



RECOMMENDED ADDITIONS/CHANGES TO SPECIFICATIONS FOR FUTURE SWIFT DESIGN

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ELECTRICAL

1.1 ELECTRICAL CONDUIT/ ROUGH IN METHODS

A. ALL EXTERIOR POWER AND CONTROL CONDUCTORS MUST BE FULLY ENCASED IN CONDUIT. CABLE TRAY MAY NOT BE USED ON AREAS DEFINED AS "WET LOCATION" BY THE NEC. CONDUIT STUB UPS SHALL EXTEND COMPLETELY UP TO ALL ENCLOSURES, DISCONNECTS OR WIREWAYS. NO EXTERIOR CABLE WILL BE ALLOWED TO BE RAN "FREE AIR". EXPANSION JOINTS TO BE USED WHERE REQUIRED.



B. ALL OUTLET BOX ROUGH-INS OF GWB CONSTRUCTION SHALL USE A BRACKET TO MOUNT TO AT LEAST TWO WALL STUDS. SCREW EAR BOXES ARE NOT ACCEPTABLE. USE OF THESE BRACKETS WILL ALSO INSURE THAT BOXES MOUNTED NEXT TO EACH OTHER WILL BE LEVEL.



C. ALL CONDUIT/RACEWAYS SHALL BE RAN CONCEALED IN AREAS OF GWB CONSTRUCTION.

D. ALLOW 1/2" TRADE SIZE EMT TO BE RAN ON RECEPTACLE AND LIGHTING CIRCUITS CONCEALED IN GWB CONSTRUCTION, OR ABOVE CEILING TILES.

1.2 LIGHTING

A. CONTROL ROOM LIGHTING SHALL BE OF A LOW GLARE DESIGN IN RELATION TO THE VIDEO DISPLAYS. WITH DIMMABLE SWITCHING AND OCCUPANCY SENSOR OVERRIDE.

B. ELECTRICAL AND MECHANICAL SPACES SHALL HAVE A MINIMUM LIGHTING LEVEL OF 30 VERTICAL AND HORIZONTAL FOOT CANDLES PER IES STANDARDS. 75% OF EACH ELECTRICAL AND MECHANICAL ROOM SPACE LIGHTING FIXTURES SHALL BE ON DUAL TECHNOLOGY OCCUPANCY SENSORS WITH ADEQUATE COVERAGE OF ENTIRE SPACE. THE 25% REMAINDER OF LIGHTING SHALL BE CONNECTED TO TRADITIONAL MANUAL SWITCHING.



C. NO STAIRWAY LIGHTING SHALL BE MOUNTED IN A LOCATION THAT IS NOT ACCESSIBLE VIA A STANDARD 8' A-FRAME LADDER SET ON STAIR LANDINGS.

D. NO LIGHTING ABOVE FANS DUE TO STROBING EFFECT.



1.3 DESIGN / LAYOUT

A. LAB COUNTER TOP RECEPTACLES SHALL BE ONE DUPLEX EVERY FIVE FEET OF COUNTER WITH A MINIMUM OF TWO DUPLEX RECEPTACLES FOR ANY SIZE COUNTER SPACE.



B. CONTROL ROOM DESIGN SHALL INCLUDE RACEWAYS FOR VIDEO AND DATA CABLING, AND A DUPLEX RECEPTACLE BEHIND EACH WALL MOUNTED VIDEO MONITOR OR COMPUTER DISPLAY.

INSTRUMENTATION ELECTRICAL

2.1 MOLEX CONNECTORS

A. FIELD POWERED TRANSMITTERS SHALL USE MOLEX CONNECTOR CAT. #WH1R3006A20M005G8 MOUNTED ON THE BOTTOM OF THE TRANSMITTER. THE MATING PLUG/CABLE IS CAT. #WH103000A45M0208 (2 METER CABLE LENGTH) FOR 120 VOLT POWER CONNECTIONS. THIS CONNECTOR WILL SERVE AS A MEANS OF DISCONNECT FOR INDIVIDUAL UNITS.



B. TRANSMITTERS AND SENSORS WILL USE A MOLEX CONNECTOR CAT. # WH8R4006A18M0058 MOUNTED ON THE BOTTOM OF TRANSMITTER/SENSOR WHEN POSSIBLE. THE MATING PLUG/CABLE IS CAT. # WH80400D01M0208 THIS IS A TWO PAIR CONFIGURATION THAT WILL ALLOW FOR TWO ANALOG 4-20MA CURRENT LOOPS OR TWO DIGITAL SIGNALS. IF THE EQUIPMENT REQUIRES MORE THAN TWO PAIR SHIELDED CONDUCTORS HARD WIRING IS ACCEPTABLE.

2.2 WIRING TERMINATIONS

A. ALL CONTROL WIRING TERMINATIONS WILL USE A CRIMP ON TYPE CONNECTOR OF EITHER A FORK TYPE OR A PIN TYPE APPROPRIATE FOR TERMINAL BLOCK STYLE.



B. UPON OWNER REVIEW AND APPROVAL THE MINIMUM CONTROL WIRE SIZE MAY BE REDUCED TO ACCOMMODATE EQUIPMENT WITH SMALL/CONGESTED TERMINATION SPACES. EXAMPLE: METERING PUMPS WITH 12-16 CONTROL CONDUCTORS.

2.3 VFD CABINET CONSTRUCTION

A. THE MOUNTING LOCATION OF COOLING FAN THERMOSTAT INSIDE THE CABINET SHALL BE PARALLEL OR HIGHER THAN THE TOP OF THE ACTUAL VFD UNIT WHERE THE HEAT ORIGINATES.



B. COOLING FAN POWER SHALL BE RAN THROUGH THE RUN RELAY SO THAT THE FAN DOES NOT RUN IF VFD IS NOT IN RUN MODE.

C. COOLING FAN EXHAUST OUTLETS INSIDE CONDITIONED SPACES SHALL NOT HAVE FILTERS, AND SHALL EXHAUST OUT THE SIDE OR TOP OF THE CABINET CONSISTANT WITH U.L. STANDARDS.

D. INCLUDE A BULKHEAD MOUNT WITH DUST COVER USB CONNECTOR ON THE CONTROL SURFACE OF THE VFD CABINET WHICH IS CONNECTED TO THE DATA PORT ON THE VFD UNIT. THIS IS TO ALLOW A LAPTOP CONNECTION TO THE VFD TO MODIFY PARAMETERS, ETC. WITHOUT NEEDING TO OPEN THE CABINET.





2.4 INSTRUMENT GENERAL

A. WHERE POSSIBLE MOUNT ALL TRANSMITTERS AT APPROX 5' AFF OR WALKWAY FOR EASE OF ACCESS AND VISUAL INSPECTION.

B. PROVIDE LOCAL AUDIBLE AND VISUAL ALARMS IN CHEMICAL ROOMS FOR CHLORINE AND SULPHUR DIOXIDE GAS DETECTORS. CURRENTLY INSTALLED GAS DETECTORS ONLY HAVE A BLINKING DISPLAY WHEN ALARM CONDITION EXISTS.

C. PROVIDE A UPS TO POWER SHIMADZU TOC ANALYZER SIZED TO CARRY IT THROUGH GENERATOR STARTUP/SWITCHING.

INSTRUMENTATION PIPING METHODS

3.1 SAMPLE PIPING

A. FIRST SAMPLE INSTRUMENT IN A LINE UP SHALL NOT BE AFFECTED BY AIR BUBBLES. FOR EXAMPLE A PH PROBE FIRST IN LINE WILL ALLOW AIR TO ESCAPE BEFORE REACHING TURBIDITY METERS.

B. ALTERNATIVE METHODS SHOULD BE INVESTIGATED TO CONTROL FLOW TO INSTRUMENT LINE UPS ON INFLUENT AND FLOC/SED INSTRUMENTATION. ROTAMETERS AND REGULATORS ARE CLOGGING CAUSING LOW OR NO FLOW CONDITIONS.

C. PROVIDE A MEANS TO FLUSH BIOFILTER HEADLOSS TRANSDUCER SAMPLE LINES.

D. INCORPORATE A FULL DIAMETER FLUSH VALVE AT LOW POINT OF INSTRUMENT LINEUP SAMPLE LINES.

3.2 DRAIN PIPING

A. FLOOR DRAINS AT EACH INTERIOR INSTRUMENT LINEUP.

B. INSTRUMENT DRAIN LINES ON FRONT OF INSTRUMENT LINEUP WITH AIR GAP TO ALLOW VISUAL FLOW CONFIRMATION.

3.3 GENERAL

C. METERING PUMPS ON TURBIDITY INSTRUMENTS.

D. SELF CLEANING DEVICES ON INFLUENT AND FLOC/SED TURBIDITY INSTRUMENTS.

E. HEAT TRACING AND INSULATION ON ALL EXTERIOR SAMPLE AND DRAIN LINES INCLUDING PRESSURE TRANSMITTERS AND SWITCHES.

DCS

4.1 INTERPOSING RELAY CABINET

A. PROVIDE A POWER MONITORING OUTPUT POINT TO DCS THAT WILL INDICATE POWER LOSS TO ANY INTERPOSING RELAY CABINET CONTROL CIRCUITS.

4.2 OPCON

A. AT LEAST ONE ADDITIONAL OPERATORS CONSOLE FOR DCS THAT IS NOT LOCATED IN THE MAIN CONTROL ROOM.

4.3 NETWORK

A. SPEC FIBER OPTIC CAPABLE CISCO NETWORK SWITCHES IN ALL VENDOR PROVIDED EQUIPMENT THAT WILL CONNECTED THIRD PARTY TO THE DCS.

B. ENCOURAGE THE USE OF FIBER OPTIC CABLE IN LEIU OF TYPE TC CAT-6 CABLE.

C. IF CAT-6 TYPE TC IS USED IT MUST BE TERMINATED TO A PATCH PANEL AND NOT DIRECTLY CONNECTED TO NETWORK EQUIPMENT. THIS IS TO PREVENT DAMAGE TO NETWORK JACKS FROM THE RELATIVELY LARGE HEAVY CABLE.

D. INVESTIGATE THE USE OF VENDOR NETWORKS TO ALLOW THIRD PARTY COMMUNICATION TO THE DCS. SUCH AS HACH INSTRUMENTS, YASKAWA VFD AND CHEMICAL METERING PUMPS. THIS WOULD ALLOW MORE DETAILED INFORMATION TO BE AVAILABLE TO THE DCS. IT WOULD ALSO ALLOW ALL CONTROL WIRING TO REMOTE AREAS SUCH AS RECHARGE WELL HOUSES TO BE FIBER OPTIC. THIS

NEEDS TO BE FURTHER DISCUSSED WITHIN HRSD TO DETERMINE IF WE WILL GET ALL NEEDED ALARMS WE DESIRE FROM THE VFD CABINET. IE: POWER LOSS INDICATION

E. PROVIDE A HRSD CORPORATE NETWORK HARDWIRE CONNECTION OR WI-FI AT REMOTE LOCATIONS SUCH AS PUMP HOUSES TO ALLOW TROUBLESHOOTING VIA EDS, ETC.