

**SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD**

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

**EASTERN MUNICIPAL WATER DISTRICT,  
TEMECULA VALLEY REGIONAL WATER RECLAMATION FACILITY**

**SCHEDULED FOR OCTOBER 13, 2010**

**DECLARATION OF**

**ROBERT NARANJO**

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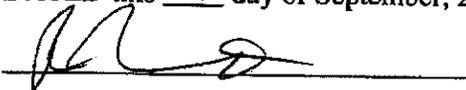
I, ROBERT NARANJO, declare:

I have worked as a Wastewater Plant Controls Technician for 14 years, the last four years as a Senior Wastewater Plant Controls Technician at EMWD. I am assigned to the San Jacinto and Temecula Valley Regional Wastewater Reclamation Facilities; I am one of the "go-to" guys regarding the SCADA Systems. I have an Associate of Science Degree from the Community College of the Air Force in Systems Management, with additional course work in Mathematics and Computer Science from Mt San Jacinto Community College. I hold a current CWEA Grade III Electrical Control and Instrumentation Technologist Certificate, No. 05017302.

I have investigated the circumstances leading up to and surrounding the spill at the Temecula Valley Facility on December 25, 2009, and have prepared the attached "Review of Release Events."

I declare under penalty of perjury that the foregoing and the information set forth in the attached "Review of Release Events" is true and correct.

DATED this 21 day of September, 2010, at Perris, California.



ROBERT NARANJO

## Attachment to Declaration of Robert Naranjo

### Review of Release Events

The following discussion describes that SCADA alarms and operator responses that let up to the release.

#### December 24, 2009

08:42:55.5 [AWT1] PAL\_173\_11 CFN LO **GritPump #3 Suction pressure low**  
08:43:20.5 [AWT1] DISPATCH\_ALARM CFN ACTIVE A DISPATCH ALARM IS ACTIVE  
08:43:20.5 [AWT1] TELEMETRY\_ALARM CFN CALLOUT A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
08:45:55.0 [AWT1] YIC12\_ALM\_ACK.F\_0 set to 1.000 by AWT1::1737  
08:45:55.2 [AWT1] YIC12\_COMMFAIL\_ACK.F\_0 set to 1.000 by AWT1::1737  
08:46:10.5 [AWT1] DISPATCH\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE  
08:46:10.5 [AWT1] TELEMETRY\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE FOR SCADALARM

On December 24, 2009 while operations staff were on shift, the grit pump #3 low suction pressure alarmed. Staff acknowledged the alarm releasing it from the IOC. Operations staff proceeded to trouble shoot the system. Operations staff determined that the grit pump was moving grit as designed and place the pump into local control that overrode the automatic control. A work order was generated for maintenance staff to evaluate at a later date.

#### December 25, 2009

08:17:00.5 [AWT1] LAHH\_125\_11 CFN HIHI **Rag Washer High High Level**  
08:17:10.5 [AWT1] DISPATCH\_ALARM CFN ACTIVE A DISPATCH ALARM IS ACTIVE  
08:17:10.5 [AWT1] TELEMETRY\_ALARM CFN CALLOUT A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
  
08:19:15.8 ANTHONY JIMENEZ logged in as Application User  
08:19:23.5 [AWT1] YIC12\_ALM\_ACK.F\_0 set to 1.000 by AWT1::1423  
08:19:23.7 [AWT1] YIC12\_COMMFAIL\_ACK.F\_0 set to 1.000 by AWT1::1423  
08:19:40.5 [AWT1] DISPATCH\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE  
08:19:40.5 [AWT1] TELEMETRY\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
  
=====

08:36:30.5 [AWT1] LAHH\_125\_11 CFN HIHI **Rag Washer High High Level**  
08:36:50.5 [AWT1] DISPATCH\_ALARM CFN ACTIVE A DISPATCH ALARM IS ACTIVE  
08:36:50.5 [AWT1] TELEMETRY\_ALARM CFN CALLOUT A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
  
08:39:52.6 ANTHONY JIMENEZ logged in as Application User  
08:39:59.2 [AWT1] YIC12\_ALM\_ACK.F\_0 set to 1.000 by AWT1::1423  
08:39:59.3 [AWT1] YIC12\_COMMFAIL\_ACK.F\_0 set to 1.000 by AWT1::1423  
08:42:00.5 [AWT1] LAH\_125\_11 OK OK **Rag Washer High Level**  
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On December 25, 2009 while operations staff were on shift, the rag washer alarmed several times and operations responded to the alarms as needed, by making adjustments.

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December 25, 2009 (continued)

12:12:50.5 [AWT1] YA\_125D\_11 CFN FAIL Rag Washer Spiral Failed  
12:12:50.5 [AWT1] IAH\_125B\_11 CFN HI Rag Washer Spiral High Current  
12:13:20.5 [AWT1] DISPATCH\_ALARM CFN ACTIVE A DISPATCH ALARM IS ACTIVE  
12:13:20.5 [AWT1] TELEMETRY\_ALARM CFN CALLOUT A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
12:18:15.5 [AWT1] LAHH\_125\_11 CFN HIHI Rag Washer High High Level

12:34:59.6 JAMES KING logged in as Application User  
12:36:01.3 [AWT1] YIC12\_ALM\_ACK.F\_0 set to 1.000 by AWT3::1811  
12:36:02.2 [AWT1] YIC12\_COMMFAIL\_ACK.F\_0 set to 1.000 by AWT3::1811  
12:45:50.5 [AWT1] DISPATCH\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE  
12:45:50.5 [AWT1] TELEMETRY\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE FOR SCADALARM

12:57:25.5 [AWT1] LAHH\_125\_11 CFN HIHI Rag Washer High High Level  
12:59:50.5 [AWT1] LAHH\_125\_11 OK OK Rag Washer High High Level  
13:06:20.5 [AWT1] LAHH\_125\_11 CFN HIHI Rag Washer High High Level  
13:08:50.5 [AWT1] LAHH\_125\_11 OK OK Rag Washer High High Level  
13:12:00.5 [AWT1] YA\_125B\_11 CFN FAIL Rag Washer Agitator Fail Alarm  
13:12:00.5 [AWT1] TAH\_125A\_11 CFN HI Rag Washer Agitator High Motor Temperature  
13:27:46.7 JAMES KING logged in as Application User  
13:27:57.4 [AWT1] LAHH\_130\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.4 [AWT1] LAH\_125\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.4 [AWT1] LAHH\_125\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.4 [AWT1] YA\_125B\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.4 [AWT1] TAH\_125A\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.5 [AWT1] YA\_125D\_11 ALARM is acknowledged by AWT1::1811  
13:27:57.5 [AWT1] TAH\_125B\_11 ALARM is acknowledged by AWT1::1811  
13:47:47.0 Login Timed Out of Application User JAMES KING

Later that day, the Rag Washer alarms again, however staff is not on-site. The operator is notified by the Integrated Operations Center (IOC) of the alarm, and logs into SCADA System remotely from home. Operator acknowledges Rag Washer Failure, releasing alarm from Plant to IOC. Operator dispatches to Plant, and realizes Rag Washer spiral ejection auger is broken. Operator bypasses Rag Washer, and goes home. The Rag Washer poses no threat, neither is it an indication of a pending release.

December 25, 2009 (continued)

15:41:30.5 [AWT1] YIC12\_COMM\_FAIL CFN FAIL YIC12 ALARM STATION COMM FAIL  
15:41:30.5 [AWT1] DISPATCH\_ALARM CFN ACTIVE A DISPATCH ALARM IS ACTIVE  
15:41:30.5 [AWT1] TELEMETRY\_ALARM CFN CALLOUT A DISPATCH ALARM IS ACTIVE FOR SCADALARM  
15:46:57.8 Connection is established with node AWT3  
15:42:10.7 JAMES KING logged in as Application User  
15:42:17.5 [AWT1] YIC12\_ALM\_ACK.F\_0 set to 1.000 by AWT3::1811  
15:42:18.3 [AWT1] YIC12\_COMMFAIL\_ACK.F\_0 set to 1.000 by AWT3::1811  
15:51:30.5 [AWT1] DISPATCH\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE  
15:51:30.5 [AWT1] TELEMETRY\_ALARM OK OFF A DISPATCH ALARM IS ACTIVE FOR SCADALARM

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At 15:41 the YIC12 COMM\_FAIL alarmed the IOC. IOC notifies the Operator and he logs onto SCADA System from home. According to Operator account, he identifies a "Grit Pump #3" alarm located on the 1<sup>st</sup> of 3 Alarm screens, refer to Exhibit 1. He "clicks" the acknowledge button on the 1<sup>st</sup> Alarm Screen, releasing the alarms from Plant to IOC. He proceeds to the Headworks Process screen, without viewing the remaining 2 Alarm screens. Everything appears to be normal on the Headworks Process screen. Operator logs off Scada System without identifying the YIC12 COMM\_FAIL alarm. He assumes the alarm was from the Grit Pump #3, the same alarm that he had been experiencing earlier.

However, at 15:41 the YIC12 COMM\_FAIL alarmed because the PLC 12 had faulted. The faulted PLC no longer provided the run signal to clear debris collecting on the Barscreen. The release is initiated.

Although redundant high level controls are regularly tested and operational, they are useless since they also are initiated through PLC 12. When staff arrived the following day, they quickly open bypass channel ending the release, and mobilize clean-up efforts. They also dispatch me, the on-call Plant Control Technician at 6:20 AM. Upon arrival, I log onto the Scada computer, and toggle through the YIC 12 Alarm screens, discovering a "YIC12 Comm Fail" alarm actively flashing red on the 3<sup>rd</sup> Alarm screen. I walked from the office to motor control center (about 50 yards) and reset PLC 12 by cycling the keyed switch. The PLC immediately regained control, and turned all equipment on (including Barscreens). On-line analysis using diagnostic tools yielded no defects in the PLC. Since no defects were found, Control Technicians installed additional controls, so the root cause could be further analyzed.

#### Root Cause Analysis

Several weeks after the release, operations staff report to plant control technicians that they were experiencing erratic control at PLC 12 Headworks area. Plant Control Technicians responded immediately to troubleshoot while the intermittent problem was active. Technicians discovered that faulty wiring between the supply circuit breaker and the Uninterruptable Power Supply (UPS), is rapid cycling erratic and intermittent power to the PLC, causing it to fault in a unique way. The wiring insulation had been damaged, most likely during initial construction in 2003. Over the years, the exposed copper wiring had deteriorated to the point where the wires began to intermittently arc, reducing the power to the PLC but not to the point where it absolutely shut down. The damage to the wires was in an underground conduit and could not be seen without pulling the wires out of the conduit. Electrical installations of this nature, are undisturbed permanent installations. Installed correctly, they will perform as designed indefinitely without inspection or maintenance. There is no industry standard or practice to inspect or maintain this type of electrical installation. New wiring was installed, and the PLC has experienced no failure since. Since the PLC was never defective, it remains in service today. See the attached Exhibit 2, "Schematic of the Motor Control Center".

#### Summary

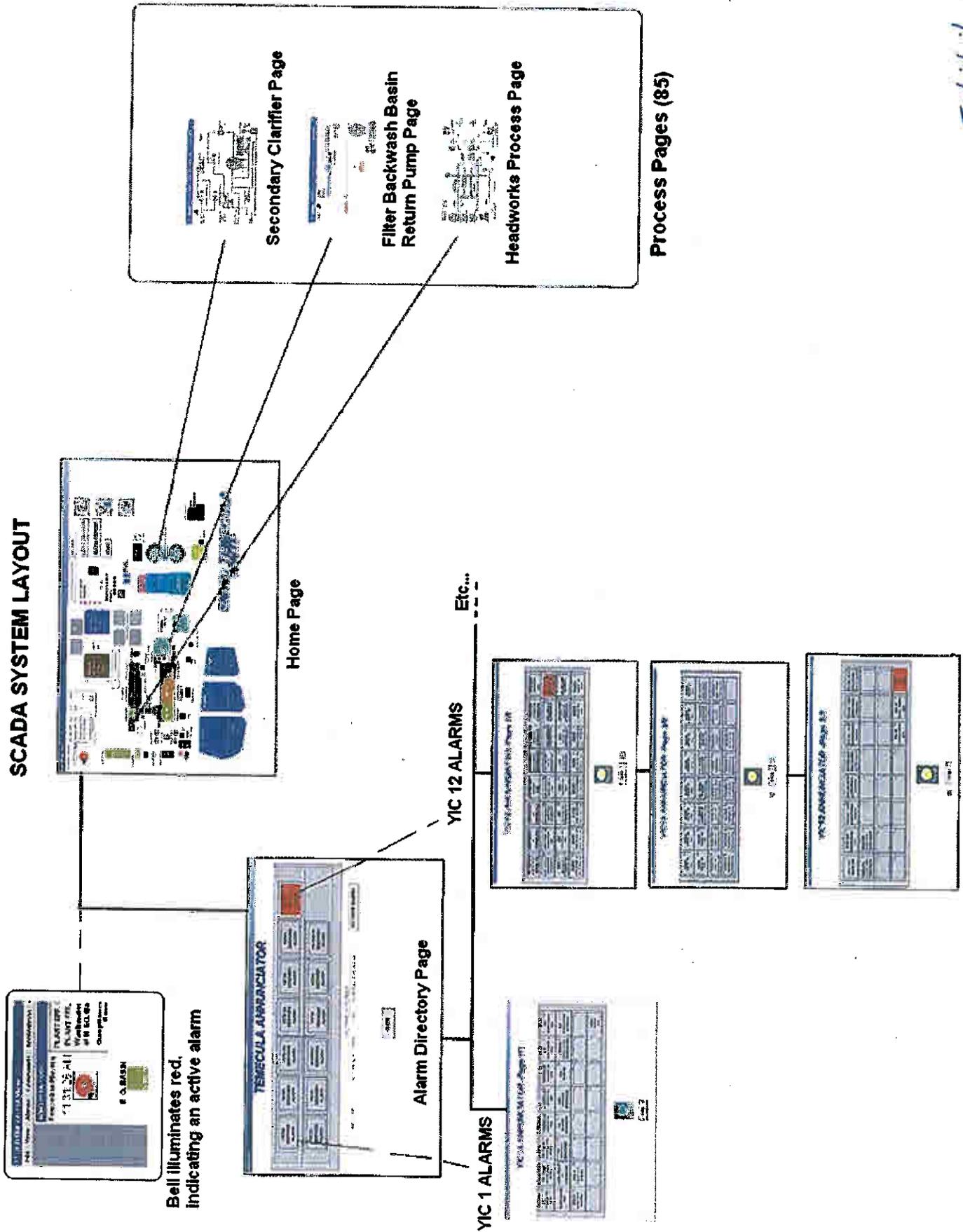
Faulty wiring installed 6 years prior to the release cascaded into a series of unforeseen events, resulting in the release. Untimely failures of low priority equipment, masked the underlying high priority alarm, causing the Operator to be unaware of the pending release. Further compounding the incident was an unanticipated interaction between the Operator, Scada System, and IOC, specific to the rare nature of a PLC failure. This allowed the function of the acknowledge control, to dismiss the alarm from Plant to IOC. This function, or logic bit, was a result of

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transcended programming performed 15 years ago, when equipment malfunctions did not have the ability to create a release. The upgrade from Channel Augers to "total" debris removing Barscreens gave the new equipment this ability. The upgrade from telephone dialer to wide band microwave communication, unknowingly transcended the single channel function of a dialer to the acknowledge control logic no longer necessary with unlimited data transfer. All of these "What ifs" were oversights, not due to neglect, lack of motivation, or dereliction to duty. All of these factors have been reviewed, and improved upon at all four of our Wastewater Treatment Plants, assuring this will not happen again.

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**SCADA SYSTEM LAYOUT**

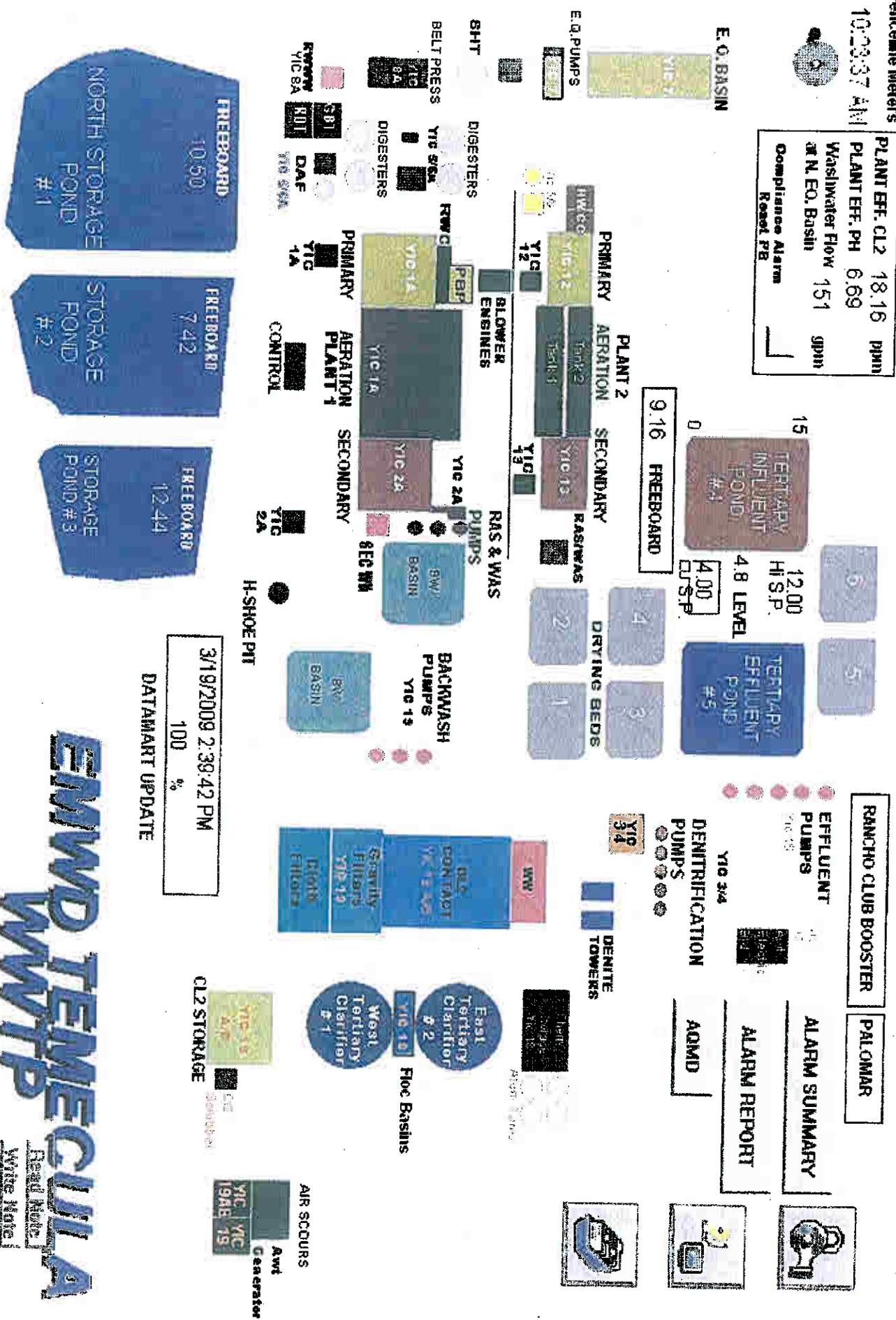


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Exhibit 1

FenceLine Meters  
10/23/07 AM

PLANT EFF. CL2 18.16 ppm  
PLANT EFF. PH 6.69  
Wastewater Flow 151 gpm  
at N. EQ. Basin  
Compliance Alarm  
Reset PB



3/19/2009 2:39:42 PM  
100 %  
DATAMART UPDATE

**EMWD TEMECULA WWTTP**  
Read More / Write Note

As 9/21/10

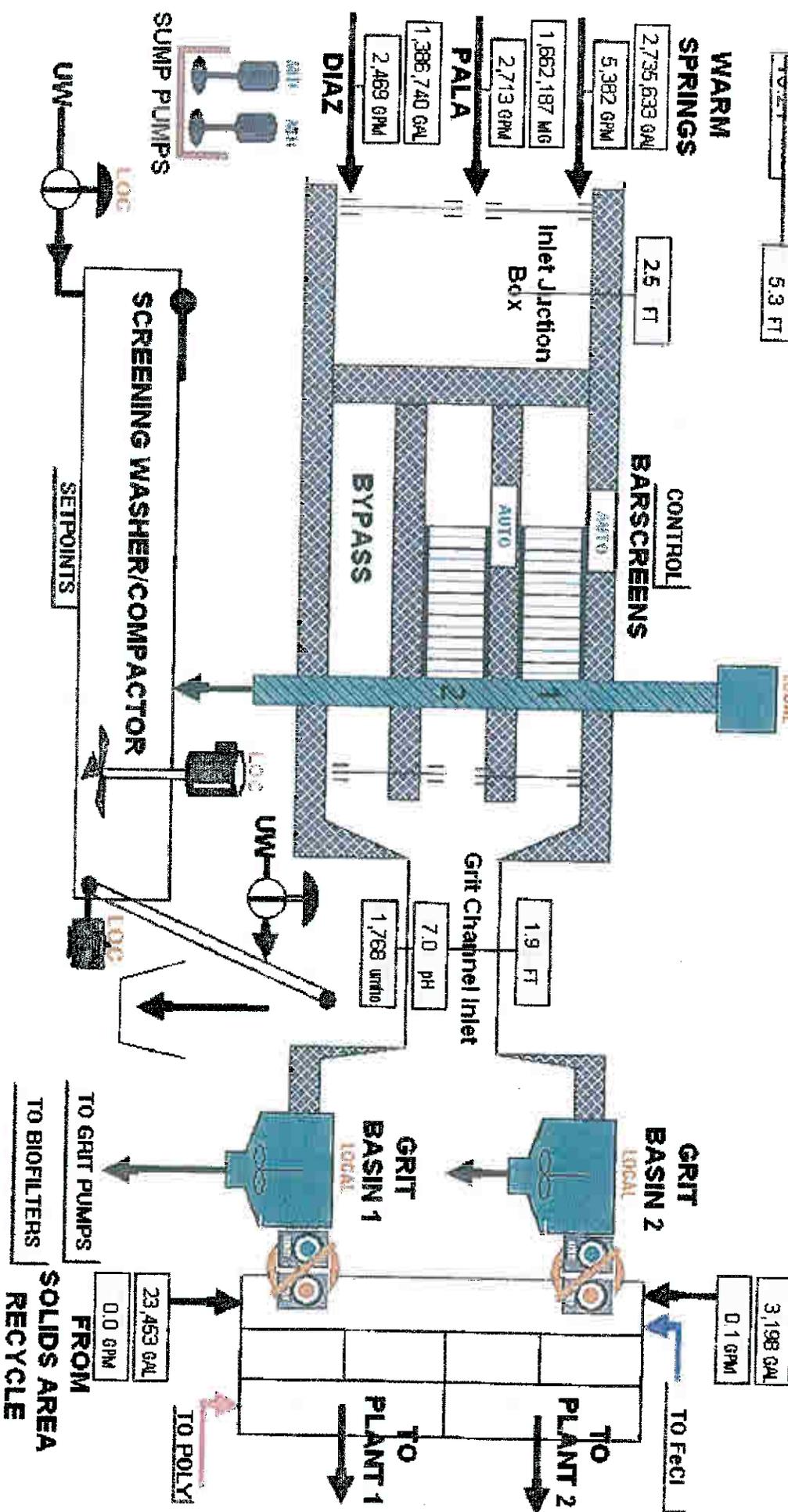
Exhibit 1A

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ALARM SUMMARY

FROM  
FOUL AIR  
TREATMENT



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Exhibit 1-B

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<input checked="" type="checkbox"/> INF. JUNCTION BOX HI LEVEL/SENSOR FAIL	<input checked="" type="checkbox"/> BARSCREEN #1 COMMON FAIL	<input checked="" type="checkbox"/> BARSCREEN #2 COMMON FAIL	<input checked="" type="checkbox"/> RAIL WASTEWATER COMMON FAIL	<input checked="" type="checkbox"/> HEADWORKS SUMP PUMPS COMMON ALARM	<input checked="" type="checkbox"/> GRTT CHAMBER INLET HI LEVEL	<input checked="" type="checkbox"/> SCREENING CONVEYOR COMMON FAIL	<input checked="" type="checkbox"/> SCREENING CONVEYOR ESD
<input checked="" type="checkbox"/> GRTT BASIN #1 FLOW PROP. OVERLOAD	<input checked="" type="checkbox"/> GRTT BASIN #1 FLOW PROP. ESD	<input checked="" type="checkbox"/> GRTT BASIN #2 FLOW PROP. OVERLOAD	<input checked="" type="checkbox"/> GRTT BASIN #2 FLOW PROP. ESD	<input checked="" type="checkbox"/> RUFF WATER VALVES COMMON FAIL	<input checked="" type="checkbox"/> GRTT PUMP #1 COMMON FAIL	<input checked="" type="checkbox"/> GRTT PUMP #2 COMMON FAIL	<input checked="" type="checkbox"/> GRTT PUMP #3 COMMON FAIL
<input type="checkbox"/> GRTT WASHER #1 COMMON FAIL	<input checked="" type="checkbox"/> GRTT WASHER #1 ESD	<input type="checkbox"/> GRTT WASHER #2 COMMON FAIL	<input checked="" type="checkbox"/> GRTT WASHER #2 ESD	<input type="checkbox"/> LINE FEEDER #1 COMMON FAIL	<input type="checkbox"/> LINE FEEDER #2 COMMON FAIL	<input type="checkbox"/> ADT POLYMER BLENDERS COMMON FAIL	<input type="checkbox"/> ADT POLYMER EYEWASH
<input checked="" type="checkbox"/> SLUDGE COLLECTION #1 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE COLLECTION #2 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE COLLECTION #3 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE COLLECTION #4 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE COLLECTION #5 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE COLLECTION #6 COMMON FAIL	<input checked="" type="checkbox"/> SLUDGE VALVE 1A FAIL	<input checked="" type="checkbox"/> SLUDGE VALVE 1B FAIL



EXHIBIT 1-C

# VIC12 ANNUNCIATOR Page 2/3

<input type="checkbox"/> SLUDGE VALVE 2A FAIL	<input type="checkbox"/> SLUDGE VALVE 2B FAIL	<input type="checkbox"/> SLUDGE VALVE 3A FAIL	<input type="checkbox"/> SLUDGE VALVE 3B FAIL	<input type="checkbox"/> SLUDGE VALVE 4A FAIL	<input type="checkbox"/> SLUDGE VALVE 4B FAIL	<input type="checkbox"/> SLUDGE VALVE 5A FAIL	<input type="checkbox"/> SLUDGE VALVE 5B FAIL
<input type="checkbox"/> SLUDGE VALVE 6A FAIL	<input type="checkbox"/> SLUDGE VALVE 6B FAIL	<input checked="" type="checkbox"/> PR1. SLUDGE GRINDER #1 COMMON FAIL	<input checked="" type="checkbox"/> PR1. SLUDGE PUMP #1 COMMON FAIL	<input checked="" type="checkbox"/> PR1. SLUDGE GRINDER #2 COMMON FAIL	<input checked="" type="checkbox"/> PR1. SLUDGE PUMP #2 COMMON FAIL	<input checked="" type="checkbox"/> PR1. CLAUSTRATED DRAIN PUMP COMMON FAIL	<input checked="" type="checkbox"/> PR1. SLUDGE SLIMP PUMPS COMMON FAIL
<input checked="" type="checkbox"/> FERRIC CL. PUMP #1 COMMON FAIL	<input type="checkbox"/> FERRIC CL. PUMP #2 COMMON FAIL	<input checked="" type="checkbox"/> FERRIC CL. PUMP #3 COMMON FAIL	<input checked="" type="checkbox"/> FERRIC CL. STORAGE TANK COMMON FAIL	<input checked="" type="checkbox"/> FERRIC CHLORIDE EYEWASH	<input checked="" type="checkbox"/> BIOPFILTER FAN #1 COMMON FAIL	<input type="checkbox"/> BIOPFILTER FAN #2 COMMON FAIL	<input checked="" type="checkbox"/> BIOPFILTER SLIMP PUMPS COMMON FAIL
<input checked="" type="checkbox"/> AERATION BLOWER #1 COMMON FAIL	<input checked="" type="checkbox"/> AERATION BLOWER #1 VALVES FAIL	<input checked="" type="checkbox"/> AERATION BLOWER #2 COMMON FAIL	<input checked="" type="checkbox"/> AERATION BLOWER #2 VALVES FAIL	<input checked="" type="checkbox"/> AERATION BLOWER #3 COMMON FAIL	<input checked="" type="checkbox"/> AERATION BLOWER #3 VALVES FAIL		



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EXHIBIT 1-D

# VIC12 ANNUNCIATOR - Page 3/3

<input checked="" type="checkbox"/> JOHN ZINK FLARE FAIL	<input checked="" type="checkbox"/> JOHN ZINK COMMUNICATE FAIL	<input checked="" type="checkbox"/> GEN ENG. #117 ADMN PERMIT ALARM	<input checked="" type="checkbox"/> GEN ENG. #117 ADMN PERMIT WARNING	<input checked="" type="checkbox"/> BEN ENG. #117 APRC STATUS/ COMM. ALARM	<input checked="" type="checkbox"/> BEN ENG. #120 ADMN PERMIT ALARM	<input checked="" type="checkbox"/> BEN ENG. #120 ADMN PERMIT WARNING	<input type="checkbox"/> BEN ENG. #120 APRC STATUS/ COMM. ALARM
<input type="checkbox"/> JOHN ZINK FLARE LOW TEMP WARN	<input type="checkbox"/> JOHN ZINK FLARE LOW TEMP ALARM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> VIC-12 24VDC POWER FAIL	<input checked="" type="checkbox"/> RID-12 24VDC POWER FAIL	<input checked="" type="checkbox"/> VIC12 COMM FAIL



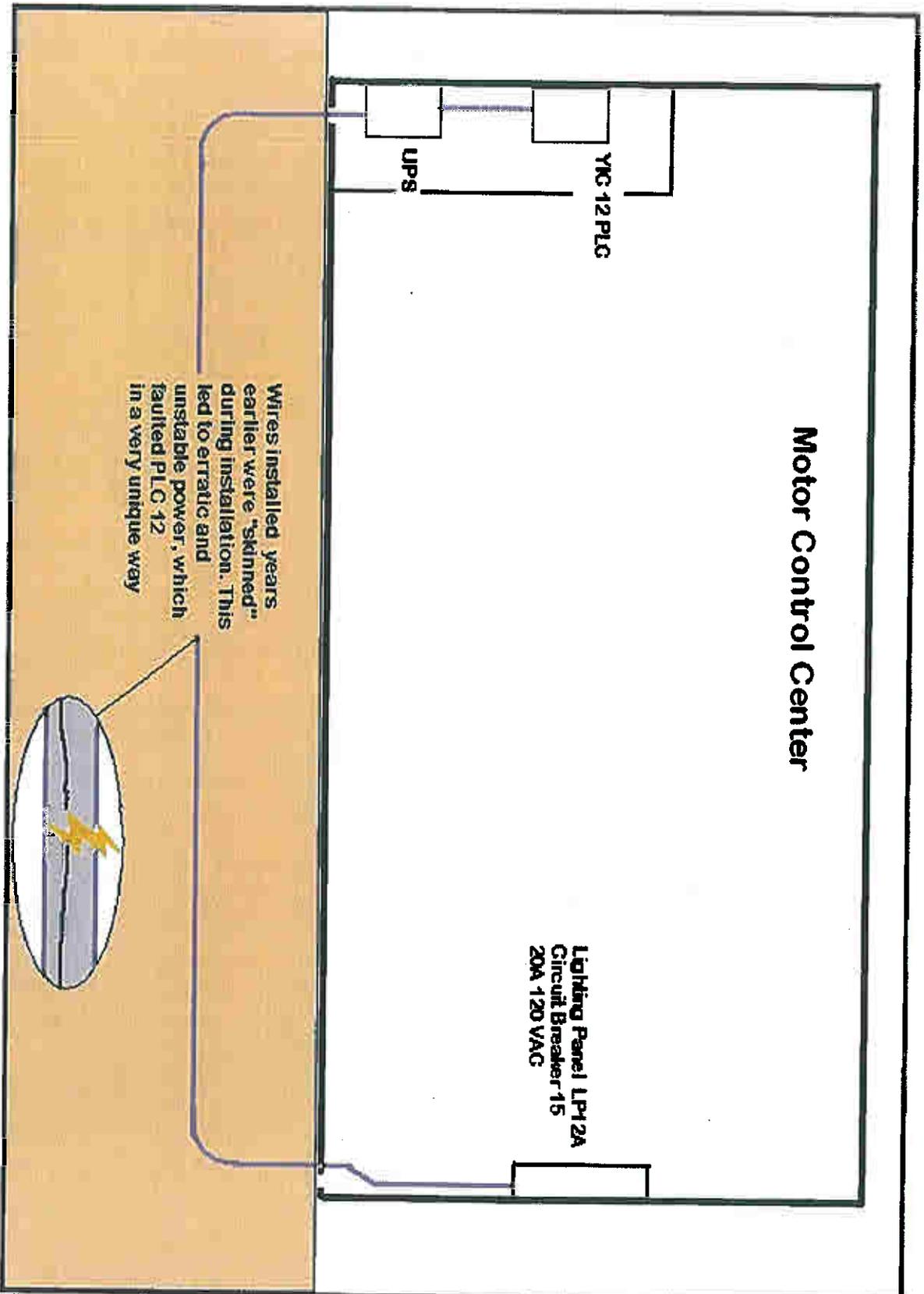
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EXHIBIT 1-E

**Exhibit 2: Schematic of the Motor Control**



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