



WATER-RIGHT DOCKET

Hopewell Furnace National Historic Site

Docket No: 7

WELL. LLOYD HOUSE, BLDG. #71

Supporting Hydro Data

00-00-0000: water right/source docket information

NARRATIVE

Enclosed are well logs and results of chemical analysis of water from the new well completed on May 26, 1967 at Hopewell Village National Historic Site in Pennsylvania.

The field log includes samples collected at various depths from 10 feet to 142 feet.

Drilling was started on May 18 by James Bucci Well Drilling Company of Reading, Pennsylvania under the terms of Contract No. 5:376-472.

Total depth of the finished well is 142 feet below land surface with the upper 60 feet being cased with a six-inch inner diameter pipe. The water bearing formation is located in sandstone of the Stockton formation. The well was developed and pumped. Flow measurements indicated that the well was being pumped at an estimated rate of 150 gallons per minute at 130 feet depth for four hours.

The well was completed on May 25, and accepted on May 26. Final cost of well is \$1,283.10.

Water quality is good with the exception of a high concentration of iron (0.66 ppm) and manganese (0.44 ppm). According to the Public Health Drinking Water Standards - 1962, the maximum concentration of iron and manganese combined is set at 0.3 mg/l.

WATER SYSTEM DATA

Llyod House #71

AREA Hopewell Village N.H.S. DATE COLLECTED C-15-67 COLLECTED BY Moore

1. Name of System: Building #71
2. Location: State Pennsylvania County Berks General Area Hopewell
Reference to permanent landmark _____
3. Source of Supply: Spring Capacity 17.7 gpm, May 19, 1937
(Well, Spring, Stream, Impoundment, etc.)
4. Type of System: Pumped (Pneumatic)
(Pumped, Gravity, etc.)
5. Treatment: Chlorinator
(Filtration, Chlorination, Aeration, etc.)
6. Distribution Mains: Size 1½ Length _____; Size _____ Length _____
Size _____ Length _____; Size _____ Length _____
Size _____ Length _____; Size _____ Length _____
7. Pump Unit: Make Myers; Type _____; Model No. _____
Serial No: --; Outlet 1½ in.; Inlet -- in.
(Size) (Size)
8. Power Source: Electric Motor: Make Century; HP ½;
(Elec., Gas, Generator)
Serial No. X9; Voltage 115; Amps 4.2;
RPM 1750; Type --; Phase one;
Cycles 60; Others _____; Stages _____
9. Control: Automatic Pressure*; Manual _____;
(Float, Electrode, Pressure, Time)
Other _____
(Explain)

* Square D, Class 9013, Type FSG6U closes @ 40 opens @ 20

10. Pump Design: Capacity _____ gpm _____ (Actual) _____ (Design) _____ gpm
Head _____ ft. _____ (Actual) _____ (Design) _____ ft.
Basement of _____
11. Pump Housing: Type Const. _____ House _____; Size _____
(Walls) _____ (Roof) _____
12. Storage: _____ Pneumatic Tank (Domu) _____; Type Const. _____ Steel (Galv.) _____
(Pneumatic, Elevated, Underground, etc.) _____ (Concrete, Wood, Steel) _____
Size 19'X12'; Capacity 2600 gal.; Inlet _____ ft. _____ in.
(Elev.) _____ (Size) _____
Outlet 279.0 ft. 2" in.; Pressure Setting _____
(Elev.) _____ (Size) _____ (If pneumatic) _____
13. Distribution: Water Closets _____; Lavatory _____; Urinal _____;
Drinking Fountain _____; Hose Bids _____; Residences 1 _____;
Other _____; _____; _____
14. Metered or Nonmetered: Non-metered _____; No. _____; Size _____
No. _____; Size _____
No. _____; Size _____
15. Fire Protection: Fire Hydrants N/A _____; Yard Hydrants None _____
16. Water Analysis: _____

17. Condition of System: _____
(Repairs needed itemize) _____

GILBERT ASSOCIATES, INC.

ENGINEERS AND CONSULTANTS

LABORATORY DIVISION

LABORATORY
2249 FAIRVIEW STREET
READING, PENNSYLVANIA 19606

OFFICE
525 LANCASTER AVE., BOX 1498
READING, PENNSYLVANIA 19603

CERTIFICATE OF ANALYSIS

SAMPLE OF: RAW WATER

SAMPLED: May 26, 1967

LABORATORY NO: 230532

RECEIVED: May 26, 1967

YOUR NO:

REPORTED: June 9, 1967

SUBMITTED BY: Hopewell Village
R. D. 1
Elverson, Pa.

MARKED: BLDG. #71 LLOYD HOUSE
130 FT. FLOW 150 GPM

		CaCO ₃ Equiv.	Ions
Calcium	ppm Ca	84.0	33.6
Magnesium	ppm Mg	46.0	11.2
Sodium	ppm Na	31.1	14.3
TOTAL CATIONS	ppm	161.1	
Carbonates	ppm CO ₃	12.0	7.2
Bicarbonates	ppm HCO ₃	130.0	158.5
Sulfates	ppm SO ₄	13.2	12.7
Chlorides	ppm Cl	4.2	3.0
Nitrates	ppm NO ₃	1.7	2.1
TOTAL ANIONS	ppm	161.1	
Hydrogen Ion Conc.	pH		8.2
Conductivity	Mmho		277
P. Alkalinity	ppm CaCO ₃		6
M. O. Alkalinity	ppm CaCO ₃		142
Total Hardness	ppm CaCO ₃		130
Silica - Soluble	ppm SiO ₂		21.3
Iron - Soluble	ppm Fe		0.06
Iron - Total	ppm Fe		0.66
Manganese	ppm Mn		0.44
Copper	ppm Cu		0.04
Iron & Aluminum Oxides	ppm R ₂ O ₃		0.4
Color	ppm		0
Turbidity	ppm		10
Suspended Solids	ppm		3.6
Soluble Solids	ppm		114
Total Solids	ppm		118

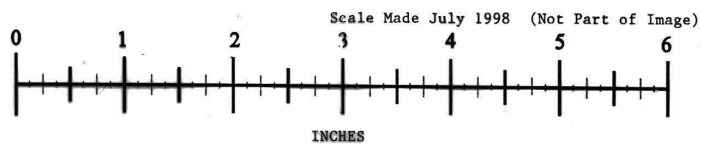
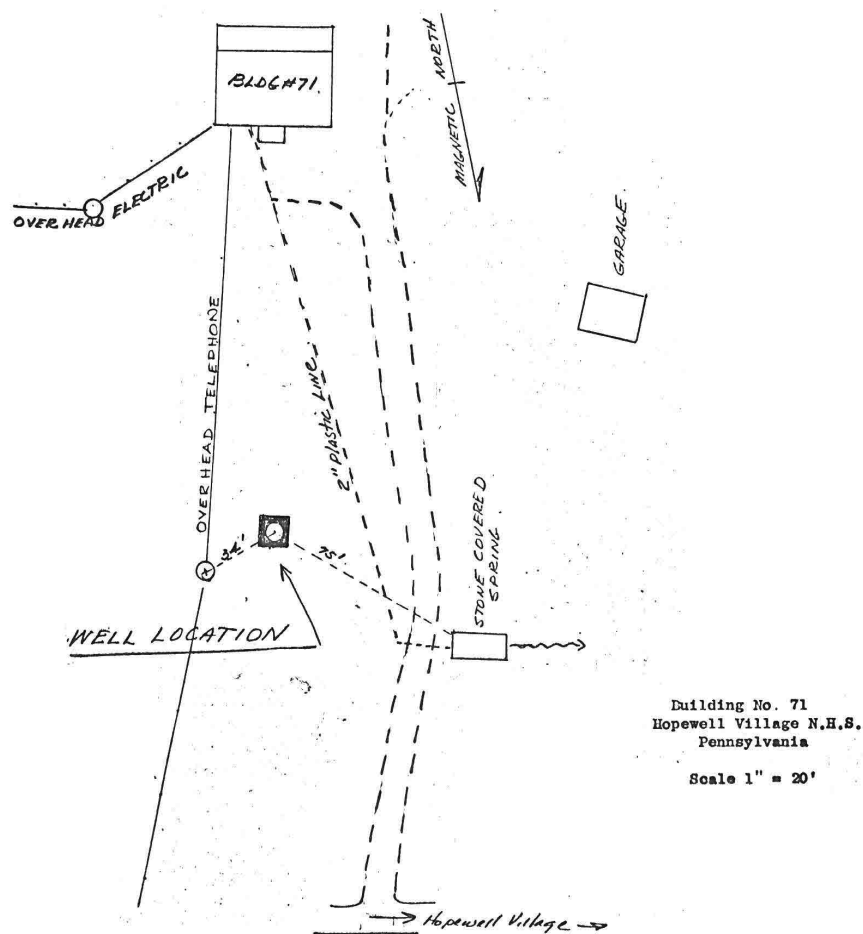
Respectfully submitted,



W. J. Delp

EMS

Name, Family & Given Well Known St. or ch. City Town or County District License No. What Use, Domestic or Foreign Other Date of all Granted Location Description	Date of Length of Weight Color Shape Material Quantity Value Remarks Other	Date of Length of Weight Color Shape Material Quantity Value Remarks Other
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Other Supporting Information



IN REPLY REFER TO:
L54

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

HOPEWELL VILLAGE NATIONAL HISTORIC SITE
R.D. #1
ELVERSON, PENNSYLVANIA 19520

April 24, 1968

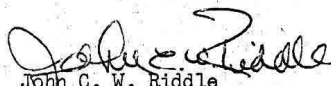
Memorandum

To: Chief, Office of Land and Water Rights, WSC
Attention: Hydraulic Engineer, Garland Moore

From: Superintendent, Hopewell Village

Subject: Installation of Hydro-Pneumatic Water System,
Lloyd House

The Test Well drilled in March 1967 at the Lloyd House, Hopewell Village is now being utilized. A hydro-pneumatic water supply system was installed on April 16, 1968 and we are enclosing related material for your information.


John C. W. Riddle

Enclosures

SPECIFICATION - HYDRO-PNEUMATIC WATER SUPPLY SYSTEM
Lloyd House, Hopewell Village NHS

I. DESCRIPTION: The Hydro-Pneumatic Water Supply System shall consist of an electric motor driven submersible pump, motor starter, safety switch, pressure switch, air volume control, pressure relief valve, liquid level control, pressure gauge, galvanized steel pressure tank and all necessary controls, wiring and piping. The materials shall be assembled into a completely operable unit capable of supplying a minimum of 5 gpm from the existing well. The work shall include excavation, backfill, connection to existing line inside house, disinfecting pipeline, cleaning, capping spring supply, and necessary incidentals.

II. MATERIALS

1. Pump: The pump shall be capable of delivering 5 gpm against a total head of 200 feet with sufficient piping to set the pump approximately 150 feet below the existing ground. The pump unit shall be a submersible type, 2" riser pipe, driven by a minimum 3/4 hp, 60 cycle, 3500 rpm, single phase, 230 volt electric motor or approved equal.
2. Underground Discharge Unit: Pitless adapter with check valve and watertight cap, and designed for a 6-inch diameter well and a 3-foot burial depth for the discharge line. Similar and equal to Monitor PS as manufactured by Baker Manufacturing Co., Evansville, Wisconsin.
3. Electric Cable and Wire: Shall be #10 or larger cable in plastic pipe installed according to manufacturer's recommendations and conforming to the National Electrical Code.
4. Pressure Switch: Pump shall be controlled by a pressure switch (not mercury) at the hydro-pneumatic tank, set to start pumping at 25 psi and stop at 45 psi tank pressure. An auxiliary switch shall be provided so that an operator may bypass the automatic controls and operate the pump manually.
5. Air Volume Control: Shall be furnished and installed to automatically maintain the proper air charge in the pressure tank. All controls shall be installed in accordance with the manufacturer's recommendations and shall be of the proper size and type to operate the well pump. The units used shall be Jacuzzi Bros., Inc. Line type Jet charger Figure No. 210B complete with 2" line air aspirator, or approved equal.
6. Pressure Relief Valve: Shall be 1" with bronze body with a screwed side outlet, exposed regulating screw and have a male inlet. The pressure setting shall be at 60 psi.

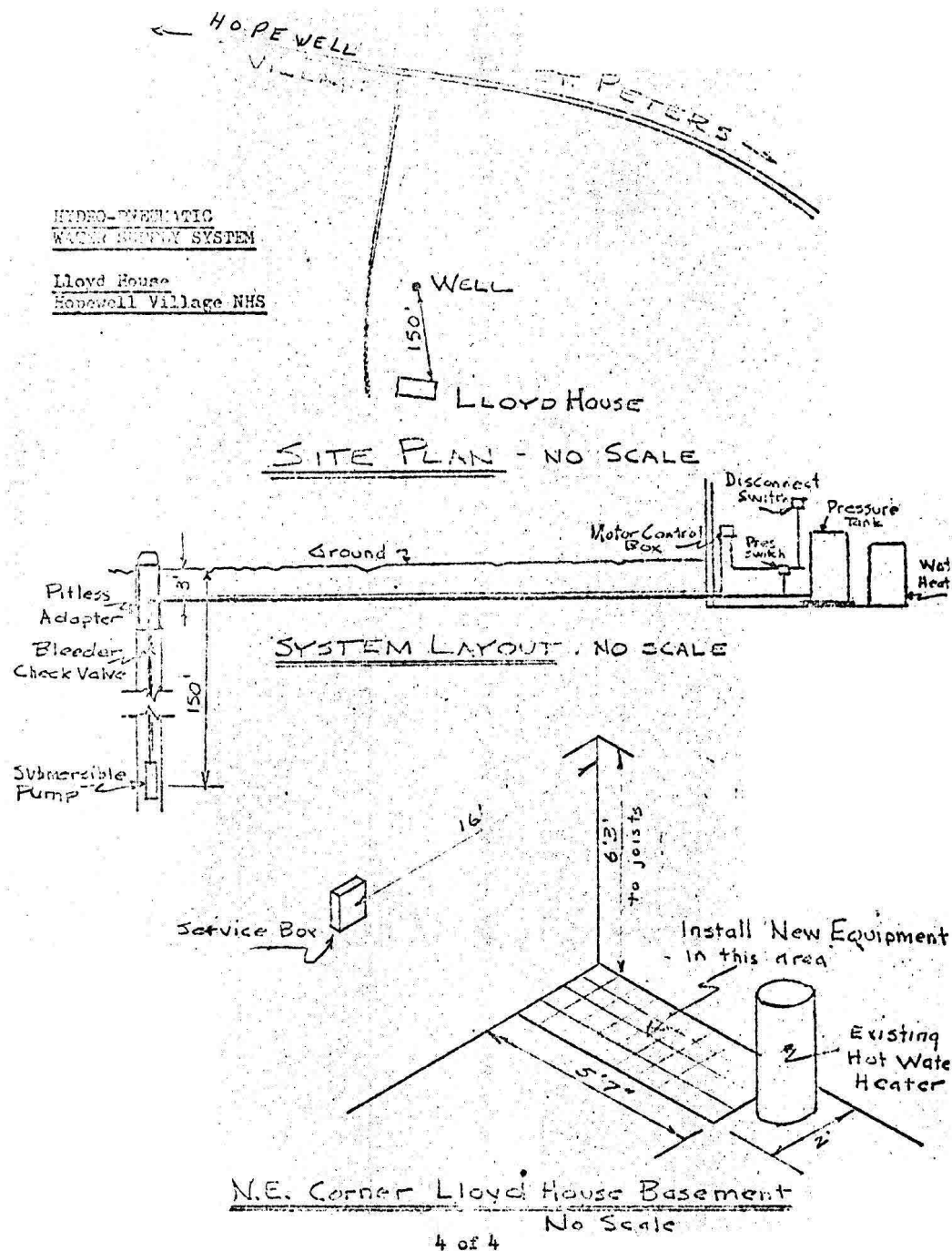
II. MATERIALS (CONT'D)

7. Non-Back Check Valve: Shall be 2" with bronze body and screwed threads.
8. Throttle Valve: Shall be a standard 2" gate valve with bronze body and screwed threads.
9. Liquid Level Control (Floatless): Shall be provided and installed in the well to protect the pump and motor during period of low water conditions. PUMP UP or PUMP DOWN, one-pole double-throw induction relay in NEMA 1 enclosure mounted at control panel for 115V, 60 cycles, with two shielded stainless steel electrodes suspended in well. Control unit shall be a Jacuzzi No. 23-1069, (formerly Fig. 65E1), or approved equal set to shut pump off at low well water level and restart pump at predetermined water level.
10. Pressure Gauge: Shall have a minimum diameter of 2-1/2" and shall be rust proof construction, with a dial reading from 0 to 100 psi. mounted on pressure tank for easy visibility.
11. Pressure Tank: Shall be of galvanized steel, vertical pneumatic tank with a minimum capacity of 120 gallons, a minimum shell thickness of 3/16" and have a minimum working pressure of 75 psi.
12. Galvanized Steel Pipe and Fittings: All piping shall be Class II, Weight A, welded or seamless pipe, zinc coated, conforming to the requirements of Federal Specifications WW-P-404c, and WW-P-521e.

III. CONSTRUCTION

1. Water Piping and Fittings: Shall be installed, tested and disinfected in accordance with manufacturer's recommendations and U.S. Public Health Service standards. Pipe shall be brought into building through a wall sleeve.
 2. Pump, Wiring and Controls: Shall be installed in accordance with these specifications and with the manufacturer's recommendations. The control panel shall be mounted on wall in a suitable location for easy access.
 3. Excavation and Backfill: Excavation shall be to lines and grades indicated. Backfill shall not be completed until entire system is tested.
- IV. MEASUREMENT: The hydro-pneumatic water supply system shall be considered as one unit and shall include pump, tank, controls, all piping, wiring, and appurtenances to make up a complete operable unit.

V. PAYMENT: Payment shall be made at the lump sum price bid. The lump sum price shall be full compensation for excavation and backfill and for furnishing and placing all materials, including all labor, tools, equipment and incidentals necessary to complete the Hydro-pneumatic water supply system as set forth in these specifications and shown on

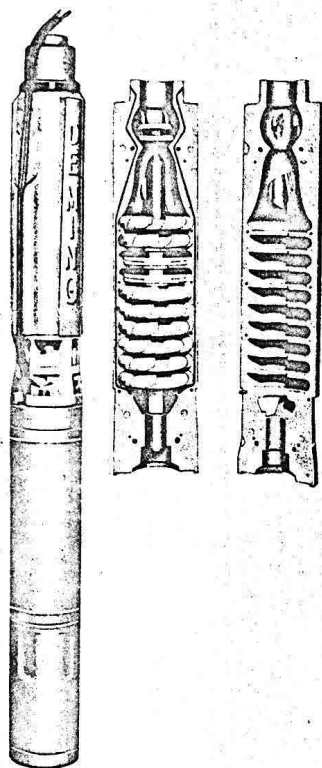


PURCHASE ORDER

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE		REGISTRATION NO. 106		THIS NUMBER MUST APPEAR ON ALL PACKAGES AND PAPERS RELATING TO THIS ORDER																			
Hopewell Village N.H.S.		DATE OF ORDER 03/25/68		ORDER NUMBER 376-82																			
DISCOUNT TERMS 10% - 30 days		ACCOUNTING CLASSIFICATION 1481034 376-161140-23																					
VENDOR'S NAME AND ADDRESS C. E. Grober & Sons, Inc. Route 50 Hopewell, Iowa. 19512		SHIP TO: (Consignee and Address) Superintendent Hopewell Village N.H.S. R.D. #1 Elverson, Penna. 19520																					
CONTRACT NO.		DISCOUNT TERMS		SHIP VIA																			
DELIVERY METHOD: Destination		TIME FOR DELIVERY ASAP		GOVT. S/L NO.																			
<table border="1"> <thead> <tr> <th>ITEM NO.</th> <th>ARTICLES OR SERVICES</th> <th>QUANTITY ORDERED</th> <th>UNIT</th> <th>UNIT PRICE</th> <th>AMOUNT</th> </tr> </thead> <tbody> <tr> <td>1</td> <td> To install Hydro-Pneumatic water supply system from existing well to Lloyd House, Hopewell Village N.H.S. Work shall include excavation, backfill, connection to existing line inside house, disinfecting pipeline, cleaning, capping spring supply, and necessary incidentals. Work to be completed in strict accordance with the specifications submitted and the General Provisions attached, within 30 calendar days following notice to proceed. Job to be completed to the complete satisfaction of the Superintendent or his designated representative. Night bidders were contacted, one bid was received which was determined by the Superintendent to be a reasonable bid and was accepted after concurrence with Regional Office on March 19, 1968. </td> <td>1</td> <td>Job</td> <td></td> <td>1748.95</td> </tr> <tr> <td colspan="5">TOTAL</td> <td>1748.95</td> </tr> </tbody> </table>						ITEM NO.	ARTICLES OR SERVICES	QUANTITY ORDERED	UNIT	UNIT PRICE	AMOUNT	1	To install Hydro-Pneumatic water supply system from existing well to Lloyd House, Hopewell Village N.H.S. Work shall include excavation, backfill, connection to existing line inside house, disinfecting pipeline, cleaning, capping spring supply, and necessary incidentals. Work to be completed in strict accordance with the specifications submitted and the General Provisions attached, within 30 calendar days following notice to proceed. Job to be completed to the complete satisfaction of the Superintendent or his designated representative. Night bidders were contacted, one bid was received which was determined by the Superintendent to be a reasonable bid and was accepted after concurrence with Regional Office on March 19, 1968.	1	Job		1748.95	TOTAL					1748.95
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THE ARTICLES OR SERVICES LISTED WERE RECEIVED ON 04/16/68 (DATE)																							
AND ACCEPTED ON 04/15/68 (DATE)		RECEIVING REPORT NO. 81																					
SIGNATURE: <i>Charles H. Seidel</i> Foreman III, Charles H. Seidel		SIGNATURE: <i>John C. W. Riddle</i> NAME AND TITLE: John C. W. Riddle Superintendent PURCHASING OFFICER																					
2A. RECEIVING REPORT																							

115V Single Phase Only, 60 Cycle
230V Single Phase Only, 60 Cycle
220/2 Three Phase Only, 60 Cycle
230V Three Phase Only, 60 Cycle

10 GPM SERIES — F & ALS SUBMERSIBLE PUMPS



SPECIFICATION TABLE

UNIT NO.	HP	PHASE	VOLTS	NO. STAGES	A	B	C	D	E	F	CPLO. STYLE
2 ALF 4	1/2	1	115 230	7	26 1/2	3 3/4	11 1/2	3 1/2	2 3/4	1	SPLINE
3 ALS 10	1/2	1	115 230	10	38 7/8	3 3/4	21 1/4	3 1/2	2 3/4	1	SPLINE
3 ALF 4	1/2	1	115 230	10	28 3/4	3 3/4	12 1/2	3 1/2	2 3/4	1	SPLINE
4 ALF 4	3/4	1	230	13	33 1/2	3 3/4	14 3/4	3 1/2	2 3/4	1	SPLINE
5 ALF 4	1	1	230	16	36 3/4	3 3/4	15 3/4	3 1/2	2 3/4	1 1/4	SPLINE
7 AL 30	2	1	230 220 440	30	38 7/8 56 3/4	3 3/4	25 1/4 22 3/4	3 1/2	2 3/4	1 1/4	SPLINE
8 AL 45	3	1	230 220 440	45	78 1/2 72 1/2	3 3/4	31 1/4 25 1/4	3 1/2	2 3/4	1 1/4	SPLINE

CABLE SELECTION TABLE

10 GPM SERIES		WIRE SIZE						
PHASE	HP	#14	#12	#10	#8	#6	#4	#2
115 Volts Single Phase	1/2	110	165	260	310	400	500	600
	1/2	80	130	195	240	300	360	420
	1/2	410	665	1,040	1,230	1,500	1,800	2,100
230 Volts Single Phase	1/2	315	490	775	960	1,200	1,440	1,680
	3/4	190	300	475	560	660	760	860
	1	165	260	415	460	500	540	580
	2	95	130	240	280	300	320	340
	3	100	155	245	285	315	345	375
220 Volts Three Phase	2	480	760	1,210	1,390	1,590	1,790	1,990
	3	350	550	875	1,095	1,220	1,345	1,470
440 Volts Three Phase	2	1,930	3,050	4,750	5,650	6,450	7,250	8,050
	3	1,390	2,200	3,300	3,950	4,450	5,000	5,550

Cable selection table — maximum cable length from pump motor to control box or starter near top of well.

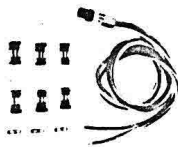
MOTOR LEAD ASSEMBLY SELECTION

10 GPM SERIES		WIRE SIZE						
PHASE	HP	#14	#12	#10	#8	#6	#4	#2
115 Volts Single Phase	1/2	25	40	65	105	165	260	400
	1/2	20	30	50	80	125	200	300
	1/2	100	165	260	415	650	1,050	1,600
230 Volts Single Phase	1/2	75	120	195	310	490	775	1,230
	3/4	45	75	120	190	300	480	760
	1	40	65	105	165	265	420	660
	2	25	40	60	95	150	240	385
	3	25	40	60	95	150	240	385
220 Volts Three Phase	2	120	190	300	480	765	1,215	1,905
	3	85	140	220	350	555	880	1,400
440 Volts Three Phase	2	480	790	1,210	1,990	3,050	4,750	7,250
	3	350	550	880	1,395	2,220	3,345	5,050

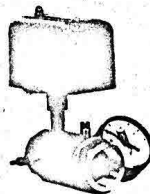
Maximum service supply wire length in feet from control box or starter to load center or transformer.



SYSTEMS FITTINGS PACKAGE NO. 1: For regular tanks include: pressure switch, drain fitting with tee, air control, pressure gauge, combination check valve and union with snifters.



THREE WIRE MOTOR LEAD: Assembly and splicing kit 48" long for 1/2 hp through 2 hp motor. For larger motors use 100" long kit.



SYSTEMS FITTING PACKAGE NO. 2: For air separator tanks include: brass combination check valve, control center, pressure gauge, snifter valve and pressure switch.

Deming submersible cable is available in bulk on reels or packaged to specific lengths with motor connector plug molded on one end. Cable is available with either plastic or rubber covering; twisted or parallel molded; two or three wire. See current Price Page for details.

CRANE CO. 4100 So. Kedzie, CHICAGO, ILL. 60632

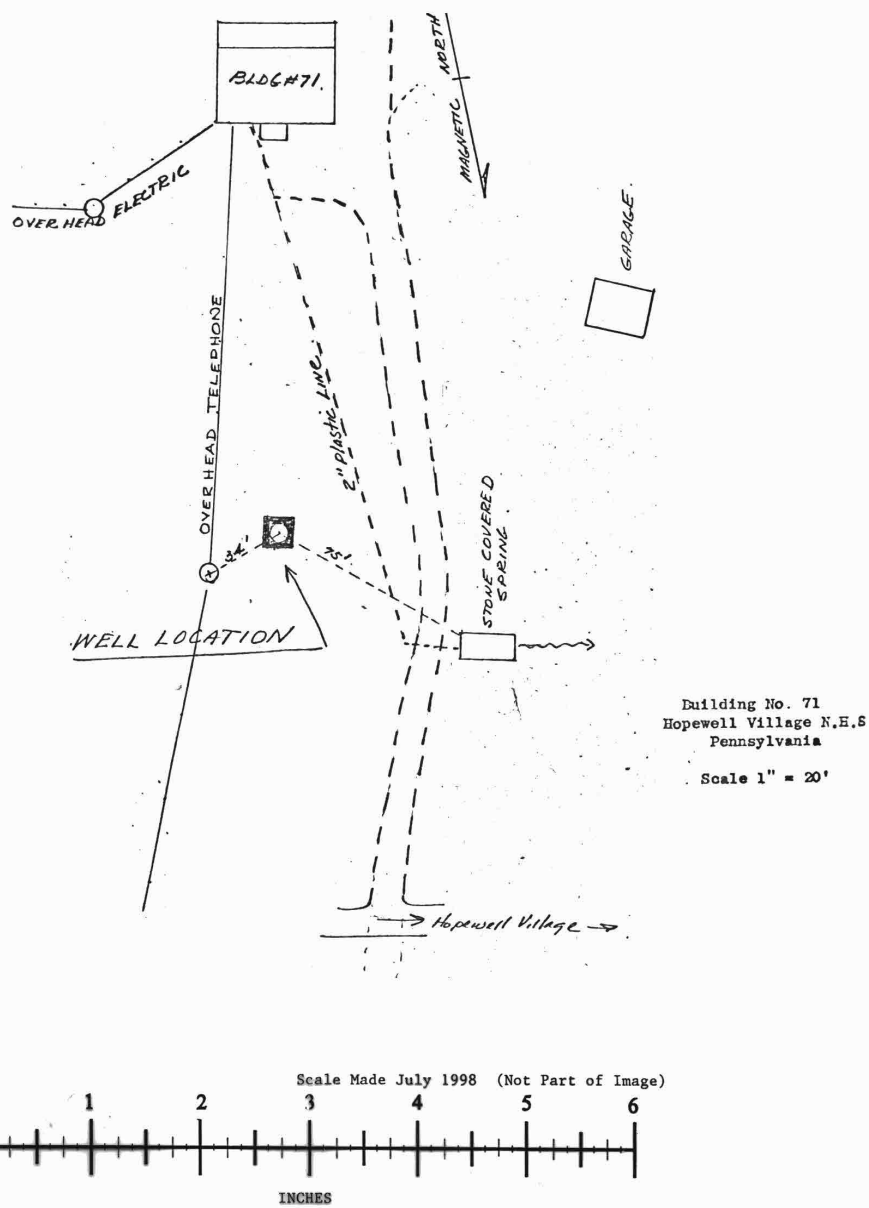
VALVES • PUMPS • FITTINGS • WATER TREATMENT • PIPING • PLUMBING • HEATING • AIR CONDITIONING

FACTORY — SALEM, OHIO 44460

RECEIVED

APR 23 1968 ROGERS, ARK. 72756

Form 866-25M



Docket Information

Number of Documents in Docket 15
Documents Dated from 6/9/1967 to 4/24/1968
Docket Compiled: 4/11/2011