SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

HEARING REGARDING
ADMINISTRATIVE CIVIL LIABILITY COMPLAINT
NO. R9-2010-0085
ISSUED TO

EASTERN MUNICIPAL WATER DISTRICT,
TEMECULA VALLEY REGIONAL WATER RECLAMATION FACILITY

SCHEDULED FOR OCTOBER 13, 2010

DECLARATION OF

ARTHUR BEAVENS

I, ARTHUR BEAVENS, declare:

I am President of Beavens Systems, Inc., which, among other things, designs, sells and installs SCADA (Supervisory Control and Data Acquisition) Systems for wastewater treatment facilities (hereafter "plants"). These systems operate, monitor and provide operational status reports on treatment processes.

I have a Bachelor of Science Degree in Chemical Engineering from Oregon State University and have been in the Control Systems business for over 50 years, with the last 34 years as President of Beavens Systems Inc. I also hold a Professional Control Systems Engineering licence #1541 from the State of California.

I am familiar with the SCADA System at Eastern's Temecula Valley Plant and am generally familiar with the events surrounding the spill that occurred on Christmas Day,

3008, at that Plant. My company did not design or install the original SCADA System at the Temecula Valley Plant but did help add facilities around 1992, and then again to increase flow capacity in about 2002.We have since provided additional systems there and at the three other plants operated by EMWD.

EMWD's Plant Expansions, including SCADA System modifications, are designed by a number of different Engineering firms and, although provide similar functions, are unique to each plant. We try to employ as many common features as we possible (e.g., all four plants use the same General Electric Intellution Fix32 SCADA System software along with Allen-Bradley PLC-5 field hardware) but, although the basic systems are the same, the physical makeup of the treatment processes are different at each plant and the systems are unique in that they are designed and set up differently to address those differences. Plant personnel may also request various changes which are unique to their plant.

There is, to my knowledge, no "universal" SCADA Systems standard in the industry; nor is there any such "standard" among EMWD's four systems. Neither is there an "old" or "new" SCADA System; the hardware and operating software is the same, so it is not like one system is "modern" and another is "outdated." The alarm systems at all four plants were setup using the ISA (Instrument Society of America) standard ISA-A Annunciator Sequence, with a SCADA Screen representation of a Hardwired Annunciator with light boxes. These Hardwired Annunciators consist of rows and columns of

backlighted windows. Because the SCADA equivalent typically requires more than one screen, an operator must check multiple screens to see all potential alarms. The ISA-A sequence operates as follows:

A new alarm triggers lamps in the corresponding window, which then flash to indicate a new unacknowledged alarm.

At the same time a horn and/or strobe is energized to alert an operator (signal to OMC, and then their call to standby operator in this case).

The operator goes to the Annunciator Panel (connection via laptop), checks any flashing windows, determines what if any action is required, and then presses the ACK button to silence the Horn (OMC), and turn any flashing window(s) to a steady light. When the alarm clears, the lighted window is extinguished.

When the SCADA Annunciator was added to the Temecula Plant in 2002, the PLC fail function was implimented as a Communications Fail, which would alarm for either Communication Fail or PLC Fail. A software alarm system (SCADAlarm) was requested as well. This was to directly alert operators to provide redundancy. This operated over a dial-up telephone line and was triggered by a common coil in YIC-10. If any PLC had an active alarm, the telephone would call to alert operators, as well as reporting to OMC. After receiving the SCADAlarm call, the operator could acknowledge the alarm via the telephone, and release the system for another alarm. This necessitated doing the same for the "PLC Comm/Fail" alarm. The Common Alarm coil

for each PLC which triggered this call-out, also went to the OMC via radio. Sometime through the years, the telephone dialer was removed and only OMC notification was used. The current setup for Temecula, and the other plants, modifies the ISA-A sequence to essentially allow the horn (actually signal to OMC) to continue as long as a "PLC Comm/Fail" alarm is active. A standard ISA-A annunciator would not have this option. To make use of this modification, the OMC personnel would need to make additional determinations before deciding to take any new action.

My company normally receives requests for additions and modifications to EMWD SCADA Systems as the need or opportunity arises, but there was no indication that the Temecula Valley SCADA System was in need of change before December 25, 2009, as respected the "clearing" of alarms.

To my knowledge, there was no problem with the alarm clearance portion of the design of the Temecula Valley SCADA System before December 25, 2009, and no reason to change it. In fact, the design operated exactly as intended (ISA-A) on that day, but a "perfect storm" of events occurred that resulted in the spill on that day. The same thing would have happened had it been a Hardwired Annunciator. Those events included the fact that the intermittent arcing of the wiring supplying power to PLC 12 (formerly YIC 12) caused it to stop program execution, which in turn triggered the "watchdog timer" in PLC 10 (the function of which is to monitor all of the 14 PLC's in place at the Temecula Valley plant, and alert the OMC), but also prevented it from sending "run commands" to the bar

screens in the headworks. If PLC 12 had totally shut down because of a full power outage, the SCADA screen would have shown the bar screens in red, indicating that they were not running, or that there was a communications/PLC failure. Because of the "lock up" however, PLC 12 continued to report the last information it had scanned, which was that the bar screens were operating. This caused the SCADA screen to continue indicating them in green, which would lead an operator to believe they were in fact operating.

The SCADA System at Temecula Valley has been modified since the spill so that PLC "communication/fail" alarm to OMC cannot be cleared by acknowledgment and will appear on the first rather than the last annunciator screen. That does not mean, however, that the system was previously out of date or defective; as mentioned above, it operated as it was designed and intended to operate.

I declare under penalty of perjury that the foregoing is true and correct.

DATED this 21 day of September, 2010, at Honolulu, Hawaii.

Arthur Beavens

ARTHUR BEAVENS

FILENAME \p X:\WP2000\Jane\WDS\EMWD\EVIEWRF - RWQCB - Christmas Spill\Alt Chgs to Declaration of Arthur Beavens BSI modification Rev2 (2).doc