

The vertical electric motor is normally used to operate the pump. If there is an electric power failure or failure of the electric motor, the Right Angle Gear Drive is then brought into service by engaging the sliding clutch.

Our cross sectional print 7176 shows a Right Angle Drive arranged for Combination Drive. The vertical electric motor is mounted on the stand above the drive.

When the vertical electric motor is operating the pump, sliding clutch 724 is in the raised position which disengages the Right Angle Drive from the vertical pump shaft. Two sets of screws, 791 and 794, hold the clutch in the disengaged position. As a safety measure, pin 790 is permitted to drop by loosening screw 791. When the pin has dropped below screw 791, the screw is then tightened above the pin. The pin is the correct length to prevent the sliding clutch from dropping down and engaging should screw 794 become loose.

To engage the Right Angle Gear Drive to operate the pump, screws 791 are backed out until pin 790 is free, which allows the clutch to move downward until it is engaged with pins 741. Screws 791 and 794 are then tightened to prevent the clutch from working up out of engagement.

We do not furnish or manufacture the vertical shaft shown in the photograph and drawing for standard hollow shaft Combination Drives; however, on Combination Drives we suggest the use of two top shafts. One shaft would be long enough to extend through the Right Angle Gear Drive and the electric motor, which normally is the prime power source. A shorter (spare) shaft would be recommended in the event that the electric motor is damaged and removed for repair. A screw coupling below the gear drive and above the packing gland in the discharge head would necessarily be a part of the installation to accommodate the use of either shaft. The longer shaft used in conjunction with the motor and the Gear Drive should be keyseated above the

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drive to permit the engagement of the sliding clutch during a temporary power failure. With

this arrangement the thrust bearing in the vertical electric motor carries

the thrust for both units. The rotor of the electric motor always rotates when the Right Angle Drive is operating the pump. Should the electric motor be removed for any purpose, the spare shaft would be used to replace the longer shaft and the thrust would be transferred to the Right Angle Gear Drive.

A grease lubricated steady ball bearing 6200Z is provided to prevent run-out and vibration in the top shaft.

The Combination Drive may be used with hollow shaft or solid shaft motors. A support bearing may be installed in the base of the Right Angle Drive for a solid shaft drive.

There are numerous arrangements by which the Combination Drive may be used with solid shaft or hollow shaft vertical motors to operate deep well turbine pumps or vertical pumps.

COMBINATION DRIVE INSTALLATION

Install the Right Angle Gear Drive on the surface discharge head. Be sure there are no burrs or dirt on the base which would cause misalignment. Install the top shaft by slipping it through the sliding clutch and steady bearing bushing of the drive. After the top shaft has been made up, install gib keys 792 in the steady bearing bushing and in the sliding clutch.

