

Hydroflo Prepackaged Pumping Systems

Presented to:



BARNEY'S PUMPS



Presented by:
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BARNEY'S PUMPS INC.

Hydroflo

- ▶ What is it?
 - ▶ A Hydroflo **Packaged Pumping System** provides variable volume at a constant pressure regardless of flow requirements.
- ▶ Why buy it?
 - ▶ Availability
 - ▶ Quality
 - ▶ UL QCZJ listed as an entire assembly
 - ▶ Cost
 - ▶ Pre-engineering provides cost savings
 - ▶ A framework with options
 - ▶ Accountability
 - ▶ Witness testing at no charge



A Hydroflo System



Hydroflo Applications

- ▶ Potable water
- ▶ Reclaimed water
- ▶ Sewage
- ▶ Seal water system
- ▶ Process water
- ▶ Any application for
 - ▶ Quick turnaround
 - ▶ Minimized on-site presence
 - ▶ Possible elimination of or reduced need for a contractor



Hydroflo Applications



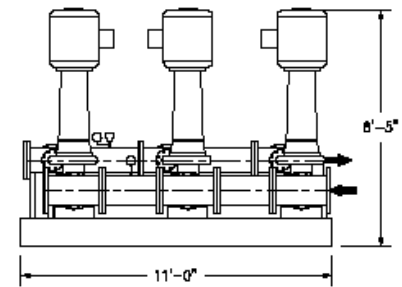
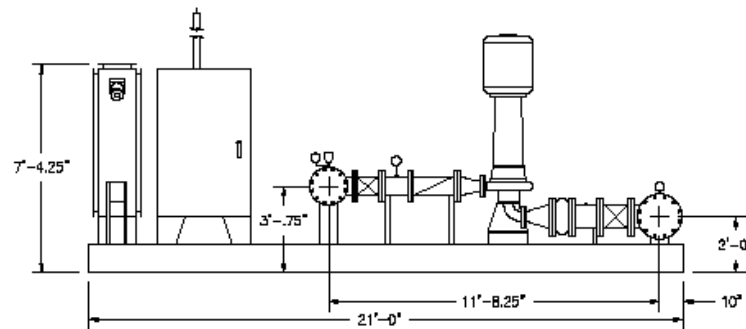
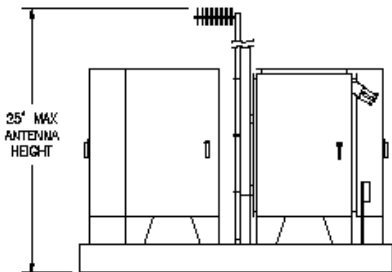
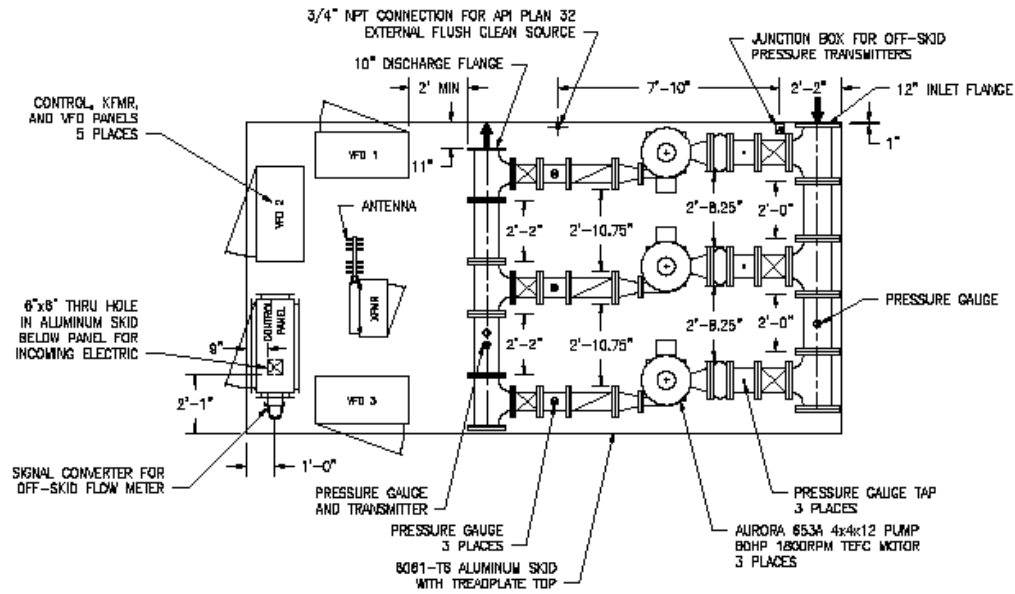
Hydroflo Components

- ▶ Pump(s)
 - ▶ Main
 - ▶ Jockey/pressure maintenance pump
- ▶ “Skid” base
- ▶ Pipe and valves
 - ▶ Hydraulically-actuated automatic control valve (Cla-Val)
- ▶ Hydropneumatic tank?
 - ▶ Depends on system, but VFD’s are generally better
 - ▶ A tank means a larger footprint
- ▶ Control Panel
- ▶ Instrumentation
- ▶ Other
 - ▶ Power Zone
 - ▶ Antennae



A Hydroflo System

PUMP STATION LAYOUT



ALL NUTS, BOLTS, AND MISCELLANEOUS HARDWARE ARE 316 STAINLESS STEEL.
ALL TAPS IN PIPE SHALL BE MADE USING A DOUBLE STRAP TAPPING SADDLE.

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		APPROVAL DATE		DESIGNER GLOBALTECH	
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				DATE 01/06/2010	
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				REV. A	

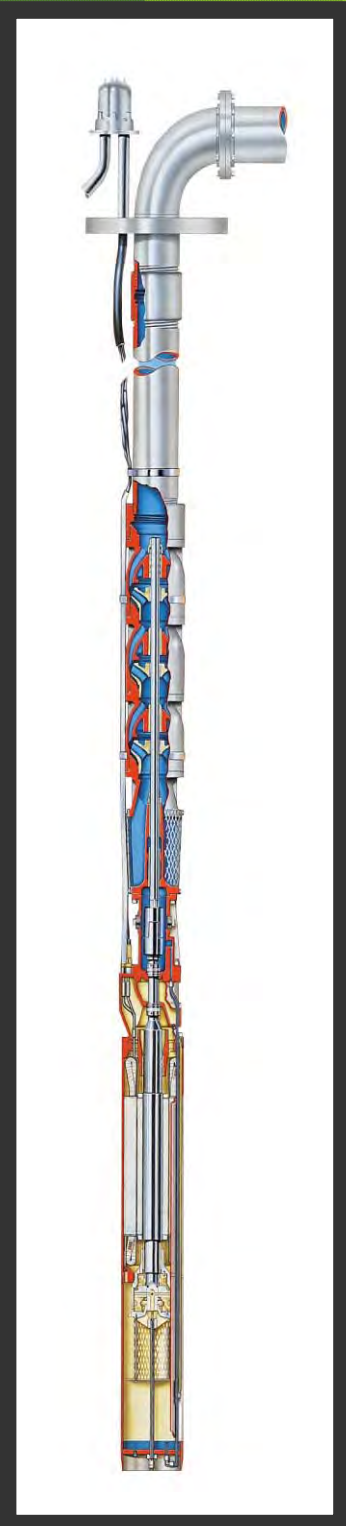
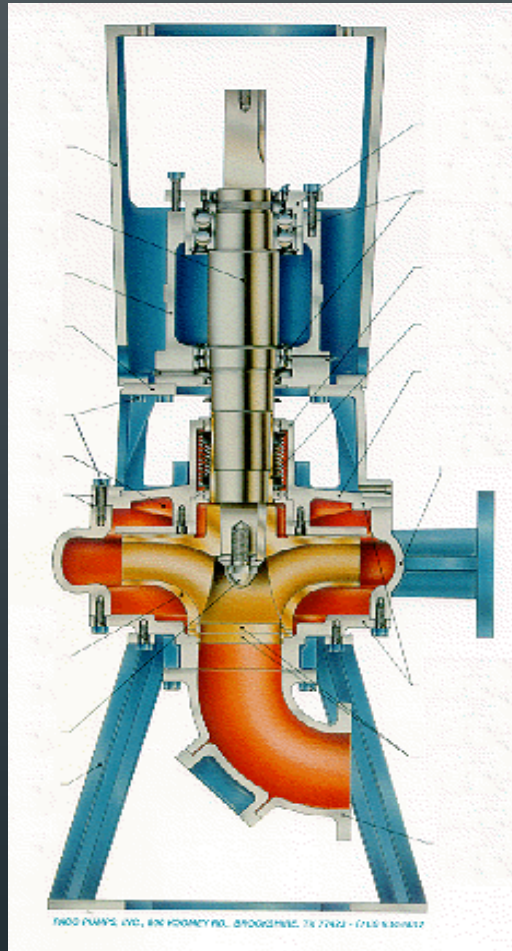
A Hydroflo System



Hydroflo Pump Types

- ▶ Basically most any type of pump can be used to meet the needs of the application
- ▶ Flow considerations
- ▶ Pressure considerations
- ▶ Space/geometry considerations
- ▶ Special constraints imposed by the application (material, environmental, etc.)
- ▶ Cost considerations





Hydroflo Valves, Pipe & Skid

- ▶ Valves & Pipe
 - ▶ AWWA, Plug, Control, etc.
 - ▶ Steel, ductile iron, stainless steel or HDPE pipe
- ▶ Baseplate / Skid
 - ▶ Steel or aluminum
 - ▶ Stainless steel bolts
 - ▶ Rigid and flexible conduit on Aluminum Unistrut
 - ▶ NEC code wiring
- ▶ Coatings
 - ▶ Epoxies
 - ▶ NSF 61
 - ▶ Zinc



Hydroflo Valves, Pipe & Skid



Hydropneumatic Tank

- ▶ Not standard for Hydroflo/VFD system
- ▶ Allows the system to shut down all pumps. Low demand and/or system leakage slowly drain the tank until the pressure drops to the cut-in point. System reactivation brings the system pressure back up and recharges the tank.
- ▶ Used on systems that have periods of no flow, or very, very low flow
- ▶ Bladder vs. Non-bladder
- ▶ Small percentage of volume is useable
- ▶ Can be located anywhere in the system
- ▶ Bypass line is an alternative → Control Valve

Hydropneumatic Tanks

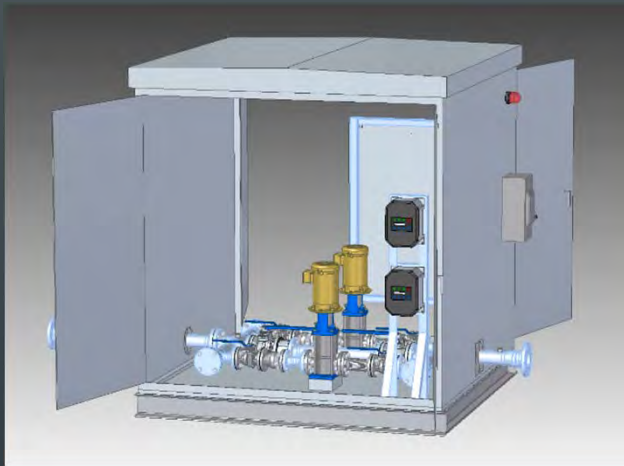


Barney's Pumps Engineering

- ▶ Four P.E.'s on staff
- ▶ Electrical and mechanical CAD dwgs
- ▶ 3D models available with SolidEdge

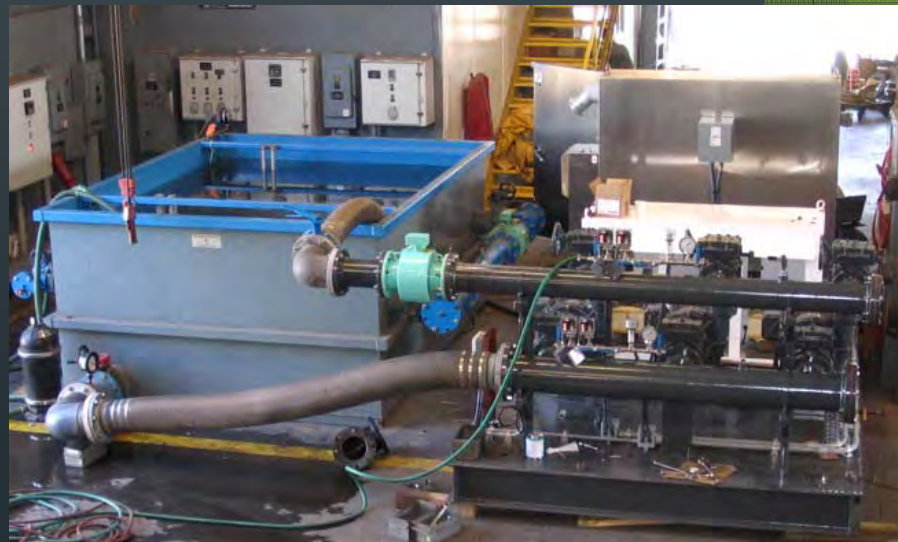


Barney's Pumps Engineering



Barney's Pumps Testing

- ▶ Test Tank
 - ▶ 2500 gal capacity
 - ▶ 2000 gpm max
 - ▶ 150 psi max
- ▶ Instrumentation
 - ▶ Flow (Mag Meter)
 - ▶ Power
 - ▶ Pressure



Hydroflo Control Systems

- ▶ A framework with options
- ▶ Constant pressure - variable speed
 - ▶ Pressure transducer(s) with pressure switch backup
 - ▶ Flowmeter
- ▶ Pump sequencing
 - ▶ VFD feedback
 - ▶ Flow calls
 - ▶ Pumps always operate on their curve
- ▶ PLC with HMI
 - ▶ Control other equipment
 - ▶ SCADA interface
 - ▶ Local wireless (spread spectrum)
 - ▶ Mobile wireless (GSM and CDMA)



Hydroflo Control Systems

- ▶ System adjusts to changes in demand
 - ▶ By adjusting pump speed
 - ▶ By sequencing pumps on/off
- ▶ Energy savings
 - ▶ Avoids running a large pump at low flows
- ▶ Only what is needed is provided
- ▶ Design point on right-side of curve
 - ▶ Operate through the BEP
 - ▶ H.I. Variable Speed Pumping



Hydroflo Pumps & Controls

- ▶ Pump selection example
 - ▶ Engineer wanted
 - ▶ 1000 gpm @ 200' TDH
 - ▶ 4 main split-case pumps
 - ▶ 75 hp
 - ▶ Barney's Pumps selected
 - ▶ 1375 gpm @ 200' TDH
 - ▶ 100 hp



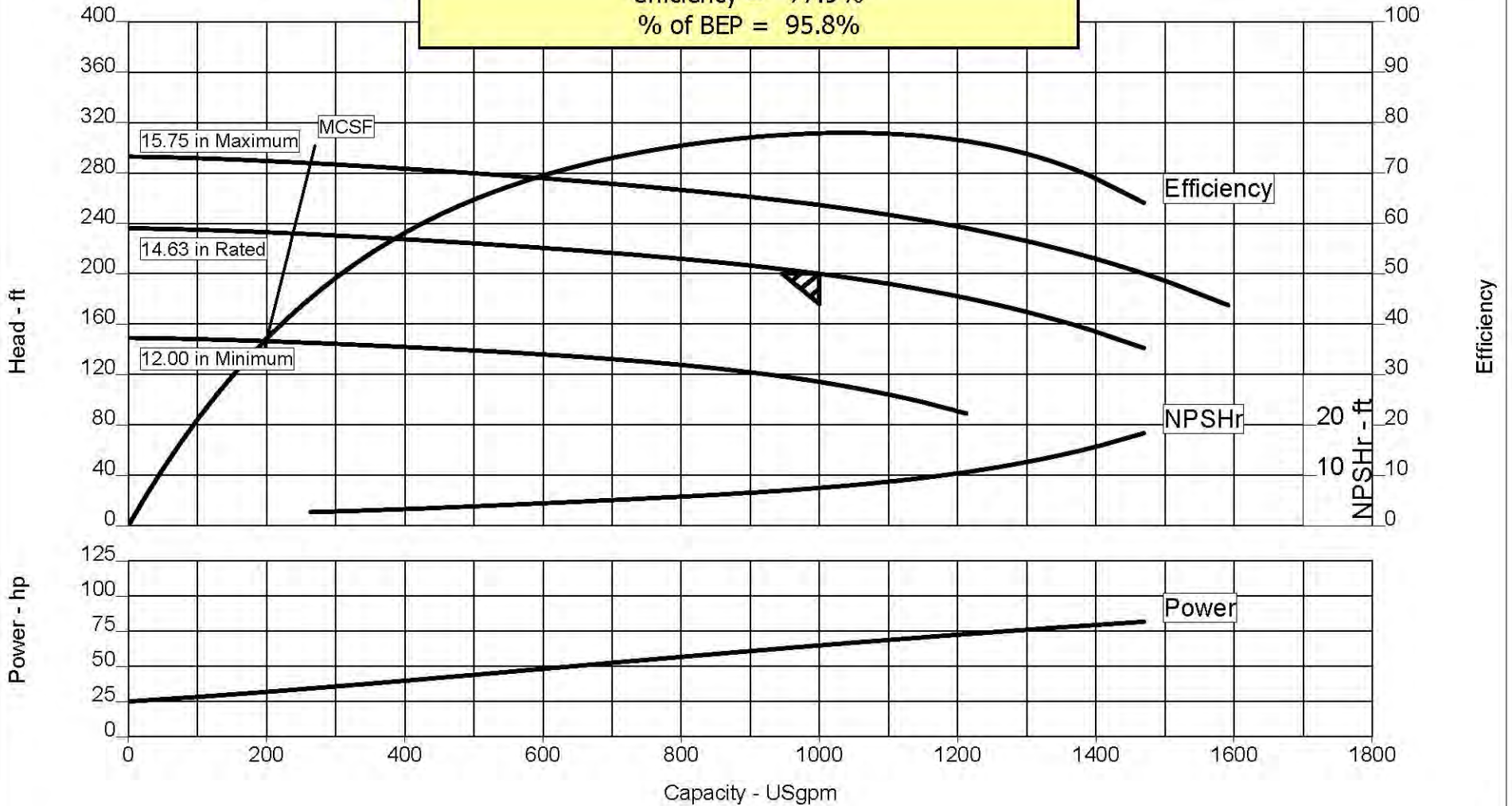
Customer : Barney's Pumps
 Item number : tradition Irv 75hp
 Service : high service
 Vendor reference : 1350-W0000
 Date : January 10, 2005



Capacity : 1000.0 USgpm Specific gravity : 1.000
 Head : 200.00 ft Pump speed : 1750 rpm

Pump size & type : 5LR-15D
 Based on curve no. : A-19601R2
 Number of stages : 1

Original 75 hp selection to meet engineer's design point
 efficiency = 77.9%
 % of BEP = 95.8%



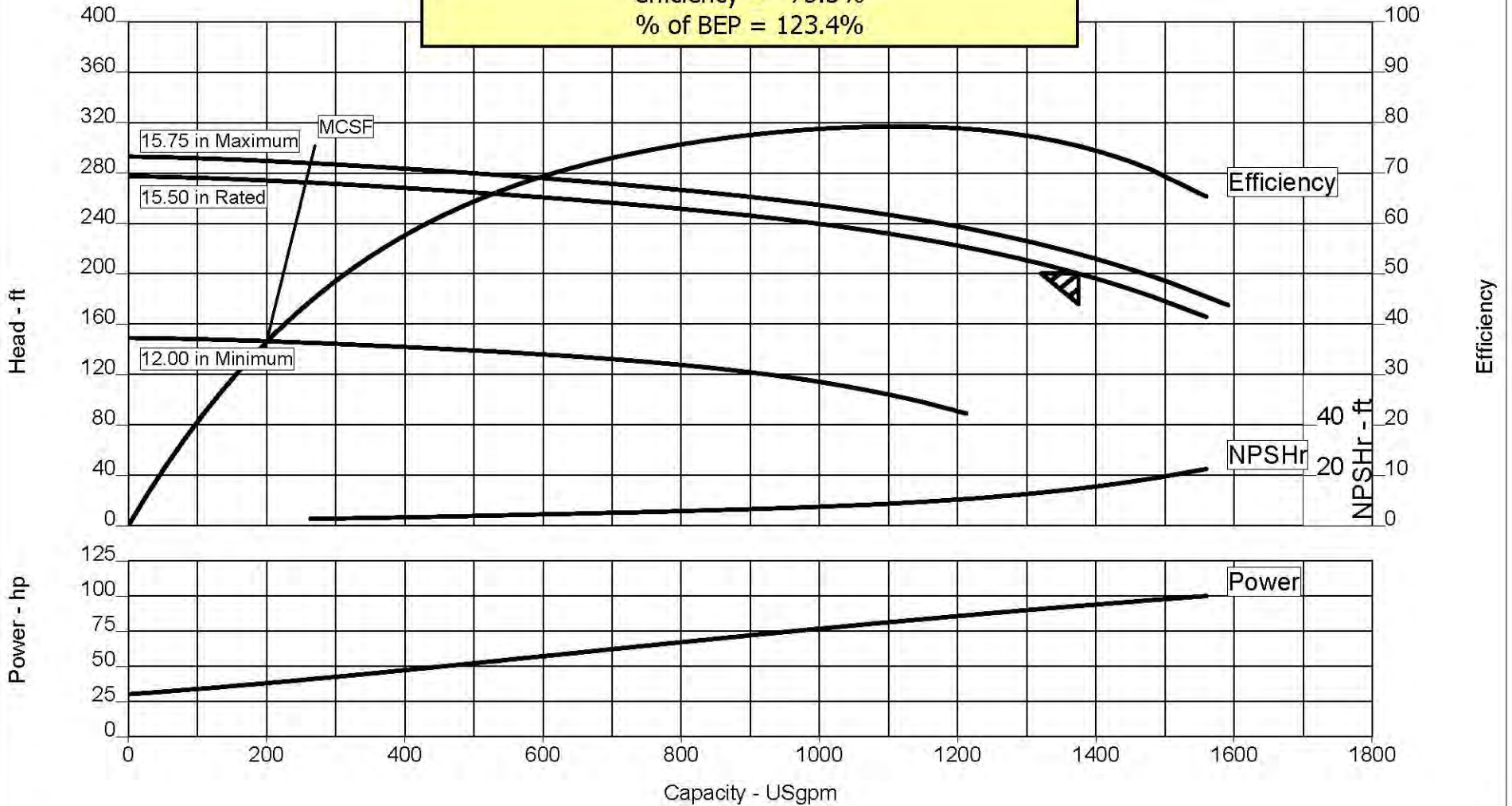
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 Item number : tradition lrv alt
 Service : high service
 Vendor reference : 1350-W0000
 Date : January 10, 2005



Pump size & type : 5LR-15D
 Based on curve no. : A-19601R2
 Number of stages : 1

Capacity : 1375.0 USgpm Specific gravity : 1.000
 Head : 200.00 ft Pump speed : 1750 rpm

100 hp selection for based on BPI experience
 efficiency = 75.3%
 % of BEP = 123.4%



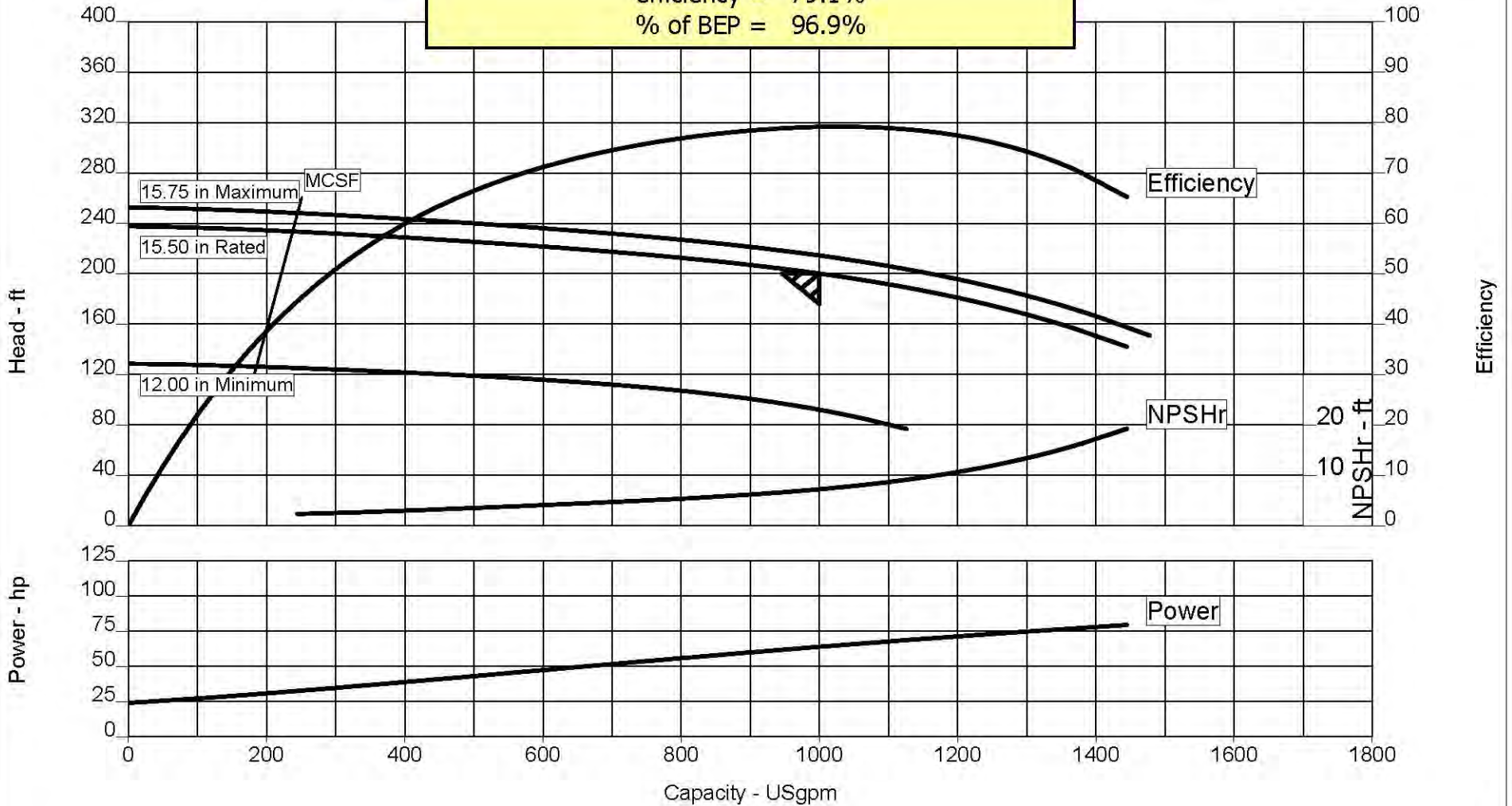
Customer : Barney's Pumps
 Item number : tradition lrv alt
 Service : high service
 Vendor reference : 1350-W0000
 Date : January 10, 2005



Capacity : 1000.0 USgpm Specific gravity : 1.000
 Head : 200.00 ft Pump speed : 1625 rpm

Pump size & type : 5LR-15D
 Based on curve no. : A-19601R2
 Number of stages : 1

100 hp impeller at original 75 hp design point
 efficiency = 79.1%
 % of BEP = 96.9%



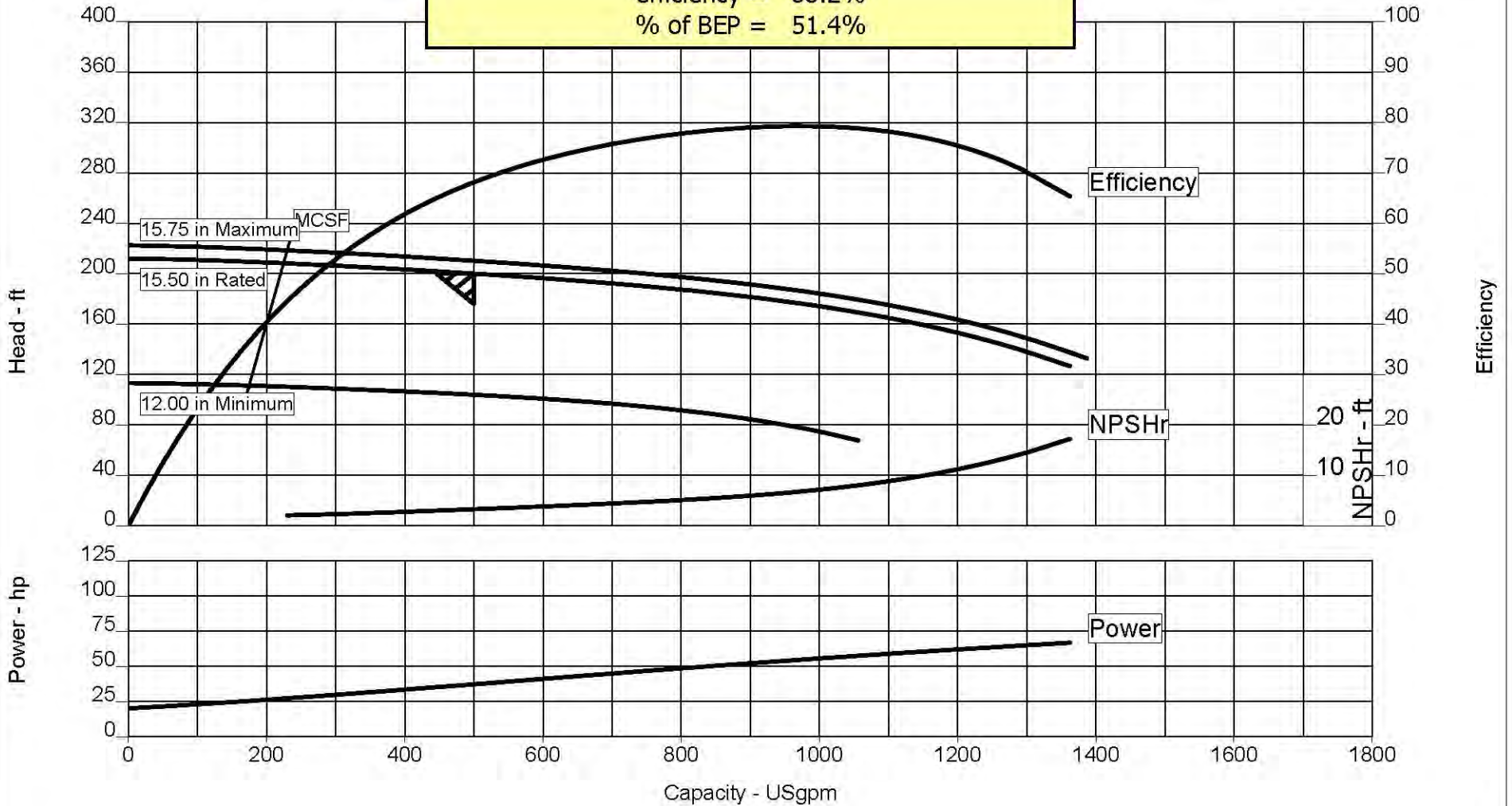
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 Item number : tradition lrv alt
 Service : high service
 Vendor reference : 1350-W0000
 Date : January 10, 2005



Capacity : 500.0 USgpm Specific gravity : 1.000
 Head : 200.00 ft Pump speed : 1525 rpm

Pump size & type : 5LR-15D
 Based on curve no. : A-19601R2
 Number of stages : 1

100 hp impeller at 50% of original 75 hp design point
 efficiency = 68.2%
 % of BEP = 51.4%



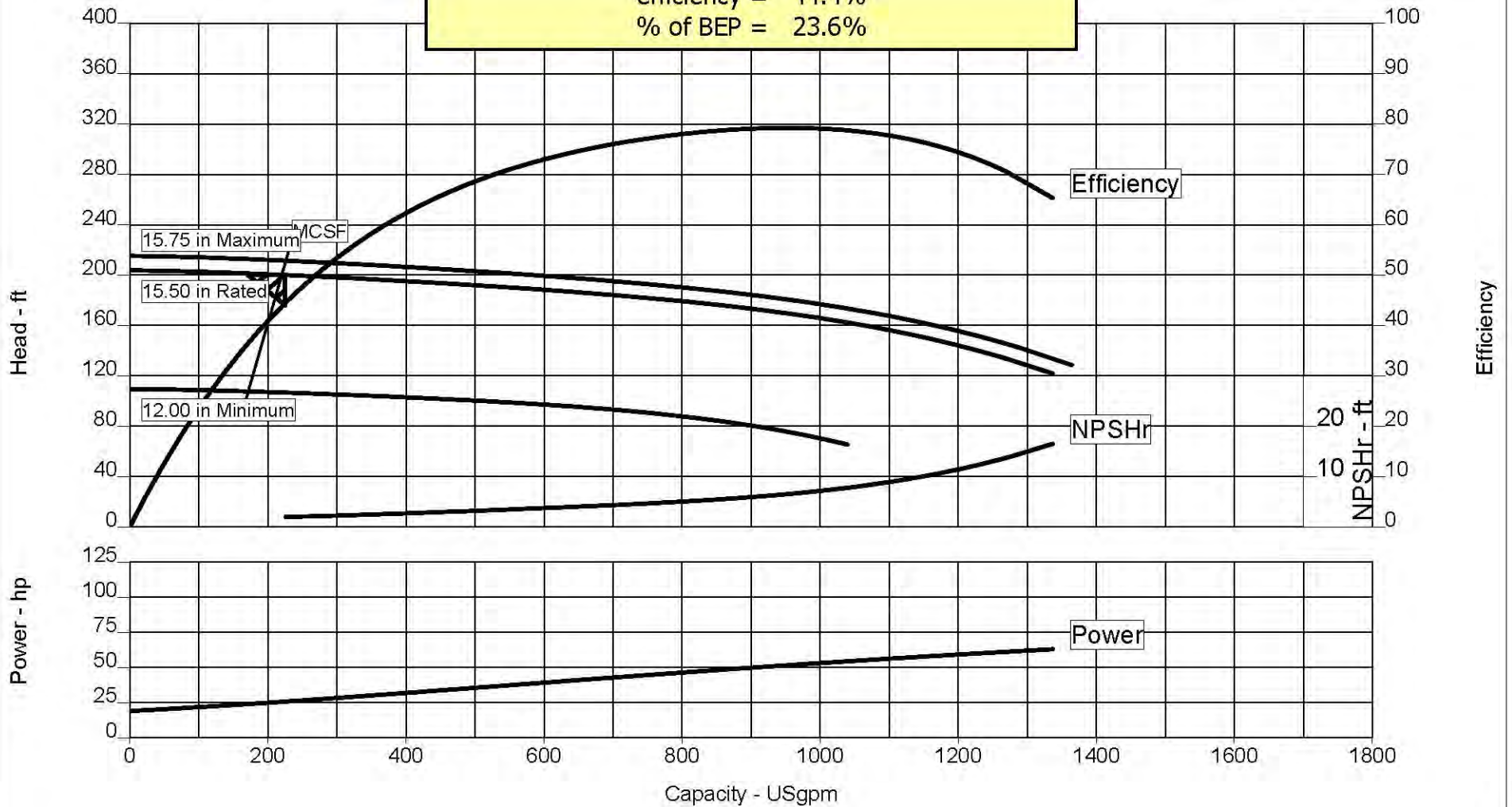
Customer : Barney's Pumps
 Item number : tradition lrv alt
 Service : high service
 Vendor reference : 1350-W0000
 Date : January 10, 2005



Capacity : 225.0 USgpm Specific gravity : 1.000
 Head : 200.00 ft Pump speed : 1500 rpm

Pump size & type : 5LR-15D
 Based on curve no. : A-19601R2
 Number of stages : 1

100 hp impeller at MCSF (switch point to jockey pump)
 efficiency = 44.4%
 % of BEP = 23.6%

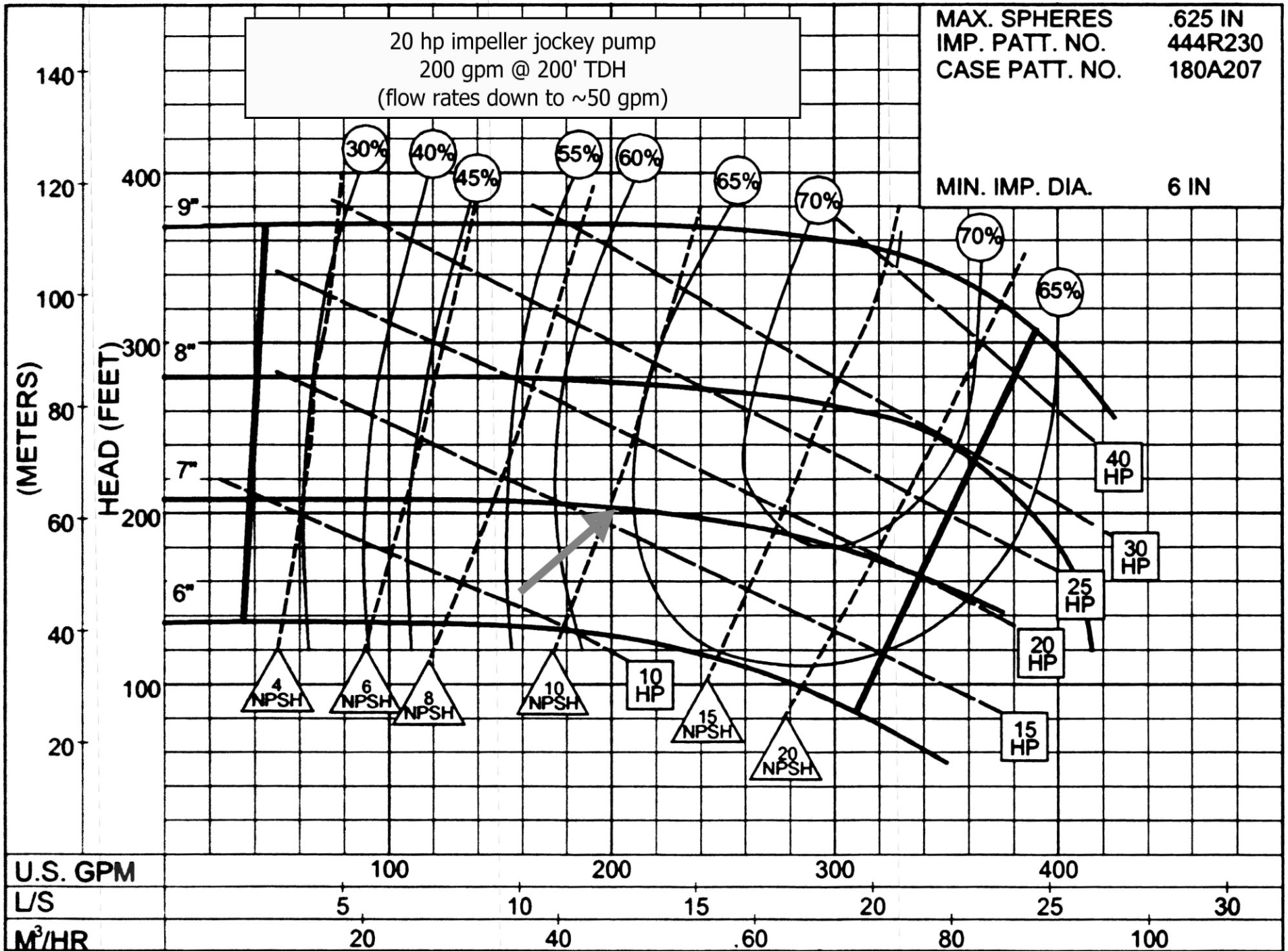


SIZE : 3x3x9A

TYPE : 382

IMPELLER : Enclosed

R. P. M. : 3500



3PC-159192

Hydroflo Control Systems

- ▶ Manufactured by Unitron Controls®
- ▶ Wholly-owned by Barney's Pumps
- ▶ UL 508A, UL 698, UL QCZJ certified
- ▶ The heart of the UL Listed Packaged Pumping System



Control System Components

- ▶ Panel enclosure
 - ▶ NEMA 3R/12, 4X, 12
- ▶ NEMA starters
 - ▶ Not IEC
- ▶ Circuit breakers
 - ▶ Not fuses!!!
- ▶ Pressure transducer and backup switch
- ▶ Flowmeter
 - ▶ Accuracy depends on application
- ▶ Variable Frequency Drive
 - ▶ One or one per pump
- ▶ PLC and HMI



Standard Hydroflo Features

- ▶ Enclosure cooling
- ▶ Reversing starters
- ▶ HOA switch per pump - not on HMI
- ▶ VFD / VFD Bypass switch
- ▶ VFD Speed Control switch (manual/auto)
- ▶ Laptop GFI
- ▶ PID control



Standard Hydroflo Alarms

- ▶ High pressure
- ▶ Low pressure (manual reset)
- ▶ Low water level
- ▶ PT failure (manual reset)
- ▶ Flowmeter failure (manual reset)
- ▶ Phase failure
- ▶ Motor start failure
- ▶ VFD fault (manual reset)



Human Machine Interface

- ▶ Color touchscreen displays
- ▶ Screens
 - ▶ System status
 - ▶ Individual pump status
 - ▶ VFD parameters
 - ▶ Pressure configuration
 - ▶ Flow configuration
 - ▶ Timer Configuration
- ▶ Alarms
 - ▶ Alarm flashes to main screen
 - ▶ Alarm page with history



ALARM SILENCE

MAIN MENU

LOGIN

LOGOUT

SITE OVERVIEW

SYSTEM STATUS

PUMP STATUS

HIGH SERVICE PUMPS SETPOINTS

WELL PUMPS SETPOINTS

SITE OVERVIEW

TIME DELAY SETPOINTS

BACKUP MODE SETTINGS

3:43:36 PM
Thursday, June 28, 2007

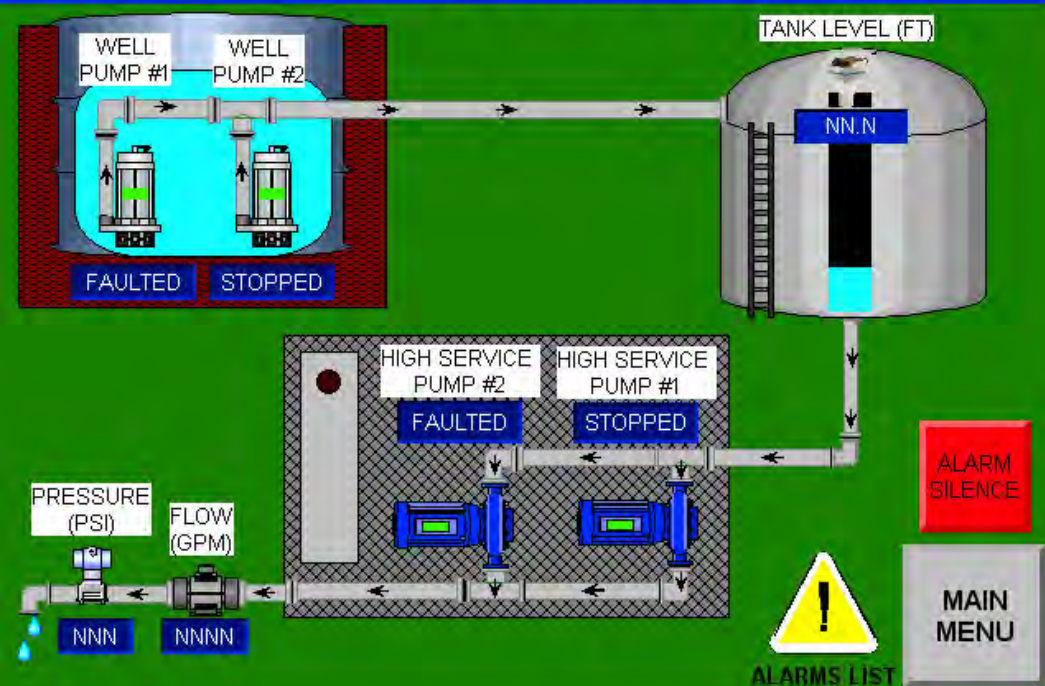
TIME OF DAY SETPOINTS

STATION INFO

ALARMS LIST

ALARM SETPOINTS

PID LOOP SETTINGS



WELL PUMPS SETPOINTS

BACKUP MODE SETTINGS

LEAD STOP LEVEL - ###.# FT

LEAD START LEVEL - ###.# FT

LAG STOP LEVEL - ###.# FT

LAG START LEVEL - ###.# FT

TANK LEVEL - NN.N FT

ALARM SETPOINTS

HIGH TANK LEVEL - NN.N FT

LOW TANK LEVEL - NN.N FT

ALARM SILENCE

ALARMS LIST

WELL PUMPS STATUS

MAIN MENU

INSTRUMENTATION STATUS - NO INSTRUMENT FAILURES

PRESSURE TRANSMITTER FAILURE BACKUP MODE SETPOINTS

LEAD STARTS ON CLOSED PRESSURE SWITCH AND STOPS ON BELOW FLOW CALL AND OPEN PRESSURE SWITCH

LAG STARTS AND STOPS ON BELOW FLOW CALL SETPOINTS

PRESSURE SWITCH STATUS - OPEN

BACKUP LEAD STOP FLOW - #####GPM

BACKUP LAG START FLOW - #####GPM

BACKUP LAG STOP FLOW - #####GPM

BACKUP LEAD STOP PRESSURE - ###.# PSI

BACKUP MODE MUST BE MANUALLY ACTIVATED!!

BACKUP MODE SWITCH - OFF ON

FLOW METER FAILURE BACKUP MODE SETPOINTS

LEAD AND LAG START NORMALLY

LAG STOPS NORMALLY

LEAD STOPS ON BELOW SETPOINT INSTEAD OF LOW FLOW

ALARM SILENCE

ALARMS LIST

MAIN MENU

Programmable Logic Controller

- ▶ Microprocessor based controller with many inputs and outputs
- ▶ Rugged and dependable (no reboots)
- ▶ Digital and analog I/O
- ▶ Ladder logic is in the software
- ▶ Functionality increasing
- ▶ Cost decreasing



Programmable Logic Controller

▶ Pros:

- ▶ Can handle very complex control systems.
- ▶ Much less wiring required (logic is internal)
- ▶ Can be less expensive than hardwired panel for complex systems
- ▶ New control sequences can be incorporated by simple reprogramming
- ▶ Setpoints easily changed through panel HMI
- ▶ External communication (Ethernet)

▶ Cons:

- ▶ Panel HMI or laptop required to allow access to setpoints
- ▶ More expensive on simple systems

Hard-wired Relays

- ▶ Simple technology... NOT simple to use!
- ▶ Pros:
 - ▶ Individual relays - inexpensive / easily replaced
 - ▶ Setpoints and time delays are mechanically manipulated and adjusted (hardware specific)
- ▶ Cons:
 - ▶ Complex systems are intricate, complex & expensive
 - ▶ Numerous components to go bad
 - ▶ Not always easy to identify relays and wiring
 - ▶ Not easy to change
 - ▶ Easy to make setpoint mistakes
 - ▶ Cannot do some things that a PLC can
 - ▶ Control sequence can be modified within PLC without shutdown of system.

Remote Access

- ▶ All systems should incorporate capability
- ▶ Remote troubleshooting
- ▶ Saves service call dollars
- ▶ SCADA
- ▶ Modem
 - ▶ High-speed connection is preferred
 - ▶ Many components have on-board web servers
- ▶ Access times can be controlled by customer with use of remote access selector switch.
- ▶ VPN



Custom Applications



Hydroflo Support

- ▶ Custom mechanical & electrical design
- ▶ CAD drawings
- ▶ Specifications
 - ▶ Standard with pump-type and datasheet inserts
- ▶ Witness testing at no charge
- ▶ Full-service start-up
- ▶ Remote and on-site troubleshooting
- ▶ Pump warranty center



Summary

- ▶ Why?
 - ▶ Availability
 - ▶ Quality
 - ▶ Cost
 - ▶ Accountability
- ▶ Hydroflo Packaged Pumping Systems offer many advantages

