Integrated Pump and Logging Systems
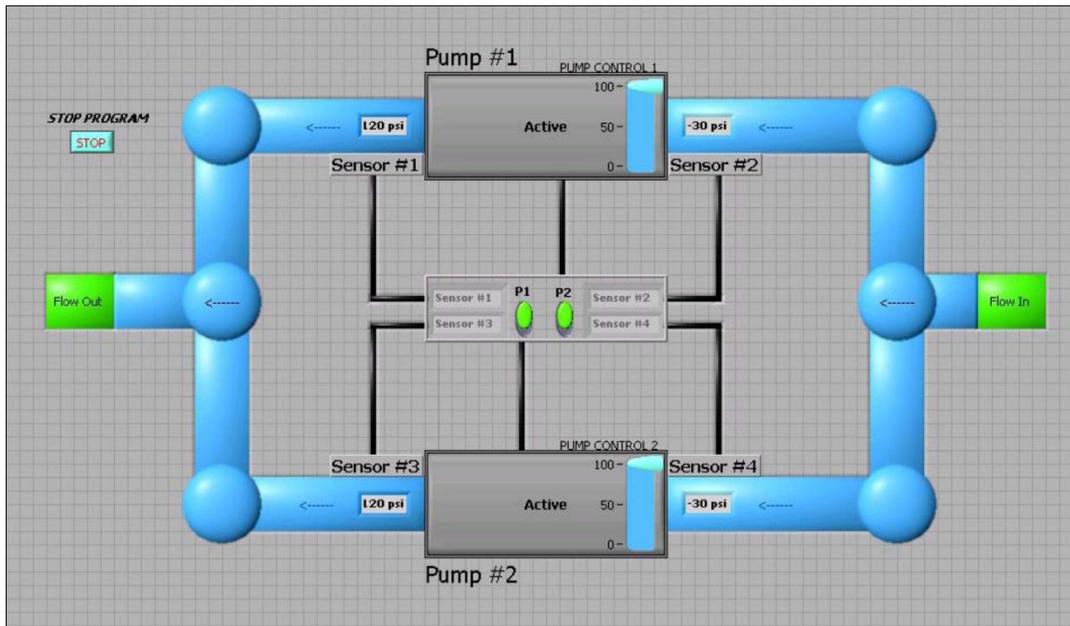
"IPALS"

Overview:

IPALS is designed as a remote monitoring system for pumps using cell phone service and text messaging for notification and remote turning on or off of relays. IPALS is setup to monitor input and output pressures of a pump and if these PSI's get out of desired specifications the system notifies a cell phone(s) via text messaging with the sensor readings and the condition of each of the relays. The operator can then text back instructions to IPALS, to remotely turn the relays on or off.

IPALS also offers the option to send reads to an online data logger. The system can log data in 15 Min (minute) intervals. That's 2800 data points per month. The logs can be used to see loss of seal on the pumps and help in scheduling preventive maintenance. The system dumps the data to our server every day, and if an immediate log is needed, you can force a data dump to our server with a text.

Cell Phone Security:

The commands for the relays can only be initiated by a text from cell phones on the users list. The system verifies the cell Id before acting on the text. If caller Id is normally withheld, the caller may have to de-activate the block for that call. (Normally just hitting *69 or alike before the call. Check with your Cell Service provider.)

System Hardware:

One IPALS can read up to 8 pumps (16 Sensors) and control up to 8 output relays. Each of the sensors must be located within 25' of the Control Box. The site for the location of the IPALS control must have access to cell service. The IPALS control box is powered by a standard 115vac connection. Upon loss of power IPALS switches to an internal battery backup system for operation during outages.

Notification:

IPALS notifies a list of cell phone numbers via text. It then waits for a confirmation text within a set time. If no one confirms the text, then IPALS texts the next number on the list until the text is confirmed.

Sample Text

```
Log # 1234567
S1 = 119   Pump 1   S2 = -32
S3 = 90    Pump2    S4 = -22
Relays On:  1, 2, 5
Relay Off:  3, 4, 6, 7, 8
Power is:  On
```

Sample Commands

```
OK    = Confirmed Text,  Do nothing
P2F   = Cancel Call outs for Pump 2
P2N   = Continue Call outs for Pump 2
R1N   = Turn Relay 1 ON
R5F   = Turn Relay 5 OFF
SRA   = Send Read Again (updated)
FLN   = Force Log to the Network
```

If you are notified in the middle of the night that Pump 2 is out of spec and you want to turn off Relay 2, and cancel notification on Pump 2, you would text:

```
R2F, P2F
```

And Send.

You would then get a confirming text:

```
S1 = 119   Pump 1   S2 = -32
Off        Pump2     Off
Relays On:  1, 5
Relay Off:  2, 3, 4, 6, 7, 8
Power is:  On
```

Call Logic

Text Cell #1
If no confirm in __ mins, **Call** Cell #1.
If no confirm in __ mins, Text Cell #2.
If no confirm in __ mins, **Call** Cell #2.
If no confirm in __ mins, Text Cell #3.
If no confirm in __ mins, **Call** Cell #3.

Reasoning… If someone is sleeping, they may not hear a text, where a call normally has a longer ring. The minutes between each call is user defined in the setup.

You then send text to confirm that it is correct.

```
OK
```

Now you have turned off Relay 2 and you will NOT be notified of any changes on Pump 2's sensors for 6 hours. So you can deal with it in the morning.

Internet Based Data Logger: Optional

IPALS communicates with the AquaFlow Int'l, Inc. server and keeps a log of the pump pressures, pump alarms and a log of all call-outs and call-ins. This is a great management tool. There are two main purposes of the logger.

First is accountability: The system logs when all the call-outs are, and how long it takes the "On Call Operator" to respond to the notifications. This helps provide management with the tools required for on-call accountability.

Second is pump preventive maintenance: Because IPALS keeps a log of the pressures, you can go back and look at the pump efficiency over time. If a pump is losing pressure over time, this is seen in the logs and preventive maintenance can be ordered, saving hundreds or thousands of dollars on a down pump.

System Requirements:

The System uses a cell phone Sims Card from ATT Cellular and requires an ATT Cell service contract. (Not provided by AquaFlow Int'l, Inc. Unlimited Text option is highly recommended.