

Reduce Operational Inconsistencies by Leveraging Automation

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FLUSHING WELLS

1A	1B	1C
2A	2B	2C
3A	3B	3C
4A	4B	4C

PRODUCTION WELLS

5B	2B	3B	1B
5A	3B	3B	1B
6A	1B	1B	1B

VALVES

10-VLV-1	10-VLV-3	10-VLV-2
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SKID CONTROL

2 NUMBER OF SKIDS TO OPERATE

SKID1 SKID2 SKID3

AUTO START AUTO STOP

AT LEAST TWO WELLS SELECTED FOR FLUSHING

LESS THAN TWO WELLS SUBSTITUTED

CORRECT AMOUNT OF PRODUCTION WELLS SELECTED

SKID AUTO OPERATION READY

RAW WATER FLUSH COMPLETE 500s SETPOINT 900s

SKIDS ISSUED COMMAND TO RUN

WELLS STARTED - TIMER HAS ELAPSED 110s

110s AUTO STOP TIMER (AFTER 40s WAITING FOR POST FLUSH TO COMPLETE)

SKID 1

READY WELL REQUIRED 0 sec

PRE FLUSH MODE 0 sec

RUNNING MODE 0 sec

POST FLUSH MODE 0 sec

1ST STAGE PRESSURE 136.86 PSI

2ND STAGE PRESSURE 159.99 PSI

TOTAL PERMEATE FLOW 384.50 GPM

CONCENTRATE FLOW 111.24 GPM

INLET CONC 57%

Feed Pump Interstage Pump

SKID 2

READY WELL REQUIRED 0 sec

PRE FLUSH MODE 0 sec

RUNNING MODE 0 sec

POST FLUSH MODE 0 sec

1ST STAGE PRESSURE 132.53 PSI

2ND STAGE PRESSURE 155.52 PSI

TOTAL PERMEATE FLOW 396.75 GPM

CONCENTRATE FLOW 134.70 GPM

INLET CONC 57%

Feed Pump Interstage Pump

SKID 3

READY WELL REQUIRED 0 sec

PRE FLUSH MODE 0 sec

RUNNING MODE 0 sec

POST FLUSH MODE 0 sec

1ST STAGE PRESSURE 8.49 PSI

2ND STAGE PRESSURE 8.82 PSI

TOTAL PERMEATE FLOW 8.39 GPM

CONCENTRATE FLOW 0.55 GPM

INLET CONC 0%

Feed Pump Interstage Pump

CHEMICALS

CL2 PUMPS	NaOH PUMPS	SCALE INHIB PUMPS	FLUORIDE PUMPS
1 34 Hz STOP	1 34 Hz STOP	1 24 Hz STOP	1 24 Hz STOP
2 0 Hz STOP	2 0 Hz STOP	2 0 Hz STOP	2 0 Hz STOP
3 0 Hz STOP	3 0 Hz STOP		

DAY TANK 3.65 FT DAY TANK 3.52 FT DAY TANK 389.61 LBS DAY TANK 540.80 LBS

STORAGE AND DISTRIBUTION

GST 1 15.86 FT

GST 2 15.71 FT

PRESSURE 65.03 PSI

FLOW 1399.86 GPM

PRE DEGAS

pH 5.81

Low Alarm High Alarm

CONDUCTIVITY 565.38 uS/CM

FINISHED WATER

pH 7.85

Low Alarm High Alarm

CL2 RESIDUAL 1.41 PPM

Low Alarm

DISTRIBUTION

pH 7.81

CL2 RESIDUAL 1.86 PPM

Navigation Bar: Overview, Plant Control, Auto Control, Well 1-6, Deep Inj Well, RD Pretreatment, RD Train 1-3, Degasifiers, Transfer PS, GST R/High Service PS, Waste PS R/ O22 System, Fluoroclick, Sod Hydro Sod Hydro, Generators, Scl Inj

Bottom Panel: PSI, Alarm Sum, Alarm Hist, Trends Query, System View, Trends, Runtimes, Cycle Counts, Flow Totals, Print Screen, Calculator, Logon, Logoff, Exit

Status Bar: 10/2/2018 6:44:48 AM, None, 99990

The City of Oldsmar, Florida was looking for a way to reduce operational inconsistencies by leveraging automation. Although the City's reverse osmosis (RO) plant was already equipped with current SCADA technology that successfully monitored and controlled the facility, the City wanted to implement an automatic, user-friendly system to ensure all five operators would start up and shut down the RO plant with the same consistent procedure.

McKim & Creed worked with City staff to identify enhancements that would accomplish that goal. Upgrades included adding an automatic startup and shutdown feature, regulating the number of wells that run during startup, and reducing raw water usage.

The benefits of the plant automation had an immediate return on investment. The automated shutdown sequence prevented water hammer and helped reduce the stress on the membranes. By regulating the number of wells running during startup, the SCADA system automation reduced the feed pressure to the membranes as the system transitioned from pre-flush to startup. This regulation of the wells also improved the quality of the water by maintaining a level that kept sand from being introduced into the flow.

Also included in the automation was the addition of time-based flushing for the raw water line sequences. Prior to this enhancement, the operators turned on the flush cycle and ran the raw water until they determined the incoming 16-inch raw water feed line was clear of any sediment. If an operator was called away to address a different issue, the raw water flush sequence could remain running for much longer than necessary, wasting precious raw water. By using the SCADA system to monitor and control the flush cycle, the plant only performs the flush for the necessary time, thereby reducing the raw water usage.

Recognizing that even the best automation is not worth the investment if it isn't user friendly, McKim & Creed worked with the City to create an easy-to-use, single-button interface. This button resides on the SCADA screen in the control room and is also accessible through City iPads connected to the SCADA system. Operators can easily press the button to initiate automatic control regardless of their location, which is helpful in emergency situations and during routine site tours.

"This programming has allowed us to take the plant to the next level by alleviating stress on equipment and reducing wasted process water," said Chief Operator Sam Cruz