

WELL #3
Cambridge, Iowa
2004

CERTIFYING PROPER EQUIPMENT INSTALLATION
AND
STATEMENT OF WARRANTY

Proper Equipment Installation:

Northway Well & Pump Co. is the manufacturer's representative for all of the equipment that was supplied for this project and that the equipment was installed in accordance with the manufacturer's installation manuals. Northway Well & Pump Co. certifies that the equipment is properly installed, lubricated, aligned, free from any undue stress imposed by connecting piping or anchoring and that it has been operated under full load conditions.

Statement of Warranty:

Northway Well & Pump Co. is responsible for warranty regarding the pump, motor, pitless unit and workmanship for one (1) year from date of acceptance of the well and pump as per the specification Section 11155 – 1.05 A.

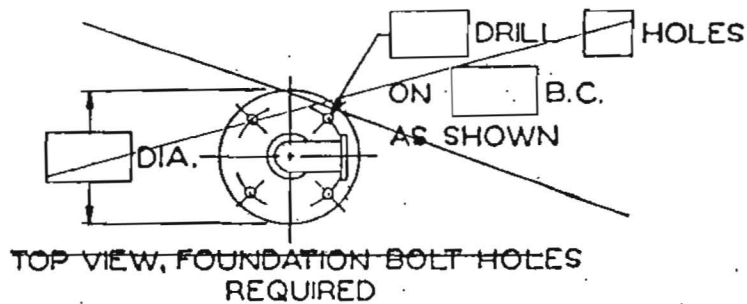
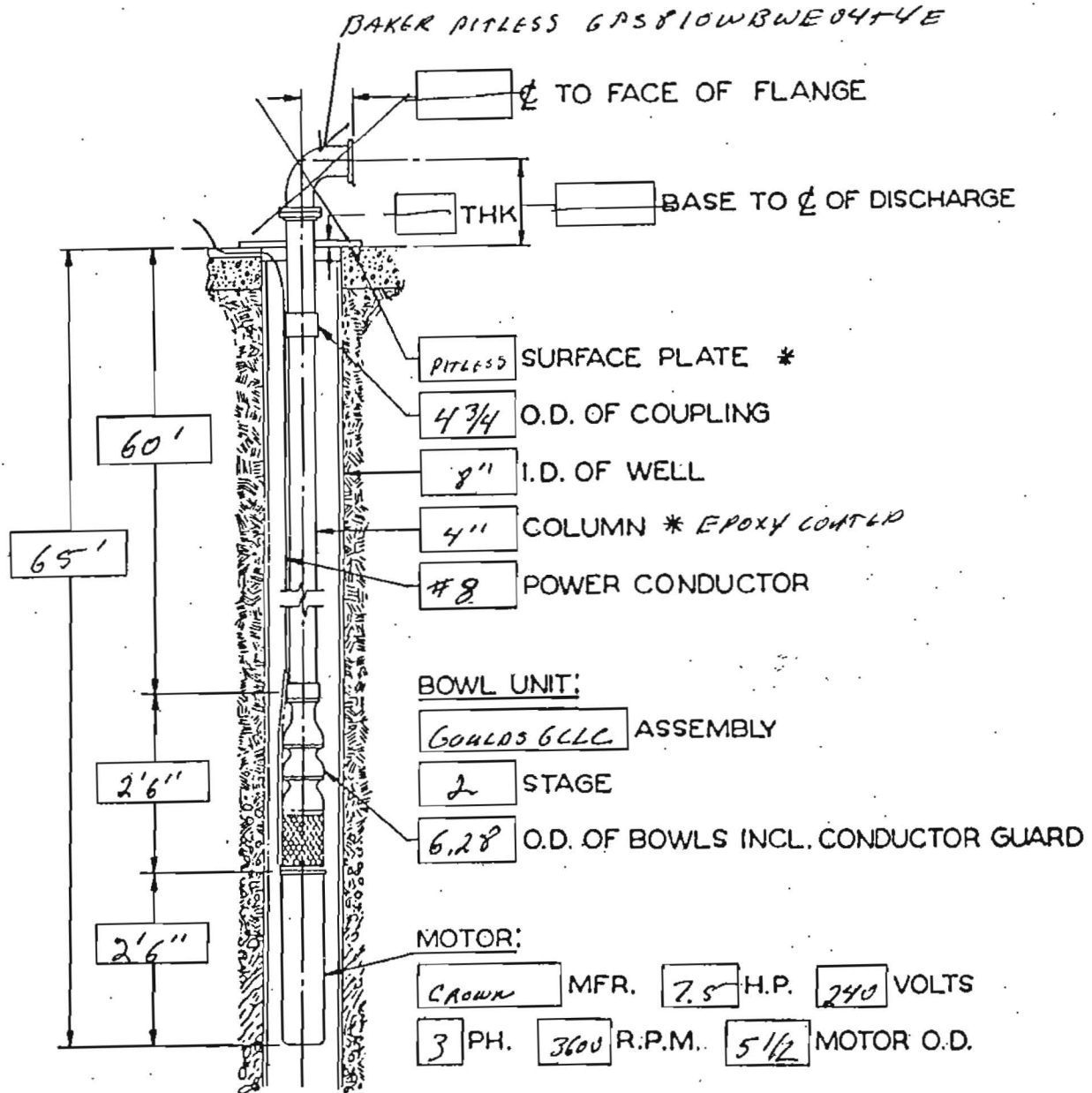
WELL #3

CAMBRIDGE, IOWA

2004

**OPERATION & MAINTANENCE
MANUAL**

CAMBRIDGE, IOWA WELL NO. 3



PUMP PERFORMANCE

U.S.G.P.M.	180
FT. TOTAL HD.	90
R.P.M.	3600

PUMP NO. _____
P.O. NO. _____

* = NOT BY CROWN PUMP

Northway Well & Pump Co.
Gale McIntosh
CAMBRIDGE #3

Goulds Turbine Pump Selection ver 6.
File: (untitled)
Date: 11/12/04

Vertical Turbine Pump
Submersible

A. Scope

This specification covers a deep well submersible turbine pump with above ground discharge and furnished with suitable driver and accessories as specified herein. The pumping unit shall be designed and furnished in accordance with the latest hydraulic institute and AWWA specifications for submersible turbine pumps.

B. Service Conditions

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a typical continuous turbine pump application. The pump shall be the product of, and manufactured by Goulds Pumps, Inc. Other manufacturers will be considered providing the unit offered is an approved equal in all respects to the brand and model preferred by the customer. Factory pump curves for alternate pumps shall be submitted with the bid.

C. Operating Conditions

Design conditions:.....180 Gallons per minute

Design head:.....90 Feet total dynamic head (TDH)

Minimum pump efficiency of:.....73.6 Percent

Maximum allowable speed:.....3450 RPM

Liquid to be pumped:.....Water

Pump bowl setting:.....60 Feet

Well diameter I.D.:.....8 Inches

D. Pump Construction

1. Bowl assembly: the intermediate bowls, and discharge adapter shall be flanged type constructed from close grained cast iron, and shall conform to ASTM designation A48, class 30. They shall be free from sand holes, blow holes, or other faults and must be accurately machined and fitted to close tolerances. The intermediate bowls shall have vitra glass lined waterways for maximum efficiency an wear protection. All intermediate bowls shall be of identical design for interchangeability.

A thrust ring shall be above the top impeller to prevent excessive vertical upthrust. Threaded intermediate bowls will be allowed on bowl sizes 8" and smaller. To ensure quality and consistency of product, cast iron components must be produced in a foundry owned by the pump manufacturer.

2. Impellers: the impellers shall be constructed from ASTM B584 Silicon

Bronze and shall be the enclosed type. They shall be free from defects and must be accurately cast, machined, balanced, and filed for optimum performance and minimum vibration. Impellers are to be standard product of the pump manufacturer and not contain special workmanship to temporarily increase efficiency. They shall be securely fastened to the bowl shaft with taper locks of 416SS.

3. The discharge adapter shall be provided with a non-soluble grease packed bronze bearing, extending through the top bowl into and through the discharge adapter and topped with a threaded cast iron cap or plug to protect the bearing from abrasives. The adapter should be such that the bearing can be easily removed through the top of the adapter housing.

4. The inlet motor adapter shall be a minimum of class 40 cast iron and shall contain an extra long bronze bearing. The inlet area shall have a net open area of at least four times the eye of the impeller and shall be protected with a 304 stainless steel screen.

5. Wear rings: pumps 6" and larger shall be fitted with replaceable wear rings of bronze material in the motor adapter and intermediate bowls. Wear rings shall have the minimum practical clearance to the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers.

6. The bowl shaft shall be constructed from ASTM 300 stainless steel

7. The motor coupling shall be of stainless steel and shall confirm to NEMA specifications and be capable of transmitting the total torque and total thrust of the bowl assembly in either direction of rotation.

E. Column Pipe

The column pipe shall be grade A steel pipe, in 21 feet random lengths, with the ends machined with 8 threads per inch with 3/4" taper. Inside diameter of the pipe shall be such that the head losses shall not be over 5 feet per 100 feet of pipe, and shall weigh not less than 10.790 lbs/ft. Pipe shall be connected with treaded sleeve type steel couplings. Pipe shall be epoxy coated ID & OD.

F. Submersible Cable # 8

Pump cable shall be sized to limit the voltage drop to no more than 5%. The cable shall have three separate conductors and a ground and shall be included in a single continuous jacketed assembly.

The insulation shall be water and oil resistant, and suitable for continuous immersion. The cable should be the length of the column pipe plus 20 feet to extend from the well plate to the pump electrical controller. The cable should be adequately secured to the column pipe by plastic ties, or other non metallic means, at 10 foot intervals.

G. Pitless Unit - Baker MFG 6PS810WBWEE04T4E

H. Submersible Electric Motor - Crown

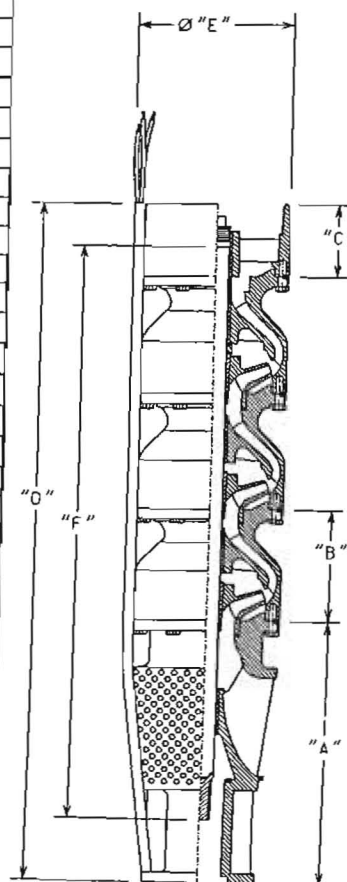
The motor shall be a heavy duty wet wound of NEMA design for 6" motors, 3600 RPM. The motor shall be capable of continuous operation under water at the specified conditions outlined above. A suitable thrust bearing shall be incorporated in the lower end of the motor adequate to receive the entire

hydraulic thrust load of the pump unit plus the weight of the rotating parts regardless of the direction of rotation. The motor shall have a 1.15 service factor, and suitable for use on a 230 volt, three phase, 60 cycle electric service.

The motor leads shall be protected against the pump end with a 304 stainless steel cable guard held in place with stainless steel banding. As the motor lead exit the top of the cable guard it shall be properly protected to prevent damaging or cutting the lead by the cable guard material.

Submersible Pump Data

Model	NEMA	"A"	"B"	"C"	"D"	"E"	"F"	Disch. Size	First Stage Wt.	Add'l Stage Wt.
5C	4	8.25	4.63	3.06	15.94	5.64	12.88	3.4	44	13
	6	10.56	4.63	3.06	18.25	5.64	13.63	3.4	49	13
5T	4	8.25	4.81	3.06	16.13	5.64	13.06	3.4	44	13
	6	10.56	4.81	3.06	18.44	5.64	13.81	3.4	49	13
5WA	4	8.38	4.00	3.06	15.44	5.64	13.25	3.4	44	13
	6	10.56	4.00	3.06	17.63	5.64	13.75	3.4	49	13
6C	4	8.44	5.13	3.75	17.31	6.28	13.63	3.4,5	50	17
	6	10.56	5.13	3.75	19.44	6.28	14.25	3.4,5	55	17
	8	12.50	5.13	3.75	21.38	6.28	15.38	3.4,5	60	17
6DH	4	4.94	5.50	3.75	14.19	5.94	10.63	3.4,5	41	16
	6	9.75	5.50	3.75	19.00	5.94	13.75	3.4,5	53	16
6RA	6	10.56	3.75	3.75	18.06	5.94	12.88	3.4	90	20
7C	6	12.88	6.38	3.63	22.88	7.50	18.50	5.6	75	28
	8	14.56	6.38	3.63	24.56	7.50	19.25	5.6	87	28
7RA	6	8.44	4.50	3.63	16.56	7.90	11.50	3.4	105	28
7T	6	12.88	7.09	3.63	23.59	7.50	19.06	5.6	78	31
	8	14.56	7.09	3.63	25.28	7.50	19.94	5.6	90	31
7WA	6	12.88	5.50	3.63	22.00	7.50	17.75	5.6	68	30
	8	14.56	5.50	3.63	23.69	7.50	18.50	5.6	80	30
8DH	6	12.88	7.38	3.63	23.88	7.90	19.25	5.6	125	34
	8	14.56	7.38	3.63	25.56	7.90	20.13	5.6	137	34
8I	6	12.88	6.38	3.63	22.88	7.90	18.13	5.6	90	33
	8	14.56	6.38	3.63	24.56	7.90	18.88	5.6	102	33
8RA	6	12.88	5.00	3.63	21.50	7.90	17.25	4.5,6	165	36
	8	14.56	5.00	3.63	23.19	7.90	18.13	4.5,6	177	36
8RJ	6	12.88	6.50	3.63	23.00	7.90	17.50	5.6	90	34
	8	14.56	6.50	3.63	24.69	7.90	18.88	5.6	102	34
9RA	6	12.88	5.50	3.63	22.00	7.90	17.50	4.5,6	185	46
	8	14.56	5.50	3.63	23.69	7.90	18.50	4.5,6	197	46
9RC	6	15.13	8.50	4.50	28.13	9.81	24.25	5.6,8	194	64
	8	13.25	8.50	4.50	26.25	9.81	21.50	5.6,8	206	64
	10	13.25	8.50	4.50	26.25	9.81	20.50	5.6,8	206	64
9T	6	15.13	9.25	4.50	28.88	9.81	25.00	5.6,8	200	70
	8	13.25	9.25	4.50	27.00	9.81	22.25	5.6,8	212	70
9RT	10	13.25	9.25	4.50	27.00	9.81	21.25	5.6,8	212	70
	6	15.13	6.63	4.50	26.25	9.81	22.38	5.6,8	158	58
9WA	8	13.25	6.63	4.50	24.38	9.81	19.63	5.6,8	170	58
	10	13.25	6.63	4.50	24.38	9.81	18.63	5.6,8	170	58
	8	13.25	9.25	4.50	27.00	10.00	22.00	6.8	185	65
10DH	10	13.25	9.25	4.50	27.00	10.00	22.00	6.8	190	65
	12	13.25	9.25	4.50	27.00	10.00	21.00	6.8	190	65
10RA	6	15.13	6.63	4.50	26.25	10.00	22.38	4.6,8	280	76
	8	13.25	6.63	4.50	24.38	10.00	19.63	4.6,8	285	76
	10	13.25	6.63	4.50	24.38	10.00	18.63	4.6,8	285	76
10RJ	6	15.13	8.40	4.50	28.03	10.00	23.38	6.8	187	60
	8	13.25	8.40	4.50	26.15	10.00	20.75	6.8	192	60
	10	13.25	8.40	4.50	26.15	10.00	19.75	6.8	192	60
10WA	6	15.13	7.63	4.50	27.25	10.00	23.38	4.6,8	183	56
	8	13.25	7.63	4.50	25.38	10.00	20.63	4.6,8	188	56
	10	13.25	7.63	4.50	25.38	10.00	19.63	4.6,8	188	56



PUMP DATA SHEET
Goulds Turbine 60 Hz

Goulds Turbine Pump Selection ver: 6.04
11/12/04

Selection file: (untitled)
Catalog: TURB60.MPC v 1.6.1

Curve: 3015

Design Point: Flow: 180 US gpm
Head: 90 ft

Pump: TURBINE - 3600 Size: 6CLC, (2 stages)
Speed: 3450 rpm Dia: 4.0625 in

Limits: Temperature: — °F Sphere size: 0.22 in
Pressure: 420 psi_g Power: — bhp

Specific Speed: Ns: 2100 Nss: —

Vertical Turbine: Bowl Size: 5.88 in Max Lateral: 0.38 in
Thrust K Factor: 2.1

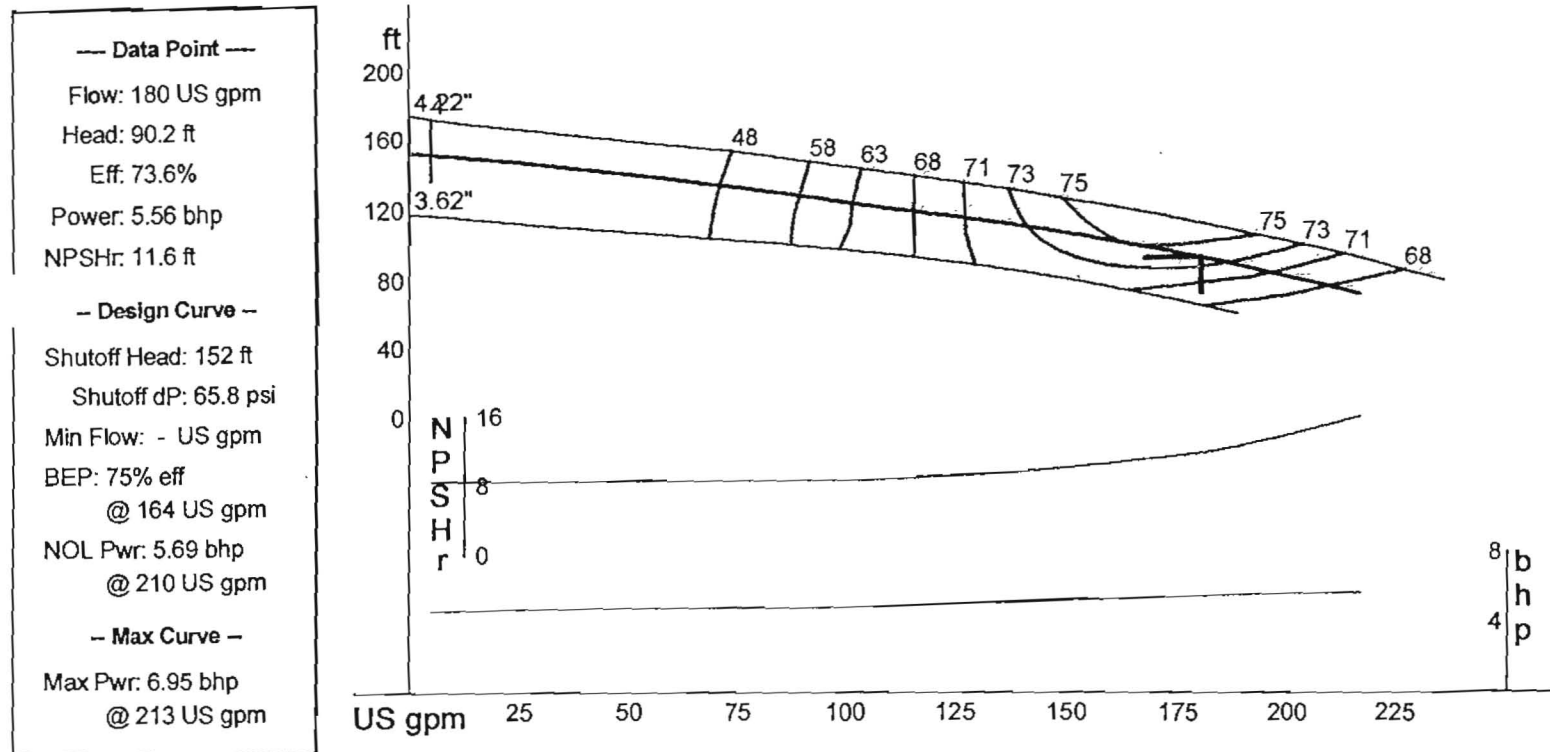
Motor: 7.5 hp Speed: 3600 Frame: 213T
NEMA Standard TEFC Enclosure
sized for Max Power on Design Curve

Fluid: Water Temperature: 60 °F
SG: 1
Viscosity: 1.122 cP
Vapor pressure: 0.2568 psi_a
Atm pressure: 14.7 psi_a

NPSHa: — ft

Piping: System: —
Suction: — in
Discharge: — in

Suction Size-4" Discharge Sizes-3",4"



--- PERFORMANCE EVALUATION ---

Flow	Speed	Head	Pump	Power	NPSHr	Motor	Motor	Hrs/yr	Cost
US gpm	rpm	ft	%eff	bhp	ft	%eff	kW		/kWh
216	3450	68.9	66.1	5.69	15.4				
180	3450	90.2	73.6	5.56	11.6				
144	3450	107	73.3	5.29	9.64				
108	3450	120	65.3	4.99	8.64				
72	3450	132	48.7	4.92	8.5				



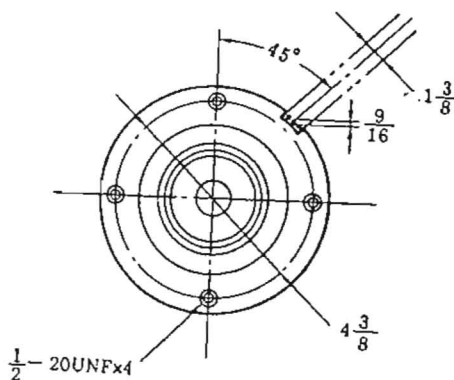
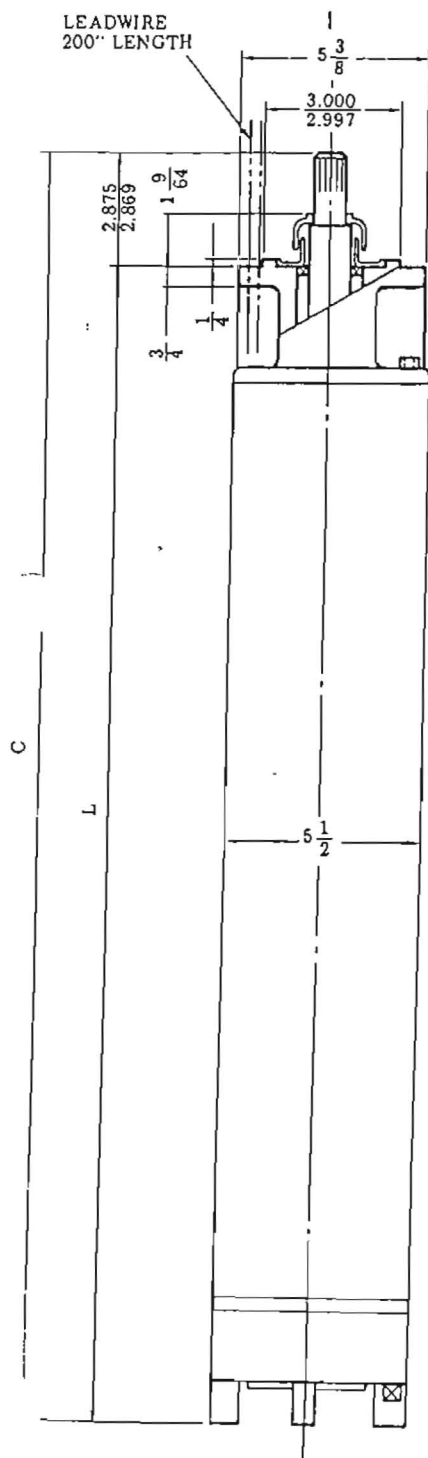
CROWN SUBMERSIBLE MOTORS

DIMENSIONS

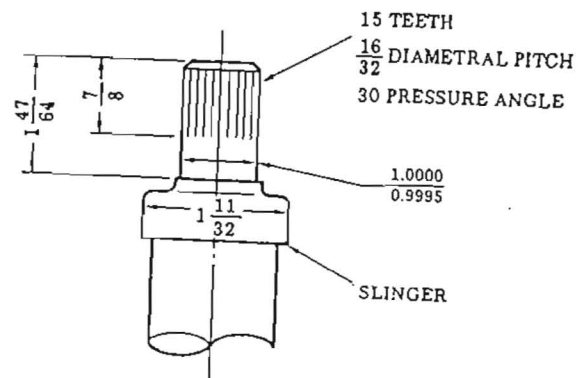
6-INCH 2 POLE SUBMERSIBLE MOTORS

Dimensions in inches

HP	PHASE	VOLT	Hz	THRUST (LBS)	C	L
5	1	230	60	3500	29.84	26.97
7-1/2	1	230	60	3500	32.79	29.92
10	1	230	60	3500	32.79	29.92
15	1	230	60	3500	36.33	33.46
5	3	230/460	60	3500	25.82	22.95
7-1/2	3	230/460	60	3500	27.67	24.80
10	3	230/460	60	3500	29.84	26.97
15	3	230/460	60	3500	32.79	29.92
20	3	230/460	60	3500	34.37	31.50
25	3	230/460	60	3500	39.09	36.22
30	3	230/460	60	3500	41.06	38.19
40	3	460	60	5000	43.42	40.55
50	3	460	60	5000	44.60	41.73
60	3	460	60	5000	44.60	41.73



6" MOUNTING FLANGE



1" SHAFT

ALL 6" MOTORS HAVE A 2.875" SHAFT PROJECTION

CROWN SUBMERSIBLE MOTORS (2 POLE)

PERFORMANCE AND APPLICATION DATA

WELL DIA. (INCH)	HP	VOLTS	HZ	PHASE	SERVICE FACTOR	WINDING CONNECTION RESISTANCE WITH MOTOR LEADS (Ω) at 68°F 20°C	RATED INPUT		SERVICE FACTOR INPUT		MAX. THRUST LOAD (LBS)	EFFICIENCY (%)			POWER FACTOR (%)			LOCKED ROTOR		OVERLOAD PROTECTION		STD FUSE SIZE	DUAL ELEMENT FUSE SIZE
							AMPS	WATTS	AMPS	WATTS		F.L.	3/4	1/2	F.L.	3/4	1/2	AMPS	CODE	STARTER SIZE	HEATER CODE (FURNAS AMB. COMP.)		
6"	5	230	60	1	1.15	R-Y, B-Y, R-B 2.172, 0.512, 2.627	23.8	4987	27.1	5735	3500	74.8	72.2	66.2	91.2	89.0	84.0	124	G	SEE OTHER DATA F1		80	35
"	7.5	230	60	1	1.15	R-Y, B-Y, R-B 1.401, 0.400, 1.774	35.2	7675	40.9	8950	3500	72.9	72.5	67.6	94.9	94.5	92.5	167	F	"		125	45
"	10	230	60	1	1.15	R-Y, B-Y, R-B 1.052, 0.316, 1.310	48.0	10135	54.0	11830	3500	73.6	73.1	67.8	93.2	91.8	88.9	202	E	"		175	60
"	15	230	60	1	1.15	R-Y, B-Y, R-B 0.678, 0.230, 0.850	70.8	15180	84.9	18050	3500	73.7	74.7	70.8	93.2	92.7	90.2	275	D	"		250	100
"	5	230	60	3	1.15	DELTA 0.806	14.8	4857	16.4	5520	3500	76.8	73.8	67.3	82.5	77.5	68.7	110	K	1	K58	45	20
"	5	460	60	3	1.15	" 3.050	7.4	4857	8.2	5520	3500	76.8	73.8	67.3	82.5	77.5	68.7	55	K	0	K43	25	10
"	5	380	50	3	1.0	" 3.050	8.6	4825	-	-	3500	77.3	76.3	71.9	85.3	81.4	73.3	52	H	1	K50	25	10
"	7.5	230	60	3	1.15	" 0.651	21.8	7127	24.4	8140	3500	78.5	76.1	70.4	81.8	77.1	68.1	144	J	1	K64	70	30
"	7.5	460	60	3	1.15	" 2.430	10.9	7127	12.2	8140	3500	78.5	76.1	70.4	81.8	77.1	68.1	72	J	1	K54	35	15
"	7.5	380	50	3	1.0	" 2.430	12.9	7127	-	-	3500	78.5	78.2	74.7	84.6	81.0	73.0	67	G	1	K56	40	15
"	10	230	60	3	1.15	" 0.448	28.2	9407	32.0	10730	3500	79.3	76.9	71.3	82.8	78.2	69.6	208	K	1-3/4	K68	80	40
"	10	460	60	3	1.15	" 1.619	14.3	9407	16.0	10730	3500	79.3	76.9	71.3	82.8	78.2	69.6	104	K	1	K58	40	20
"	10	380	50	3	1.0	" 1.619	16.5	9395	-	-	3500	79.4	79.1	75.7	85.3	82.0	74.4	90	G	1	K60	50	20
"	15	230	60	3	1.15	" 0.312	41.4	13700	46.2	15800	3500	81.7	79.8	75.0	83.2	78.4	69.1	320	K	2	K74	125	60
"	15	460	60	3	1.15	" 1.074	20.7	13700	23.1	15800	3500	81.7	79.8	75.0	83.2	78.4	69.1	160	K	1-3/4	K63	60	30
"	15	380	50	3	1.0	" 1.074	24.6	13780	-	-	3500	81.2	81.2	78.5	86.0	82.5	74.5	147	H	1-3/4	K67	70	30
"	20	230	60	3	1.15	" 0.258	53.0	17930	60.0	20650	3500	83.2	82.2	78.5	84.9	80.2	70.8	392	J	2-1/2	K77	175	70
"	20	460	60	3	1.15	" 0.861	26.5	17930	30.0	20650	3500	83.2	82.2	78.5	84.9	80.2	70.8	196	J	2	K67	90	35
"	20	380	50	3	1.0	" 0.861	31.7	18240	-	-	3500	81.8	82.8	81.4	87.5	84.2	76.4	186	G	2	K70	100	35
"	25	230	60	3	1.15	" 0.210	67.2	22470	75.4	25800	3500	83.0	81.6	77.5	83.9	78.7	68.9	530	K	3	K83	200	90
"	25	460	60	3	1.15	" 0.666	33.6	22470	37.7	25800	3500	83.0	81.6	77.5	83.9	78.7	68.9	265	K	2	K72	100	45
"	25	380	50	3	1.0	" 0.666	39.7	22720	-	-	3500	82.1	82.6	80.6	86.9	83.0	74.3	227	G	2	K74	125	45
"	30	230	60	3	1.15	" 0.166	80.8	27130	90.6	31160	3500	82.5	81.0	76.8	84.3	79.0	69.0	610	K	3	K86	250	110
"	30	460	60	3	1.15	" 0.554	40.4	27130	45.3	31160	3500	82.5	81.0	76.8	84.3	79.0	69.0	305	K	2-1/2	K74	125	50
"	30	380	50	3	1.0	" 0.554	47.8	27230	-	-	3500	82.2	82.7	80.7	86.6	82.1	72.7	260	G	2-1/2	K76	150	50

DWG.
 SIZE E

DWG.
 NO.:

P8900T0

Order No: **4PS810WBWE04T4**

These passages will
 clear a 1.49 dia. rigid rod
 parallel to the well casing.
 (2) places

This information is confidential to
 Baker Mfg. Co. (Baker).
 It can not be disclosed to others
 without the written consent of Baker.

B" SS

Proj#2002

DATE: 5/1/01

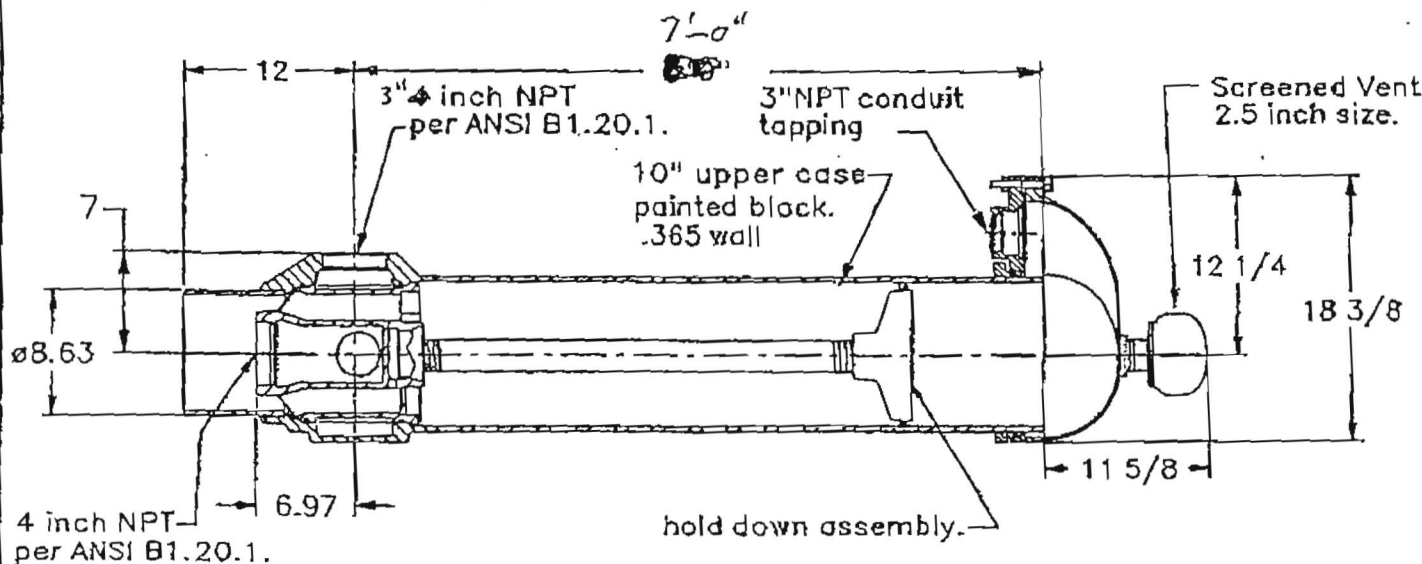
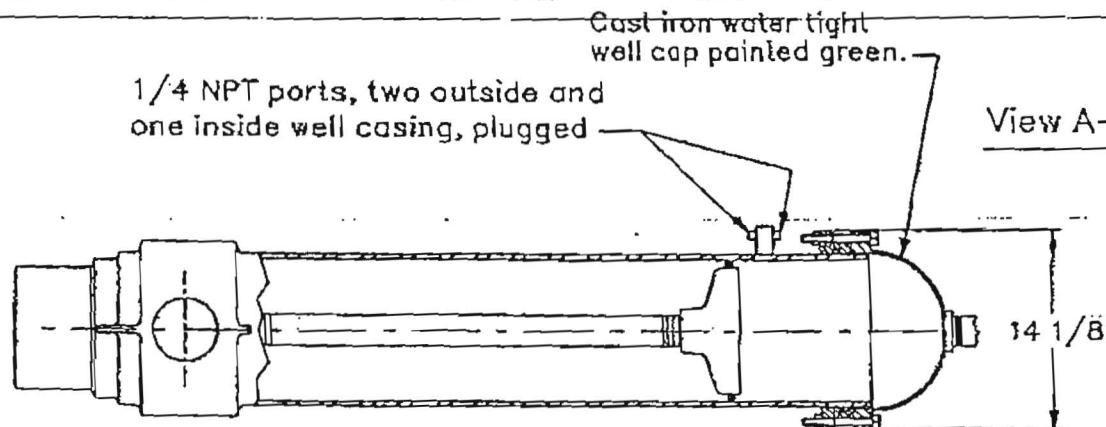
Baker Mfg. Co.
 133 Enterprise St., Evansville, WI, USA 53536

This pitless unit conforms to the Recommended Standards for
 Water Works, Great Lakes Upper Mississippi River Board of State
 Public Health & Environmental Managers.

This unit will be completely assembled before shipping.
 Maximum rated discharge pressure is 300 psi.

30,800 lb. lift out load rating.

Spool and discharge body are (lead free) galvanized.



Cambridge

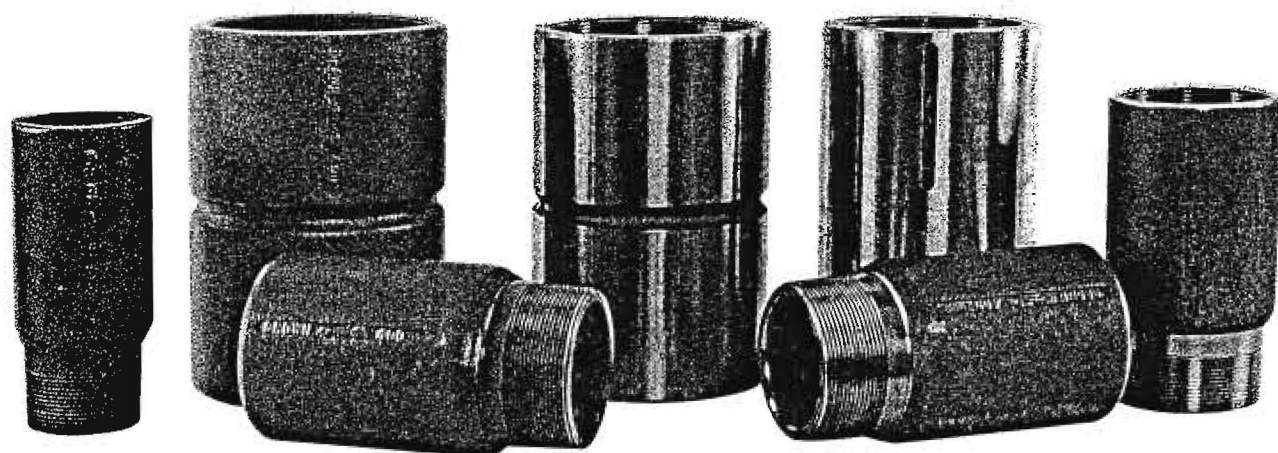
REVISION
 Release to sales
 5/1/01

DWG. NO.
P8900T0



CROWN PUMP

CHECK VALVES



CROWN CHECK VALVES WITH HEAVY CAST BODIES AVAILABLE IN:

LEAD-FREE BRONZE

DUCTILE IRON

NI-RESIST

316 STAINLESS STEEL

ALL INTERNAL COMPONENTS ARE CORROSION-RESISTANT STAINLESS STEEL

VALVE SEAL OF DURABLE NITRILE

SPECIAL THREADS AVAILABLE ON REQUEST

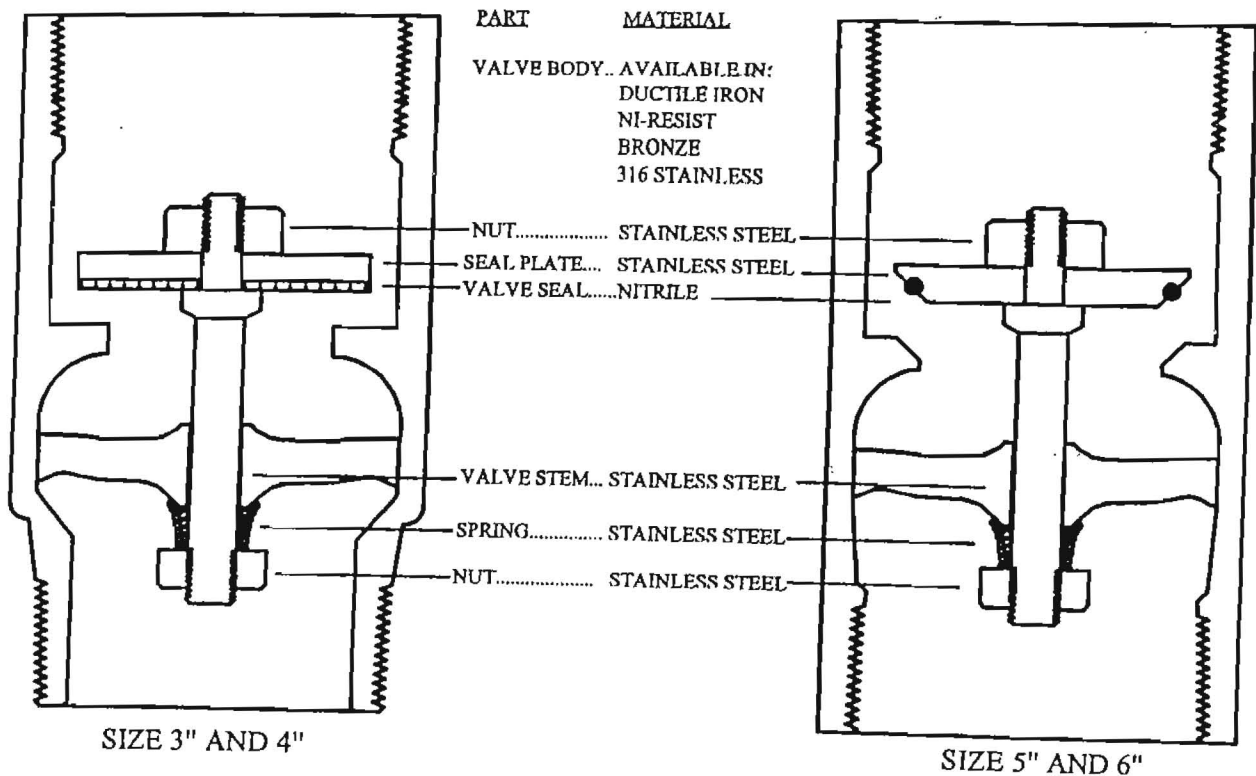
BREAK-OUT PLUGS AVAILABLE TO DRAIN RISER PIPE WHEN PULLING PUMP

**CROWN PUMP CORPORATION
101 BIVAR, DE LEON, TEXAS 76444 (817) 893-5700**

GENERAL SPECIFICATIONS

Check valves shall be of the in-line column type, specifically designed for submersible pump installations and manufactured by a submersible pump manufacturing company. All internal working parts shall be of stainless steel and the valve seal shall be of a durable nitrile to provide a positive shut-off. Valves shall be of the spring loaded design which will open immediately and automatically with flow and close silently upon cessation of flow. Valves shall be maintenance free and capable of providing long dependable life under repeated daily operation. Valve body shall be of heavy cast material (bronze, ni-resist, ductile iron, 316 stainless steel) of sufficient strength to support the full weight of the submersible pump, motor and column pipe filled with water. Valve body shall be of sufficient thickness to be drilled and tapped, if required, for installation of a break-off plug to drain the column of water for pulling of the submersible pump. Valve shall be as manufactured by Crown Pump Corporation.

MAXIMUM VALVE DIMENSIONS			
SIZE	O.D.	LENGTH	WEIGHT
3"	4.30	8.875	13#
4"	5.35	9.500	23#
5"	6.90	11.250	36#
6"	7.70	11.250	42#



CROWN WIRE & CABLE CO., INC.

P.O. BOX 945
MILLVILLE, N.J. 08332-0945
UNITED STATES OF AMERICA

Toll Free: 800 222-4597/888.825.2574

Phone: 856.825.2574

Worldwide Fax: 856.327.8618

Email: LouieBell@crownwire.com

Submersible Pump Cable

Insulation: HIGH DIELECTRIC PVC

Jacket: Heavy Duty PVC

Sizes: 8 – 500 MCM

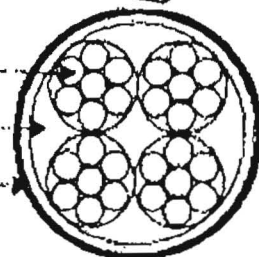
UL Listed 600 Volts VW – 1 Rated, 90 C Dry, 75 C Wet



Stranded Copper Conductors

THHN (PVC/NYLON)

PVC Jacket



1.0 Scope:

1.1

This specification covers Two, three, and four conductor Cables having VW – 1 THHN/ THWN (PVC Nylon) conductors With an overall polyvinyl chloride (PVC) jacket, conforming to Article 318 and Article 340 "Power and Control Cable of the 1981 National Electrical Code, and Subject 1277 of Underwriters Laboratories, Inc meets the Requirements of the 70,000 BTU Test Per IEEE-383 and shows reserve capabilities by also Passing the 210,000 BTU flame test. Rated 600 Volts, 90 C dry and 75 C wet.

1.2

Use:
UL Listed and OSHA acceptable. Recognized for use in Class 1, Division 2 Hazardous locations and for installation in trays, Wireways, troughs, channels, ducts, and conduit. Specifically approved for direct burial, wet or dry locations and sunlight resistant rated Designed to supply power to motors, or for connection To other power devices.

2.0

2.1

CONSTRUCTION:
Conductors:
Bare, soft annealed copper per ASTM B-3 SIZES 8 THROUGH 2 AWG Concentric stranded, class B (7 strands) ASTM B-8 and UL-83 table 4.1 SIZES 250 THROUGH 500MCM Concentric stranded, Class B (37 strands) ASTM B-8 and UL-83 table 4.1

2.2

INSULATION:
HIGH DIELECTRIC POLY VINYL CHLORIDE UL-83 table 13.1 (THWN 75 C) UL-83 table 14.1 (THHN 90 C) THICKNESS UL-83 table 21.5

2.3

INSULATION ARMOR:
NYLON UL-83 paragraph 35.1 THICKNESS UL-83 table 21.5

2.4

Cable Assembly:
SIZES 8 THROUGH 4/0 AWG Three or more conductors are assembled Round with fillers as needed. A tape binder Is applied over the assembly. Two conductors Are assembled flat parallel (round, with fillers as needed, is available upon request.) SIZES 250 THROUGH 500 MCM Conductors are assembled round with fillers as needed. A tape binder is applied over the Assembly.

2.5

Overall Jacket:
Polyvinyl chloride UL-62 part 22 class 12 Thickness specified herein

2.6

Color Code:
Black insulation with ICEA method 4 printed number code.

2.7

Markings:
Ink print on jacket (size) AWG or Submersible pump cable. THHN or THWN cdrs. Sunlight Resistant 600V (UL) Direct Burial. Indent print on other side of jacket (number of conductors)

2.8

Construction Options:
Consult factory for cable specifications with Ground wire.

CROWN WIRE & CABLE CO., INC.

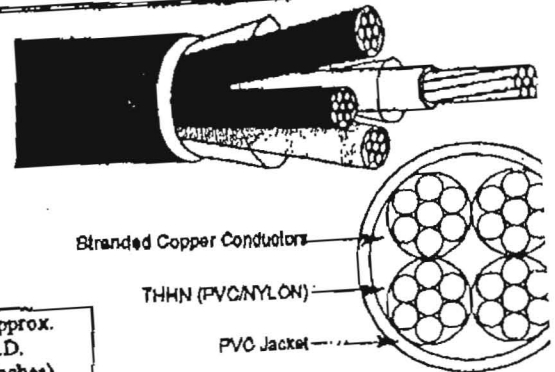
P.O. BOX 945
MILLVILLE, N.J. 08332-0945
UNITED STATES OF AMERICA

Toll Free: 800 222-4597/888.825.2574

Phone: 856.825.2574

Worldwide Fax: 856.327.8618

Email: LouieBell@crowwire.com



Ground Wire Data

Size (Awg)	Strands NO./O.D. (Inches)
10	7/.0383
8	7/.0486
6	7/.0612
4	7/.0772
3	7/.0867
2	7/.0974

Conductor Data

Size	Strands NO./O.D. (Inches)	PVC JKT (Inches)	Nylon JKT (Inches)	Approx. O.D. (Inches)
8	7/.0486	.030	.005	.218
6	7/.0612	.030	.005	.258
4	7/.0772	.040	.006	.325
2	7/.0974	.040	.006	.384
1	19/.0664	.050	.007	.447
1/0	19/.0745	.050	.007	.487
2/0	19/.0837	.050	.007	.532
3/0	19/.0940	.050	.007	.582
4/0	19/.1055	.050	.007	.638
250	37/.0823	.060	.008	.706
300	37/.0900	.060	.008	.759
350	37/.0973	.060	.008	.809
400	37/.1040	.060	.008	.854
500	37/.1162	.060	.008	.937

Cable Data

Size	NO. OF Conds	Overall Jacketed Thickness (Mils)	Approx O.D. (Inches)	Approx. WT 1000ft (Pounds)
8 AWG	2	60	.567	248
W/10AWG	3	60	.600	315
Ground	4	60	.658	384
6 AWG	2	60	.645	350
W/8 AWG	3	60	.684	451
Ground	4	60	.753	557
4 AWG	2	60	.787	485
W/8 AWG	3	80	.876	704
Ground	4	80	.983	879
2 AWG	2	80	.947	737
W/6 AWG	3	80	1.005	1029
Ground	4	80	1.107	1287
1 AWG	2	80	1.075	914
W/6 AWG	3	80	1.143	1203
Ground	4	80	1.261	1643
1/0 AWG	2	80	1.157	1180
W/6 AWG	3	80	1.231	1517
Ground	4	80	1.360	1931
2/0 AWG	2	80	1.247	1409
W/6 AWG	3	80	1.328	1831
Ground	4	80	1.469	2426

Size	NO. OF Conds	Overall Jacketed Thickness (Mils)	Approx O.D. (Inches)	Approx. WT 1000ft (Pounds)
3/0 AWG	2	80	1.347	1748
W/4AWG	3	80	1.435	2249
Ground	4	80	1.589	2879
4/0 AWG	2	80	1.459	2091
W/4AWG	3	80	1.556	2739
Ground	4	110	1.784	3609
250 MCM	2	80	1.598	3025
W/4 AWG	3	110	1.762	3319
Ground	4	110	1.950	4248
300 MCM	2	110	1.761	2774
W/3 AWG	3	110	1.876	4084
Ground	4	110	2.076	5177
350 MCM	2	110	1.861	3365
W/3 AWG	3	110	1.983	4315
Ground	4	110	2.196	5695
400 MCM	2	110	1.951	3473
W/3 AWG	3	110	2.080	4945
Ground	4	110	2.305	6443
500 MCM	2	110	2.170	4029
W/2 AWG	3	110	2.320	5980
Ground	4	110	2.570	7668

This data listed above is approximate and subject to normal Manufacturing tolerance. Specifications are subject to change Without notice.

'ALTITUDE' Bottom Connected Gauge

A utility gauge designed for use where water Depth or Head Pressure and/or equivalent PSI Pressure need to be known. This gauge is suitable for air, water, oil, gas or any other media not corrosive to brass. Other connection locations, mounting styles and accessories available upon request. A complete explanation of use of this gauge is available upon request.

GENERAL DIMENSIONS

3 1/2" or 4 1/2" Dial Size, 1/2"NPT Bottom Conn

GENERAL SPECIFICATIONS:

Black Steel Case With Chroma Bezel
Dual Scale Dial with Adjustable Red Set Hand
Brass Socket And Movement
Phosphor Bronze Bourdon Tube
Dry Non-Fillable
3-2-3 % Accuracy
Ambient Temperature: -50 to 160°F

DIAL SCALE:

DUAL SCALE: PSI & FEET of Water Col STANDARD

SINGLE SCALE: FEET ONLY AVAILABLE

OTHER: (metric, etc)

BY SPECIAL REQUEST

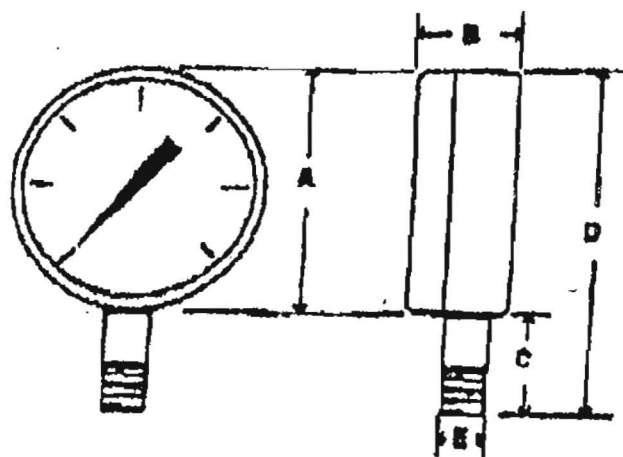
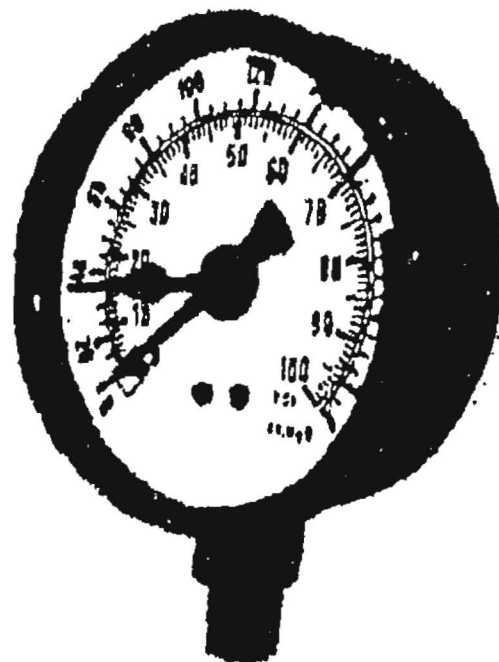
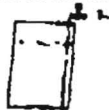
RANGE	CODE	Major Inc.	FT of Water
0/15	B	2 PSI	34'
0/30	C	5 PSI	70'
0/60	D	10 PSI	140'
0/100	E	20 PSI	230'
0/160	F	20 PSI	370'
0/200	G	40 PSI	460'
0/300	H	50 PSI	690'

Note:

- For Tower or tank Depth or Head Pressure Gauge should be mounted at the lowest possible point as Pressure/Depth reading is from gauge level up.



- For Well Depth or tank depth where gauge is mounted above maximum fill line, gauge must be mounted on air line going into top of tank (or Well) and straight down vertically to maximum depth to be measured.



		A	B	C	D	E
3 1/2"	In.	3.53"	1.14"	1.07"	4.55"	1/4
Dial	MM	90	29	26	116	MMPT
4 1/2"	In.	4.89"	1.16"	1.16"	6.05"	1/4
Dial	MM	124	29	30	154	MMPT

Site identification		Drill method
Property Owner <u>City of Cambridge</u> Well Number <u>3</u>		☒ rotary ☐ auger ☐ cable other _____
Address <u>N, E, Corner of Third & River Street</u>		Hole size hole size continued
Tenant <u>City of Cambridge, Iowa</u>	<u>18</u> inch from <u>0</u> ft to <u>101</u> ft <u> </u> inch from <u> </u> ft to <u> </u> ft <u> </u> inch from <u> </u> ft to <u> </u> ft	
Well Depth <u>100</u> ft	Date completed <u>11 / 10 / 04</u>	Record all depth measurements from ground level (GL). Use (+) for above GL measurements.
Casing		
		Drive shoe (☒) Pitless adapter (☒) Size (ID/OD) Type / Wall Depth top Depth bottom Amount (length)
		8" ID .322 wall +2 80 82
Perforated or slotted casing? (☒ yes/no) Perforated / slotted from <u> </u> ft to <u> </u> ft Perforated / slotted from <u> </u> ft to <u> </u> ft		
Casing grouted? (☒ yes/no) Placement method <u>Pressure Grout Pipe</u>		
Type	Depth Top	Depth Bottom Amount (vol/wt)
Well Grout	6	34 2 yards
Well screen? (☒ yes/no)		
Diameter	Slot size	Depth Top Depth Bottom Length Material
8	.080	80 100 20 S.S.
Bottom capped (☒ yes/no) with <u>Stainless Steel Plate</u>		
Seals/Packers (☒ yes/no) kind <u>Bentonite</u> depth <u>34' to 39'</u> ft		
Gravel packed (☒ yes/no) from <u>39</u> ft to <u>100</u> ft <u> </u> type # <u>#3 Northern</u> amount <u>6 Tons</u>		
Well developed? (☒ yes/no)		
Explain Mechanically Surged & Pump Surged (pumped, airlifted, bailed) for <u>10</u> hrs at <u>250</u> GPM.		
Pump installed? (☒ yes/no) Date <u>12 / 14 / 04</u>		
Installer's name <u>Mary Anderson</u>		
Type of pump	<u>Submersible</u>	Depth to intake <u>62'</u> ft
Pump diameter	<u>6"</u>	Rated capacity <u>180</u> GPM
Water information		
Aquifer:	☒ sand/gravel ☐ limestone ☐ sandstone	
Main water-supply zone	from <u>38</u> ft to <u>100</u> ft ☐ seepage well	
Static water level	<u>30</u> ft (below/above) GL; ☒ tape ☐ airline ☐ E-line ☐ estimate	
Pumping water level	<u>40</u> ft below GL; ☒ tape ☐ airline ☐ E-line ☐ estimate	
At yield of	<u>180</u> GPM; ☐ orifice ☒ volumetric ☐ estimate	
Measurements taken at	<u> </u> : <u> </u> (AM/PM) Date <u>12 / 14 / 04</u>	
Water quality test? (☒ yes/no) Date tested <u>11 / 10 / 04</u>		
Tested by <u>Keystone Lab.</u>		
Remarks (including depth of lost drilling fluids, materials, or tools)		
Well use		
☐ Domestic	☒ Municipal	☐ Commercial
☐ Livestock	☐ Public supply	☐ Monitoring
☐ Test well	☐ Irrigation	☐ Other _____

(explain)

STATE OF IOWA
DEPARTMENT OF NATURAL RESOURCES
Water Supply Section
401 S.W. 7th St., Suite M
DES MOINES, IOWA 50309-4611

WATER SUPPLY
CONSTRUCTION PERMIT

City of Cambridge
P.O. Box 583
Cambridge, IA 50129-1900

Permit No.: 2004-368W
Project No.: W2003-224
PWSID No.: 8509069

In accordance with the provisions of Sections 455B-173.9 and 455B-174.4, Code of Iowa, and 567 IAC 43.3 (455B) of the Iowa Administrative Code, the Director of the Department of Natural Resources does hereby issue a permit for the construction of:

830 ft of 8 inch PVC (alternate-DIP) and 9,630 ft of 6 inch PVC (alternate-DIP) water main for the distribution system portion of the City's 2004 SRF project.

NOTICE: The issuance of this construction permit is based SOLELY on the engineer's certification that all aspects of design included in the project meet the requirements of all applicable state and federal laws and regulations. An advisory review of the plans and specifications may be made at a later date.

The construction of the project shall be initiated within one year of issuance of this permit or this permit is no longer valid. Within thirty days after completion of construction, the permit holder shall submit a certification by a registered professional engineer that the project was completed in accordance with the approved project documents.

Pursuant to Section 455B.174.4, Code of Iowa, you have the right to appeal any condition of this permit by filing with the Director of the Department of Natural Resources a notice of appeal and request for administrative hearing within thirty days of receipt of this permit.

If you have any questions, contact Daryl Enfield, P.E., at 515/725-0285 or e-mail at daryl.enfield@dnr.state.ia.us.

For the Department of Natural Resources

Jeffrey R. Vonk, Director

By: *Roy D. Ang PE*
ENVIRONMENTAL SERVICES DIVISION

Date: May 20, 2004

cc: Fox Engineering Associates, Inc.; 1601 Golden Aspen Dr., Suite 103; Ames, IA 50010
Field Office # 5, Des Moines
File: PWSID #: 8509069
File: FS-85-03-DWSRF-012

10/26/2004

*Cambridge***Johnson screens™**

A Weatherford Company

WELL SCREEN SUBMITTAL DATA

CLIENT: NORTHWAY WELL & PUMP
 PROJECT: 8"PS/100' STND CONSTRUCTION

Material	304 Stainless			
Nom Size	8	PS	200	mm
Estimated Total Well Depth	100	ft	30	meters
Estimated Feet of Screen	20	ft	6	meters
Design Slot Size	0.080	in	2.0	mm
Approx. Outside Diameter	8.69	in	221	mm
Screen Barrel Inside Diameter	8.08	in	205	mm
Approx. Clear ID at Fittings	7.87	in	200	mm
Approx. Weight Per Ft	7	lbs	3	kg
Wire Width	0.116	in	2.9	mm
Wire Height	0.144	in	3.7	mm
Calc. Collapse Strength *	64	PSI	4	kg/sq.cm
Open Area	40.8%			
Intake Area	134	sq.in./ft	2,830	sq.cm./meter
Transmitting Capacity-at 0.1 ft/sec	41	gpm/ft	9	lps/meter
Support Rod Diam	0.153	in	3.9	mm
No Rods	44			
Cross Sectional Rod Area	0.95	sq.in.	6.13	sq.cm.
Design Yield Strength	30,000	PSI	2,109	kg/sq.cm
Calc. Tensile Strength *	24,200	lbs	11,000	kg
Max. Recommended Hang Wt. *	12,100	lbs	5,500	kg
Column Load **	23,700	lbs	10,800	kg

* A broad range of site conditions can impact the physical strength requirements for a successful screen installation. Consult Johnson Screens with questions regarding the parameters presented above as they relate to your specific requirements.

** Vertical weight on screen that should not be exceeded without consulting manufacturer. Column load calculations should include some allowance for gravel pack contribution.

Johnson screens™

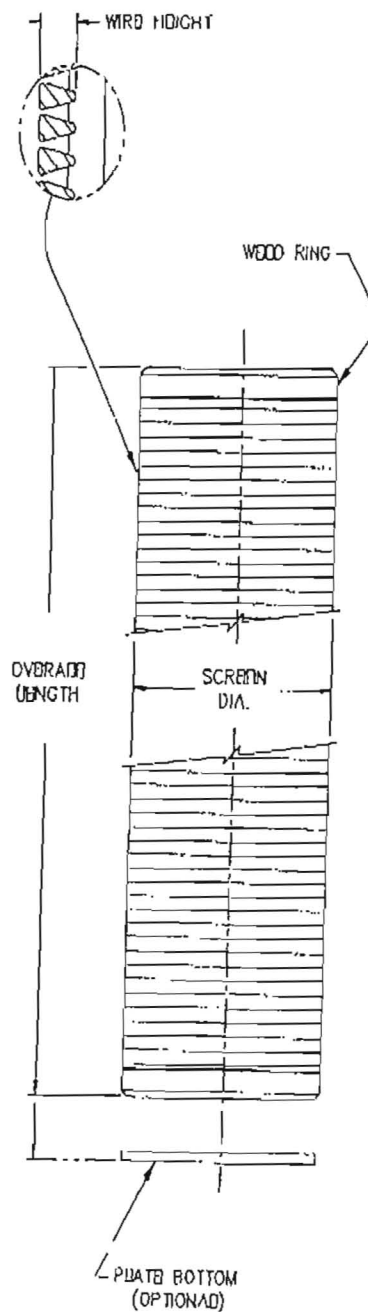
A Weatherford Company

SCREEN INFORMATION		
CUSTOMER:	NORTHWAY WELL & PUMP	
REFERENCE:	8"PS/100' STND CONSTRUCTION	
DIAMETER (IN.)	8	PS
MATERIAL:	304 Stainless	
COLLAPSE	64	PSI
SLOT SIZE	0.080	IN
OPEN AREA %	40.82%	
ROD AREA	0.950	SQ IN
HANGING WT ¹	12,118	LB
¹ MAXIMUM RECOMMENDED HANGING WEIGHT FOR THE TOP SCREEN JOINT		
LENGTH	20	FULL
NO. OF PIECES	1.00	
TOP FITTING:	WR	
BTM FITTING:	PB	

* A broad range of site conditions can impact the physical strength requirements for a successful screen installation. Consult Johnson Screens with questions successful screen installation. Consult Johnson Screens with questions regarding the parameters presented above as they relate to your specific requirements.

** Vertical weight on screen that should not be exceeded without use of rigid centralizers!

Prepared by Waterwell Customer Service. Subject to Johnson Screens Standard Terms and Conditions.



THIS DRAWING AND DESIGN DATA IS CONFIDENTIAL IN NATURE AND IS THE PROPERTY OF JOHNSON SCREENS, ST. PAUL, MN, USA, AND SHALL NOT BE REPRODUCED IN ANY MANNER OR USED FOR ANY PURPOSE WHATSOEVER EXCEPT BY WRITTEN PERMISSION OF JOHNSON SCREENS.

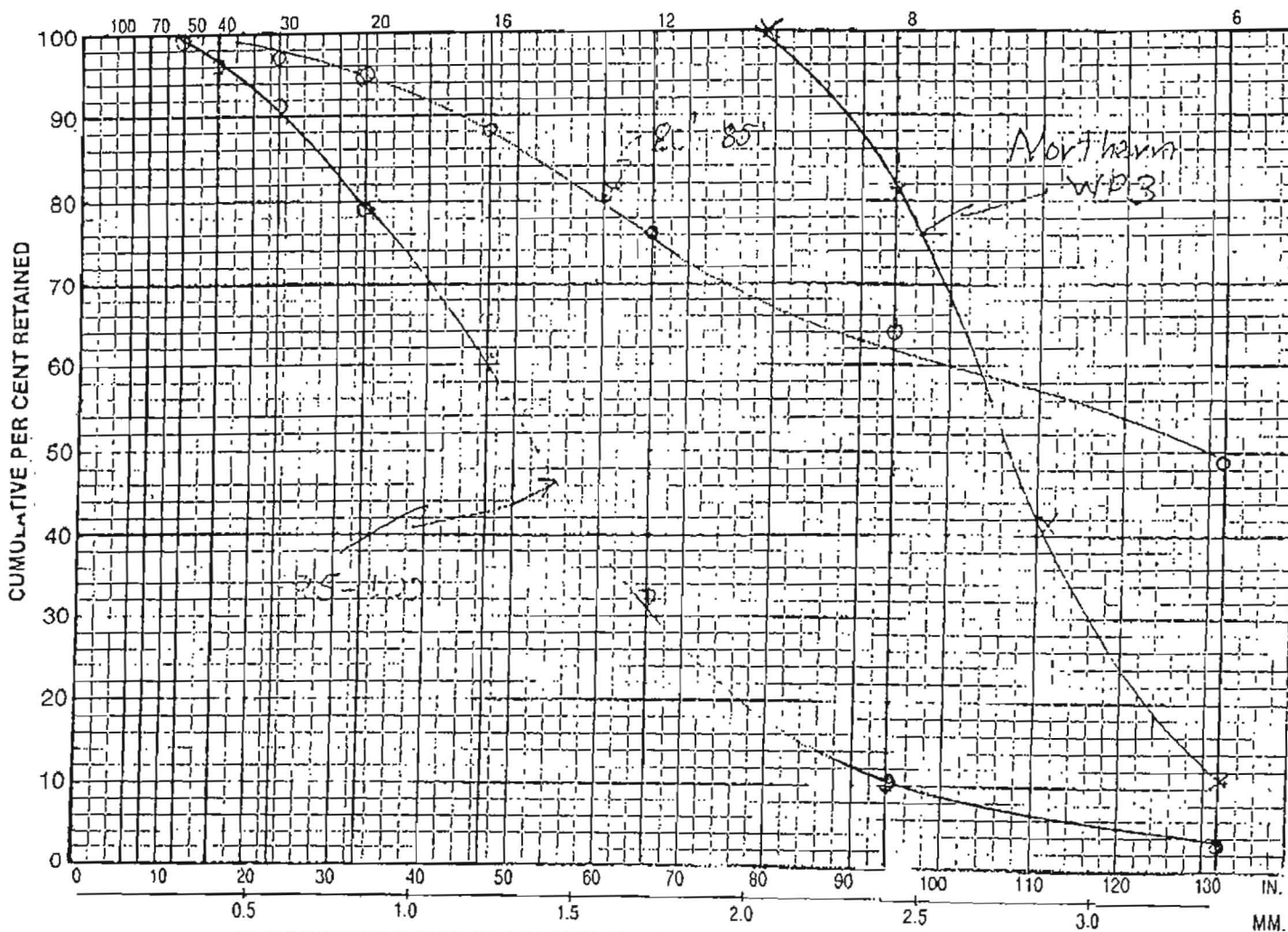
SAND ANALYSIS

BY: Roy Schreurs

SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

Job Name Cambridge, Iowa Date 10/22/04
 City _____ State _____ Zip _____
 Driller Northway Well and Pump Co. Phone _____
 Engineer _____ Phone _____
 Remarks _____

U.S. STANDARD SIEVE NUMBERS



SLOT OPENING AND GRAIN SIZE IN THOUSANDTHS OF AN INCH AND MM.

U.S. SIEVE NO.	SLOT OPENING		SAMPLE DEPTHS			
	IN.	MM.				
6	.132	3.36				
8	.094	2.38				
12	.068	1.68				
18	.047	1.19				
20	.033	0.84				
30	.023	0.60				
40	.016	0.42				
50	.012	0.30				
70	.008	0.21				
100	.006	0.15				

Comments SWL 30'

SCREEN RECOMMENDATIONS: DIAM. _____

SLOT	SETTING	LENGTH
80	80-100	20

SO MANY CONSIDERATIONS ENTER INTO THE MAKING OF A GOOD WELL THAT, WHILE WE BELIEVE SLOT SIZES FURNISHED OR RECOMMENDED FROM SAND SAMPLES ARE CORRECT WE ASSUME NO RESPONSIBILITY FOR THE SUCCESSFUL OPERATION OF ANY WELL.



PLANT
Highway 117
5 Miles East of
Sapulpa, OK

Paragon Industries, Inc.
Rt.3 Box 331A
Sapulpa, Oklahoma, 74066
Phone: (918) 291-4459
Fax: (918) 291-0918

MATERIAL TEST REPORT

Certificate Number
Customer PO
Revision (R)
Date

15116
1134335
0
12/02/2003

Melted and Manufactured in the USA

Results relate only to items tested. Test report not to be reproduced without written approval of Quality Assurance.

Manufactured by Electric Resistance
Weld (Type E)

Customer	MID STATE SUPPLY P.O. BOX 410558 KANSAS CITY, MO 64141-	Product	8.625 x .322 28.58# A53B/SA53B	Specifications	ASTM A53/A53M-01 ASME B36.10M-1996
----------	---	---------	--------------------------------	----------------	---------------------------------------

MECHANICAL PROPERTIES							
Heat Number	Steel Order No.	Yield Strength Psi	Tensile Strength Psi	Elongation % in 2 Inches	Test Type Orientation/Tensile	Test Condition	Gauge Width
S33107	3722	65220	80180	32.8%	Strip/Transverse/Body	As Rolled	1.5
S33108	3722	67980	81650	30.8%	Strip/Transverse/Body	As Rolled	1.5
S33105	3722	64060	77690	32.3%	Strip/Transverse/Body	As Rolled	1.5
N33334	3722	67910	79460	33.7%	Strip/Transverse/Body	As Rolled	1.5

CHEMICAL ANALYSIS %													
Heat Number	Mill Control	C	MN	P	S	Si	Cr	Ni	Mo	Cu	V	Ti	Cb
S33107	Heat	0.190	0.761	0.019	0.004	0.030	0.046	0.040	0.010	0.096	0.002	0.003	0.000
	R.O. Product	0.188	0.739	0.016	0.004	0.042	0.044	0.042	0.013	0.096	0.001	0.003	0.001
S33106	Heat	0.200	0.809	0.014	0.006	0.029	0.045	0.042	0.011	0.093	0.002	0.003	0.000
	R.O. Product	0.173	0.688	0.014	0.002	0.039	0.043	0.044	0.013	0.092	0.001	0.002	0.000
S33105	Heat	0.190	0.753	0.015	0.004	0.030	0.056	0.039	0.011	0.089	0.002	0.003	0.000
	R.O. Product	0.178	0.712	0.014	0.003	0.042	0.053	0.039	0.013	0.090	0.001	0.003	0.000
N33334	Heat	0.190	0.790	0.020	0.002	0.031	0.050	0.039	0.007	0.089	0.001	0.004	0.000
	R.O. Product	0.160	0.765	0.019	0.004	0.047	0.047	0.040	0.012	0.090	0.001	0.004	0.000

TEST / INSPECTION			Comment
Hydrostatic Test PSI	1570	@ 5 sec	
Flattening Test	YES		
Ultrasonic weldline (NDT)	YES	.125 DH	
Full Length Visual	YES		
Full Length Drift	N/A	size	
Heat Treat Min. Temperature	1600	degrees	
P.M.T.R.			We certify that the product described above has been Manufactured, Sampled, Inspected and Tested in accordance to the referenced specification(s). We certify that the product and / or order, and is in compliance with all requirements. QA
			12/03

At the Core

Northern Gravel



Gradation Test Report With Sieve Chart

Plant: 001 Northern Gravel
Product: 006 #03

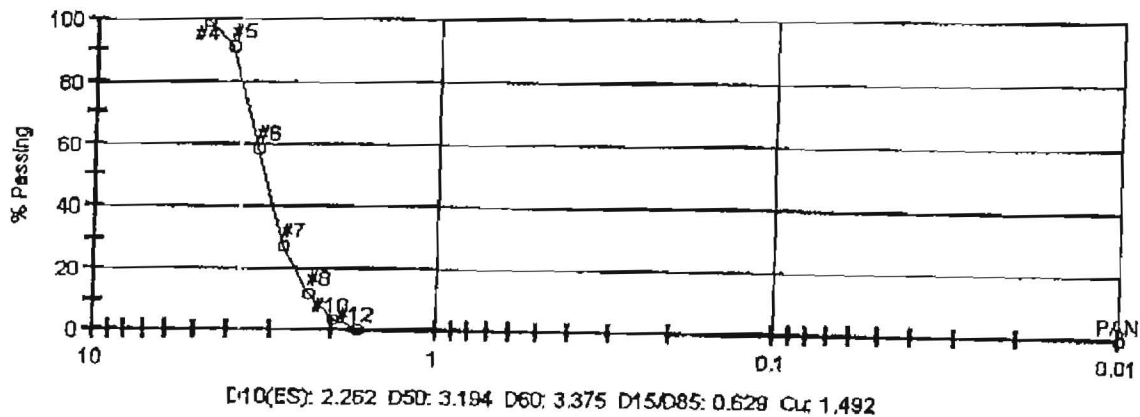
SAMPLE INFORMATION

Sample ID: -1421448946
Date Sampled: 7/29/02 12:25:00 PM
Date Completed: 7/29/02 12:25:00 PM
Sampled By: Shawn Wagler
Tested By: Shawn Wagler
Sample Type: Production
Sample Method: Belt-Stream
Sample Location:
Weather:
Temperature:
Blend:

☐ Split Sample
Sequence:
☐ Resample
Resample Code:
Borehole ID:
Depth Top/Bottom:
Notes:
SAMPLE 11 #3 WELL PACK

GRADATION RESULTS

Unit	Moist Weight	Dry Weight	Decant Weight	Moist %	Decant %
g		528.40			
Sieve	Weight Retained	Cum. Weight Retained	Percent Retained	Percent Passing	Spec Minimum
					Spec Maximum
					Comment
#4 (4.75)	3.4	3.4	0.6	99.4	
#5 (4)	41.0	44.4	8.4	91.6	
#6 (3.35)	173.6	218.0	41.3	58.7	
#7 (2.8)	163.2	381.2	72.1	27.9	
#8 (2.36)	82.0	463.2	87.7	12.3	
#10 (2)	45.6	508.8	96.3	3.7	
#12 (1.7)	15.4	524.2	99.2	0.8	
PAN (0)	4.2	528.4	100.0	0.0	



Accreditations:
Iowa DNR: 095
New Jersey DEP: IA001
Kansas DHE: E-10287

ANALYTICAL REPORT

November 24, 2004

Work Order: 14K0446

Page 1 of 4

Report To
Guy Lamar
Northway Well & Pump Co. - Waukee
100 N 6th St.
Waukee, IA 50263

Work Order Information
Date Received: 11/10/2004 8:04AM
Collector: Anderson, Marv
Phone: 1-800-747-4575
PO Number:

Project: New Well Analysis
Project Number: 8509069

Analyte	Result	MRL	Method	Analyst	Analyzed	Qualifier
14K0446-01 New Well			Matrix: Drink Wtr		Collected: 11/09/04 11:40	
<i>Determination of Volatile Organic Compounds</i>						
Vinyl Chloride	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,1-Dichloroethylene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Dichloromethane	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
trans-1,2-Dichloroethylene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
cis-1,2-Dichloroethylene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,1,1-Trichloroethane	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Carbon Tetrachloride	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Benzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,2-Dichloroethane	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Trichloroethylene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,2-Dichloropropane	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Toluene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,1,2-Trichloroethane	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Tetrachloroethylene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Monochlorobenzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Ethylbenzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Xylenes (total)	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Styrene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
o-Dichlorobenzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
p-Dichlorobenzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
1,2,4-Trichlorobenzene	<0.5 ug/l	0.5	EPA 524.2	GGD	11/22/04 15:08	
Surrogate: Dibromofluoromethane	103 %		81-122	GGD	11/22/04 15:08	
Surrogate: 1,2-Dichloroethane-d4	104 %		76-121	GGD	11/22/04 15:08	
Surrogate: Toluene-d8	102 %		79-121	GGD	11/22/04 15:08	
Surrogate: 4-Bromofluorobenzene	103 %		82-122	GGD	11/22/04 15:08	
<i>Determination of Total Trihalomethanes</i>						
Chloroform	0.6 ug/l	0.5	EPA 524.2	TVK	11/11/04 22:39	
Bromodichloromethane	<0.5 ug/l	0.5	EPA 524.2	TVK	11/11/04 22:39	
Chlorodibromomethane	<0.5 ug/l	0.5	EPA 524.2	TVK	11/11/04 22:39	

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Northway Well & Pump Co. - Waukee
100 N 6th St.
Waukee, IA 50263

November 24, 2004

Work Order: 14K0446

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Analyte	Result	MRL	Method	Analyst	Analyzed	Qualifier
14K0446-01 New Well			Matrix: Drink Wtr		Collected: 11/09/04 11:40	
<i>Determination of Total Trihalomethanes</i>						
Bromoform	<0.5 ug/l	0.5	EPA 524.2	TVK	11/11/04 22:39	
Total Trihalomethanes (TTHM)	<2.0 ug/l	2.0	EPA 524.2	TVK	11/11/04 22:39	
Surrogate: Dibromofluoromethane	97.4 %		81-122	TVK	11/11/04 22:39	
Surrogate: 1,2-Dichloroethane-d4	91.0 %		76-121	TVK	11/11/04 22:39	
Surrogate: Toluene-d8	98.0 %		79-121	TVK	11/11/04 22:39	
Surrogate: 4-Bromofluorobenzene	90.8 %		82-122	TVK	11/11/04 22:39	
<i>Determination of Polynuclear Aromatic Hydrocarbons</i>						
Benzo(a)pyrene	<0.02 ug/l	0.02	550	JRF	11/12/04 18:53	
Surrogate: Triphenylene	84.1 %		55-130	JRF	11/12/04 18:53	
<i>Determination of Base/Neutral Extractable Compounds</i>						
Bis(2-ethylhexyl)adipate	<1.0 ug/l	1.0	525.2	EPP	11/17/04 12:28	
Bis(2-ethylhexyl)phthalate	<1.0 ug/l	1.0	525.2	EPP	11/17/04 12:28	
Surrogate: 2-Fluorobiphenyl	72.7 %		55-127	EPP	11/17/04 12:28	
Surrogate: Terphenyl-d14	94.5 %		50-124	EPP	11/17/04 12:28	
<i>Determination of Nitrogen/Phosphorus Herbicides & Insecticides</i>						
Atrazine	<0.10 ug/l	0.10	507	EPP	11/23/04 11:56	
Simazine	<0.10 ug/l	0.10	507	EPP	11/23/04 11:56	
Alachlor	<0.10 ug/l	0.10	507	EPP	11/23/04 11:56	
Cyanazine	<0.10 ug/l	0.10	507	EPP	11/23/04 11:56	
Surrogate: 2-Nitro-m-xylene	94.5 %		60-128	EPP	11/23/04 11:56	
<i>Determination of Chlorinated Phenoxy Herbicides</i>						
2,4-D	<2.00 ug/l	2.00	515.1	EPP	11/17/04 3:27	
2,4,5-TP (Silvex)	<0.500 ug/l	0.500	515.1	EPP	11/17/04 3:27	
Dalapon	<2.00 ug/l	2.00	515.1	EPP	11/17/04 3:27	
Dinoseb	<0.500 ug/l	0.500	515.1	EPP	11/17/04 3:27	
Picloram	<1.00 ug/l	1.00	515.1	EPP	11/17/04 3:27	
Pentachlorophenol	<0.200 ug/l	0.200	515.1	EPP	11/17/04 3:27	
Surrogate: 2,5-Dichlorobenzoic Ac	70.4 %		50-113	EPP	11/17/04 3:27	
<i>Determination of Conventional Chemistry Parameters</i>						
Alkalinity, as CaCO3	294 mg/l	10	SM 2320B	SAA	11/12/04 10:22	
Carbon Dioxide, Free, as CO2	28.2 mg/l	10.0	SM 4500-CO2 C	SAA	11/11/04 9:37	
Nitrogen, Ammonia	0.20 mg/l	0.10	4500-NH3F	SAA	11/18/04 14:52	
pH	7.1 pH		EPA 150.1	BNS	11/10/04 15:11	1-03
Silica, total	23.5 mg/l	5.0	SM 4500-Si D	SAA	11/11/04 10:14	
Total Organic Carbon	1.81 mg/l	0.20	EPA 415.1	JRF	11/15/04 8:30	

Determination of Physical/Conventional Chemistry Parameters

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Northway Well & Pump Co. - Waukee
100 N 6th St.
Waukee, IA 50263

November 24, 2004

Work Order: 14K0446

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Analyte	Result	MRL	Method	Analyst	Analyzed	Qualifier
14K0446-01 New Well			Matrix:Drink Wtr		Collected: 11/09/04 11:40	
<i>Determination of Physical/Conventional Chemistry Parameters</i>						
Conductivity	954 uS/cm	2.0	SM 2510B	SAA	11/11/04 11:04	
Solids, total dissolved	590 mg/l	10	SM 2540C	BNS	11/11/04 12:39	
Solids, total suspended	14 mg/l	2	USGS I-3765-85	BNS	11/11/04 12:42	
<i>Determination of Inorganic Anions</i>						
Fluoride	0.2 mg/l	0.1	EPA 300.0	JRF	11/10/04 12:08	
Sulfate	105 mg/l	1.0	EPA 300.0	JRF	11/10/04 12:08	
Chloride	76.1 mg/l	1.0	EPA 300.0	JRF	11/10/04 12:08	
Nitrogen, Nitrite	<0.1 mg/l	0.1	EPA 300.0	JRF	11/10/04 12:08	
Nitrogen, Nitrate	<0.1 mg/l	0.1	EPA 300.0	JRF	11/10/04 12:08	
<i>Determination of Total Metals</i>						
Antimony, total	<0.002 mg/l	0.002	3113B	LKM	11/23/04 13:09	
Arsenic, total	0.005 mg/l	0.001	3113B	LKM	11/19/04 11:51	
Barium, total	0.295 mg/l	0.010	200.7	RVV	11/11/04 13:16	
Cadmium, total	<0.0010 mg/l	0.0010	3113B	LKM	11/23/04 14:28	
Calcium, total	108 mg/l	0.1	200.7	RVV	11/11/04 13:16	
Chromium, total	<0.005 mg/l	0.005	200.7	RVV	11/11/04 13:16	
Copper, total	<0.005 mg/l	0.005	200.7	RVV	11/11/04 13:16	
Hardness, Total as CaCO ₃	401 mg/l	1	200.7	RVV	11/11/04 13:16	
Iron, total	5.88 mg/l	0.030	200.7	LAR	11/15/04 18:59	
Lead, total	<0.005 mg/l	0.005	3113B	LKM	11/11/04 9:15	
Magnesium, total	31.7 mg/l	0.10	200.7	RVV	11/11/04 13:16	
Manganese, total	0.409 mg/l	0.005	200.7	RVV	11/11/04 13:16	
Mercury, total	<0.00050 mg/l	0.00050	EPA 245.1	MAQ	11/12/04 12:11	
Potassium, total	2.4 mg/l	1.0	200.7	LAR	11/15/04 18:59	
Selenium, total	<0.005 mg/l	0.005	3113B	LKM	11/11/04 15:02	
Silver, total	<0.020 mg/l	0.020	200.7	RVV	11/11/04 13:16	
Sodium, total	46.8 mg/l	1.0	200.7	LAR	11/15/04 18:59	
Thallium, total	<0.001 mg/l	0.001	200.9	LKM	11/23/04 9:32	
Zinc, total	<0.010 mg/l	0.010	200.7	RVV	11/11/04 13:16	

Notes and Definitions

I-03 Analyte requires immediate analysis. Analysis performed upon receipt of sample at laboratory.

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Northway Well & Pump Co. - Waukee
100 N 6th St.
Waukee, IA 50263

November 24, 2004

Work Order: 14K0446

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End of Report

Kathy Van Zee

Keystone Laboratories, Inc.
Kathy Van Zee
Project Manager

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Northway Well and Pump Company

TEST HOLE REPORT

Drilled for City Water Works City Cambridge, Iowa

Location 50-feet east of well No. 2 Date 10/20/04 Well No. 1-04

Drilling method Rotary Total depth 120' Hole size 6 3/4'

Drilling started 10/20/04 Drilling Completed 10/20/04 Static level _____

Casing dia., type and amount N/A

FORMATION LOG

[illegible]

NORTHWAY WELL AND PUMP COMPANY

4895 8th Avenue
Marion, Iowa 52302
319-377-6339

100 North 6th Street
Waukee, Iowa 50263
515-987-4575

WELL TEST DATA REPORT

Customer City Water Works City Cambridge, IA
Location 50' east of well #2 Well No. 3
Size Casing 8" Total Depth 98' Construction gravel pack
Pump Make Goulds Model No. No. of Stages 3
Diameter 6" Total Setting 80' Air Line Length 80'
Meter Used Sparling 4" Static Level 30'

DATE	TIME	GPM	P.L.	D.D.	S.C.	P.S.I.	TEMP. DISCHARGE DESCRIPTION
11/9/04	6:00am	0	0	0	0		
	6:01	280	45'	15'	18.6		clear
	6:02	280	45'	15'	18.6		no sand
	6:03	280	45'	15'	18.6		
	6:04	280	45'	15'	18.6		
	6:05	280	45'	15'	18.6		
	6:10	280	45'	15'	18.6		
	6:15	280	45'	15'	18.6		
	6:20	280	45'	15'	18.6		
	6:25	280	45'	15'	18.6		
	6:30	280	46'	16'	17.5		
	6:45	280	46'	16'	17.5		
	7:00	280	46'	16'	17.5		
	8:00	280	46'	16'	17.5		
	9:00	280	46'	16'	17.5		
	10:00	280	46'	16'	17.5		
	11:00	280	46'	16'	17.5		
	12:00	280	46'	16'	17.5		
	1:00pm	280	46'	16'	17.5		
	2:00	280	46'	16'	17.5		
11/9/04		S.W.L	Recovery				
	2:00pm	46'		2:05	30'		
	2:01	32'					
	2:02	31'					
	2:03	31'					
	2:04	31'					

4895 8th Avenue
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100 North 6th Street
Waukee, Iowa 50263
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WELL TEST DATA REPORT

PAGE -2-

Customer City Water Works City Cambridge, Iowa
Location 100' east of plant Well No. 2

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