**Functional Description for Chlorine injection into Wetwells**

Chlorine solution is abbreviated as CL2 throughout this document.

The "Wet Well CL2 Injection" control strategy is designed to inject CL2 into the wet well when all the pumps at the site stop running.

When the "all pumps off" signal transition from 0 to 1, a one-shot function block is triggered to start the CL2 pump for a user specified duration. The CL2 pump will remain running at a user specified speed/stroke until the run duration expires. The CL2 pump remains off until the "all pumps off" signal transitions from 0 to 1 again.

The trigger for the one-shot is a logical AND of the inverted pump running signals. The PUMP\_START function block may be placed into "Auto", "Hand", or "Off". When placed in "Auto", the output is the logical AND of the inverted running signals. When placed in "Hand", the output is set to one; normally used during site commissioning and testing. When placed in "Off", the output is set to zero; normally used during site commissioning and testing. This function block will remain in automatic during normal operations.

The ONE\_SHOT function block generates a user defined pulse duration when triggered by the PUMP\_START. The ONE\_SHOT supports timing units of seconds or minutes; the example strategy runs the CL2 pump for 60 seconds. The "Function Type" defines either "One-Shot" (0) or "Square Wave" (1) output; the example strategy uses "One-Shot". The "Time Units" define either "Seconds" (1000) or "Minutes" (60000); the example strategy uses "Seconds". The "Pulse On" time defines the active duration; the example strategy uses 60 seconds. The "State Timer" indicates the number of time units remaining for the current output. When a "One-Shot" event has been triggered, OUTPUT\_A is active for the defined duration.

The ONE\_SHOT may be placed in "OOS", "Auto", or "Man". When placed in "OOS", the block is "out-of-service" and all outputs are deactivated.

When placed in "Auto", the output is activated on a zero to one transition on input-50. When placed in "Man", manual pulsed may be generated of a user defined duration. The "Pulse" poke point while in "Manual" starts an output pulse of a user specified duration. The "Reset" poke point while in "Manual" resets the output pulse.

The CL2\_PUMP control is a standard start/stop pump controller. Two inputs are provided to monitor the CL2 pump: pump running and pump failure.

The pump running input indicates when the pump has started and is used to verify the correct control response. The pump failure results in fault condition reported as "Drive Fault"; this fault auto clears when the pump failed signal is removed. The CL2\_PUMP may be placed in "OOS", "Auto", "Hand", or "Off". When placed in "OOS", the block is "out-of-service" and all outputs are deactivated. When placed in "Auto", the control output is activated when the controller is called to start by the ONE\_SHOT. When placed in "Hand" or "Off", the CL2 may be started and stopped manually; normally used for site commissioning and testing. If the pump running signal is not received within a user defined timeout when the pump is called to start, a "Failed to start" alarm is generated and the CL2\_PUMP block is locked out until reset by the operator. If the pump not running signal is not received within a user defined timeout when the pump call is dropped, a "Failed to stop" alarm is generated and the CL2\_PUMP block is locked out until reset by the operator.

The control strategy uses two digital outputs (pump enable and hardware reset) and one analog output (pump speed). The pump enable digital output is activated when the CL2\_PUMP block is in "Auto" and the pump is called to start or when the CL2\_PUMP is set to "Hand". The hardware reset output is activated for five seconds when the "HW Reset" poke point is initiated by the operator. The pump speed is a 4-20mA output which remains active at all times. The output current is set by the PUMP\_SPEED\_SP which is scaled 0 to 100% (4 to 20mA).