1. GENERAL

1.1 Scope

.1 The following statement generally describes the scope of work covered by this Section:

.2 Supply and install all control devices, wiring, and ancillaries required to provide the functionality described in the documents.

.3 All enclosures shall be NEMA 4x rated.

1.2 Related Work

.1 Division 1 – General Requirements.

.2 Division 23 – Various.

.3 Section 25 90 01 – Control Sequences.

.4 Division 26 – Electrical.

1.3 Action and Informational Submittals

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit in ISA format.

.3 Submittals to include:

.1 PLC system components.

.2 Uninterruptible Power Supply for PLC.

.3 Field devices.

.4 Enclosures.

.4 Indicate for each item as applicable:

.1 Manufacturer, model number.

.2 Nominal size and dimensions including details of construction and assembly.

1.4 Closeout Submittals

.1 Submit maintenance data including monitoring requirements for incorporation into manuals specified in Section 01 78 00 - Closeout Submittals.

1.5 Delivery, Storage, and Handling

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 61 00 - Common Product Requirements.

1.6 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling.

2. PRODUCTS

2.1 Programmable Logic Controller

.1 PLC provided under this Contract shall be from a single manufacturer of compatible components so as to reduce the number of spare parts necessary.

.2 The PLC shall have capability for future Ethernet networking.

.3 PLC programming shall utilize common PLC programming conforming to the City’s current and future documentation software package. HMI programming shall utilize a common HMI programming and documentation software package.

.4 Power all PLC processors and rack assemblies by 120 VAC supply.

.5 Analog input cards shall be 4-20 mA 12 bit resolution.

.6 Analog output cards shall be 4-20 mA 11 bit resolution.

.7 Digital input cards shall be 24 VDC.

.8 Digital output cards shall be 24 VDC. Provide interposing relays where required.

.9 Provide all cabling and connectors specified by the PLC vendor necessary to install a complete communication link between PLCs, operator work station, and other PLC subcomponents.

.10 Provide all necessary I/O modules to connect all field devices and equipment shown in the Drawings and listed in the Specifications.

.11 Provide a minimum of 20% spares for each I/O type at each PLC location. All spare I/O shall be wired to terminal blocks.

.12 Size PLC power supplies to handle all modules mounted on their local racks with provision for full expansion racks. PLC power supplies are to be rack mounted.

.13 Provide PLC programming and documentation software with full feature support of all PLC functions available, including on-line, off-line and simulation support.

.14 Provide one (1) removable program storage device for each PLC processor provided.

.15 The system will consist of:

.1 One Schneider M340 processor.

.2 One NOE0100 Ethernet module.

.3 M340 I/O as required.

.4 UPS.

.5 HMI

.1 Touchscreen Panel mount type industrial computer

.2 Display size: 260 mm (10.4”)

.3 Windows XPe SP2

.4 Integral Ethernet port

.5 Acceptable Product:

.1 Magelis XBT GT 5230.

.6 Panel enclosure: minimum dimensions 900 wide x 900 high x 300 deep or larger to suit internal component layout and requirements.

2.2 Human Machine Interface (HMI) Software

.1 This software package shall run under Windows 8.1 (64 bit).

.2 Provide one (1) Development license and one (1) run time license. Tag capacity of 1,000 minimum.

.3 Provide one (1) year factory support (standard level) beginning at the end of the warranty period.

.4 Provide configuration training for:

.1 The Shoal Lake personnel at interim acceptance (allow for 4 people for 4 hours).

.2 The programming personnel within 15 days of interim acceptance (allow for 4 hours initially and 4 hours subsequently) at the Winnipeg Deacon Water Treatment Plant location.

.5 Standard of acceptance: Wonderware InTouch Development/Runtime 1000 Tag, latest version. Intouch for System Platform w/Active Factory, latest version, or Citect HMI

standalone SCADA, latest version, integrated OPC server and connection to MS-Excel for report generation, runtime/development environments to include all standard industrial drivers or approved equal in accordance with B7.

2.3 UPS Power Supply

.1 Provide an uninterruptible power supply (UPS), true on-line type in each control panel to power PLC and communications equipment.

.2 Size UPS standby capacity for thirty (30) minutes at full load rating for each installation.

.3 Provide Smart-UPS RT UPS units from APC or approved equal in accordance with B7.

2.4 Day Tank Level Switching and Alarm System

.1 Day tank level switches for connection to transfer pump control system.

.2 Multi-element float type switches with four discrete adjustable levels of control.

.3 Brass switch column, with reed switches mounted inside, with maximum length to suit operational requirements and tank height.

.4 Floats:

.1 19 mm diameter held within their travel limits by beryllium copper grip rings.

.2 Resistant to gasoline and diesel fuel immersion effects.

.3 Suitable for specific gravity of liquid, from -40°C to +40°C

.5 Individually wired switches, SPST rated 20va minimum

.6 25 mm diameter male NPT hex head nut for mounting into tank top bung, with minimum 600 mm wire lead lengths above the entry to NEMA4 junction box atop the stem.

.7 Slosh shield to prevent false alarms and rapid cycling.

.8 ULc recognized and CSA listed.

.9 Acceptable material:

.1 Gems Sensors LS-700 or approved equivalent in accordance with B7.

2.5 Interstitial Space and Sump Leak Monitoring Systems

.1 Provide continuous leak detection in the spaces indicated on the drawings

.2 Rated for diesel fuel application.

.3 Discriminating type to signal water or diesel fuel detection at PLC.

.4 Suitable for direct connection to PLC

.5 Include all necessary tank bung fittings and seals.

.6 Acceptable material: Omega LV132 discriminating sensor or approved equivalent in accordance with B7.

2.6 Solenoid Valves

.1 Refer Section 23 11 05 – Fuel Unloading and Transfer Systems.

3. EXECUTION

3.1 Programmable Logic Controllers (PLC)

.1 Install, test and demonstrate to the Contract Administrator the satisfactory operation of all PLC-to-operator station communication links.

.2 Install, test and demonstrate to the Contract Administrator the satisfactory operation of the remote PLC communication link.

.3 Install, test and demonstrate operation of UPS.

.4 Demonstrate to the Contract Administrator correct wiring of all field devices to PLC I/O.

3.2 Graphic Display Panels

.1 Load, setup and configure the software on the Graphic Display Panel and demonstrate to the Contract Administrator correct operation and interaction of the entire integrated system.

.2 Prior to performing 3.3.1, confirm with the Contract Administrator all set-up and configuration options.

3.3 Human Machine Interface (HMI) Software

.1 Install, test and demonstrate to the Contract Administrator the satisfactory operation of the HMI software.

.2 Provide graphical screen development, trending configuration and communication tasks. Demonstrate to the Contract Administrator, performance of the complete computer based HMI, peripherals and software installation.

.3 Demonstrate to the Contract Administrator the satisfactory operation of the PC to PLC communication link and the HMI device driver operation.

3.4 Interstitial Monitoring

.1 Interlocked with any tank fill system to prevent tank fill if leak is detected.

3.5 General Installation

.1 Obtain written installation instructions from manufacturer.

.2 Install in accordance with manufacturers' recommendations.

3.6 Testing

.1 Test all functions in the presence of the Contract Administrator, in Winnipeg, prior to shipping to site.

.2 Field test with actual end field devices prior to final commissioning.

END OF SECTION

PUMP AND TANK CONTROL SEQUENCES

1. GENERAL

1.1 Scope

.1 The following statement generally describes the scope of work covered by this Section:

.2 The control sequences contain a general description of the intent of the operation of the systems to be controlled. The Contractor shall review individual systems to ensure equipment and life safety interlocks are not overridden.

.3 All set points and times of operation given in the control sequences are indicative. Final set points shall be dictated by site conditions.

.4 Review with the Contract Administrator during the Shop Drawing stage to finalize the control sequences for each system.

.5 Supply and install all control devices, wiring, and ancillaries required to provide the functionality described within this Section.

.6 Confirm all graphic representation and colours with the Contract Administrator prior to final programming.

.7 These sequences should be read in conjunction with the P&ID drawings.

1.2 Related Work

.1 Division 1 – General Requirements.

.2 Division 23 - Various.

.3 Section 25 35 01 – Control Devices – Unloading and Transfer Systems.

.4 Division 26 – Electrical.

1.3 Action and Informational Submittals

.1 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submittals to include:

.1 Control sequence details.

1.4 Closeout Submittals

.1 Submit maintenance data including monitoring requirements for incorporation into manuals specified in Section 01 78 00 - Closeout Submittals.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 General

.1 Typical HMI status colours: Red = Running, Amber = Alarm

.2 Emergency Stop:

.1 When an operation is shutdown from an Emergency Stop command location, this condition shall be maintained until the device is reset. The reset shall only be permissible from that location where the Emergency shutdown originated. A reset shall not restart the pump, but only allow it to be restarted from the normal start command.

3.2 Control Sequences

Summary of pumping and dispensing operations.

.1 Note all tank sizes are nominal.

.2 Three distinct systems are used:

.1 25,000 litre diesel storage tank for storage of fuel used by the four diesel engines within the gatehouse and pump rooms. It is filled by drawing fuel from the train's locomotive fuel tank by a set of lead lag unloading pumps. Another set of lead/lag pumps are used to individually or simultaneously fill the three auxiliary (day) tanks in the building.

.2 A 5,000 litre diesel compartment, part of a combined storage tank, with single unloading pump, and separate dispensing pump to fill vehicles and miscellaneous containers.

.3 A 2,200 litre gasoline storage compartment, part of a combined storage tank, with single unloading pump, and separate dispensing pump to fill vehicles and miscellaneous containers.

.3 All required three phase pump motor starters are in the new exterior main electrical pump control/power panel.

.4 A centralized PLC, located in the Gate House will provide all control functions in response to the various field devices and the selector switches at the various pump locations.

.1 PLC will have capability to send all PLC information to site SCADA.

.2 For this contract, PLC will send only a general alarm signal to SCADA.

.5 All exterior enclosures to be NEMA 4X fibreglass, with any exposed selector switches and indicators to be weather proof, and all in conformance with any Hazardous Location requirements.

3.3 Exterior main electrical pump control/power panel

.1 Refer / Coordinate with Division 26.

.2 Three phase pumps:

.1 Individual unloading pump selector switches at main electrical pump control/power panel for each of the pumps:

.2 Single UNLOAD/OFF controlling both P-P501 and P-P502.

.3 OFF/HAND/AUTO for each pump.

.4 RESET for each pump.

.3 Indication for each pump as follows:

.1 System power available (green).

.2 Pump run signal (red).

.3 Pump no flow signal (amber).

.4 Pump overload fault (amber).

.5 Lamp test push button for all lamps.

.6 No flow alarm reset button.

.4 Audible Alarm

.1 Maintained No Flow alarm from any pump.

.2 Buzzer type, integral to panel door.

3.4 Diesel 25,000 litre Tank Systems

.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics. Password protected PLC direct operation only.

.2 Local OFF / FUEL UNLOAD switch box at hose reel enclosure location.

.3 **Fuel unloading operation:**

.1 All pumps on AUTO.

.2 Fuel unloading hose on hose reel is extended and manually connected to the locomotive tank connection.

.3 Manual unloading valves are opened.

.4 Manual flow totalizer meter reset to zero.

.5 “Unload” process.

.1 OFF / UNLOAD selector switch to “UNLOAD” position enables PLC to operate the lead/lag pumping system to unload fuel from train into tank.

.2 Designated lead pump starts up and operates for timed period.

.1 Adjustable 0-90 minutes in PLC.

.2 Initial setting 40 minutes in PLC.

.3 Pumps will alternate after each pump use.

.4 Main panel indicator light shows active pump. “RUN” signal.

.5 If no fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):

.1 Pump will turn off and pump alarm will indicate.

.2 Pump no flow will remain on until manually reset from PLC.

.3 Lag pump will be signalled on.

.6 If no lag pump fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):

.1 Pump will turn off and pump alarm will indicate.

.2 Pump no flow alarm will remain until manually reset from PLC.

.6 Storage tank mechanical overfill limiter stops flow:

.1 Fuel flow detection will cause pump shutdown, based on no flow.

.7 Fuel unloading timer stops unloading operation.

.1 OFF / UNLOAD selector switch to “UNLOAD” position.

.1 Above process repeats.

.8 Fuel unloading complete:

.1 Turn OFF / UNLOAD selector switch to OFF position.

.2 Pump turns off.

.9 Manual valves closed

.10 Hose disconnected from locomotive fuel tank.

.4 **Fuel transfer from 5,000 litre tank to 25,000 litre tank.**

.1 If large tank required fuel, and train is not available, fuel may be transferred from the smaller diesel tank to the larger tank, as follows.

.2 25,000 litre tank fuel unloading hose can be connected to dry coupling on 5,000 litre tank pumping circuit.

.3 Operation is otherwise as for unloading from locomotive supply to 25,000 litre tank.

.5 **Automatic day tank fill operation:**

.1 Day Tank Autofill enabled by PLC.

.2 All commands and indications on HMI graphics.

.3 Each day tank is equipped with a 4 level float switch system, with four discrete adjustable levels of control.

.1 Low Low level set at 33% of tank volume for low-level alarm.

.2 Low level set at 45% of tank volume for pump start.

.3 High level set at 90% of tank volume for pump stop.

.4 High High level to be set at 95% of tank volume for pump shut down and alarming.

.4 PLC monitors status of transfer pump.

.5 Alarm indicator if any transfer pump not on auto.

.6 Fuel level at Low Low level in any or all of the three tanks:

.1 Sequence as per start pump level.

.2 Alarm at HMI indicating tank low level alarm.

.3 Alarm maintained even if tank refills. Manual reset only.

.7 Fuel level at Low Level (pump start) level in any or all of the three tanks:

.1 Signal to open the corresponding fuel valve(s) at the requesting tank(s).

.2 Designated lead pump starts up.

.3 Indicator shows active pump. “RUN” signal.

.4 Lead pump will be signalled on.

.5 If no fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):

.1 Pump will turn off and pump alarm will indicate.

.2 Pump no flow will remain on until manually reset from PLC.

.3 Lag pump will be signalled on.

.6 If no lag pump fuel flow detected at flow switch after 5 seconds (adjustable 0-20 seconds at PLC):

.1 Lag pump will turn off and pump alarm will indicate.

.2 Pump no flow alarm will remain until manually reset from PLC.

.8 Fuel at High (pump stop) level

.1 Fill valve for tank shut off.

.2 Pump turns off if no other tank being filled.

.3 Indication of "full" status for that tank.

.9 Fuel at High-High level:

.1 Pump shutdown.

.2 Solenoid fill valve for that tank closes and will not operate.

.3 Indication of high level status for that tank on HMI.

.10 Storage tank mechanical overfill limiter stops flow:

.1 Fuel flow detection will cause pump shutdown, based on no flow.

.11 When a pump is already operating, and a second or subsequent tank calls for fuel, then the operation of the pump that is running will be extended until both or all of the tanks have been filled and their pump stop high level switches are all actuated .

.12 If at any time the motor of a pump is energized and the flow switch does not detect flow in the piping, an alarm circuit is energized and the lag pump will be started.

.13 Emergency stop on panel shuts down all pumping operations.

.6 **Leakage Monitoring - Day Tank Interstitial Space**

.1 Normally OK green indication on HMI screen for each location.

.2 Liquid detected in space:

.1 Detection sends signal to PLC.

.2 Alarm on HMI indicates location.

.3 Tank fuel fill valve closes or remains closed until alarm is cleared.

.4 If no other tank being filled, transfer pump shuts down, otherwise continue to run as long as there is demand from other tank(s).

.5 Leaking tank fuel fill valve locked out until alarm cleared by manual reset in PLC.

.7 **Leakage Monitoring - Fire Pump Engine Supply Piping Containment Sump and Pipe Casing Sump**

.1 Normally OK – no indication on HMI screen.

.2 Liquid detected in space:

.1 Detection sends signal to PLC and amber alarm on HMI indicates location, and whether water or diesel fuel.

.3 All transfer pumping activity to the Fire Pump Day tanks stops and is prevented until manual reset of PLC alarm.

3.5 Diesel 5,000 litre tank systems

.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics. Password protected PLC direct operation only.

.2 Local FUEL UNLOAD and STOP push button box at hose reel enclosure location.

.3 Fuel unloading operation:

.1 Pump on AUTO.

.2 Fuel unloading hose on hose reel is extended and manually connected to the locomotive tank connection.

.3 Manual unloading valves are opened.

.4 Manual flow totalizer meter reset to zero.

.5 "Unload" process

.1 Push UNLOAD button.

.2 Pump starts up and operates for timed period.

.1 Adjustable 0-60 minutes.

.2 Initial setting 40 minutes.

.3 Main panel indicator light shows active pump. "RUN" signal.

.4 If no fuel flow detected at flow switch after 5 seconds (adjustable at PLC 0-20 seconds), pump will turn off and pump NO FLOW alarm will indicate.

.5 "NO-FLOW" alarm will maintain for the pump in question, until manual RESET from panel button.

.6 Storage tank mechanical overfill limiter stops flow:

.1 Fuel flow detection will cause pump shutdown, based on no flow.

.7 Fuel unloading times out:

.1 Press UNLOAD button again.

.1 Above process repeats.

.8 Fuel unloading complete:

.1 Push OFF button.

.2 Pump turns off.

.9 Manual valves closed.

.10 Hose disconnected from locomotive fuel tank.

.4 Diesel dispensing:

.1 Manual unmonitored operation.

.2 Remove hose from remote dispensing head.

.3 Rotate dispensing head switch to turns on pump after hose removed from holder.

.4 Fuel hose inserted into tank to be filled.

.5 Normal fill operation by holding nozzle.

.6 Auto shut-off will stop flow of fuel.

.7 Hose holder rotated to off position, shuts pump off.

.8 Hose replaced.

.5 Emergency shut off Red Mushroom Head buttons mounted remote from dispensing location shuts off power to both diesel and gasoline dispensing pumps.

3.6 Gasoline unloading and dispensing system

.1 No remote operation of unloading will be possible directly from the basic PLC HMI screen graphics. Password protected PLC direct operation only.

.2 Local FUEL UNLOAD and STOP push button box at hose reel enclosure location.

.3 Fuel unloading operation:

.1 Pump on AUTO.

.2 Grounding static reel cable is connected to supply tank.

.3 Fuel unloading hose on hose reel is extended and manually connected to the supply tank connection.

.4 Manual unloading valves are opened.

.5 Manual flow totalizer meter reset to zero.

.6 "Unload" process

.1 Push UNLOAD button.

.2 Pump starts up and operates for timed period.

.1 Adjustable 0-60 minutes.

.2 Initial setting 40 minutes.

.3 Main panel indicator light shows active pump. "RUN" signal.

.4 If no fuel flow detected at flow switch after 5 seconds (adjustable at PLC 0-20 seconds), pump will turn off and pump NO FLOW alarm will indicate.

.5 "NO-FLOW" alarm will maintain for the pump in question, until manual RESET from panel button.

.7 Storage tank mechanical overfill limiter stops flow:

.1 Fuel flow detection will cause pump shutdown, based on no flow.

.8 Fuel unloading times out:

.1 Press UNLOAD button again.

.1 Above process repeats.

.9 Fuel unloading complete:

.1 Push OFF button.

.2 Pump turns off.

.10 Manual valves closed

.11 Hose disconnected from locomotive fuel tank.

.12 Static grounding cable disconnected.

.4 Gasoline Dispensing:

.1 Manual unmonitored operation.

.2 Remove hose from remote dispensing head.

.3 Rotate dispensing head switch to turns on pump after hose removed from holder.

.4 Fuel hose inserted into tank to be filled.

.5 Normal fill operation by holding nozzle.

.6 Auto shut-off will stop flow of fuel.

.7 Hose holder rotated to off position, shuts pump off.

.8 Hose replaced.

.5 Emergency shut off Red Mushroom Head buttons mounted remote from dispensing location shuts off power to both diesel and gasoline dispensing pumps.

3.7 Testing

.1 Test all functions in the presence of the Contract Administrator, in Winnipeg, prior to shipping to site.

.2 Field test with actual end field devices prior to final commissioning.

END OF SECTION

PLC INPUT AND OUTPUT DEVICE LISTS

1. GENERAL

1.1 Scope

.1 The following statement generally describes the scope of work covered by this Section:

.1 The Section includes lists of the new input and output devices related to the control systems for this project.

1.2 Related Work

.1 Division 1 – General Requirements.

.2 Division 23 – Various.

.3 Section 25 35 01 – Control Devices – Unload and Transfer Systems.

.4 Section 25 90 01 – Control Sequences.

.5 Division 26 – Electrical.

1.3 Action and Informational Submittals

.1 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submittals to include:

.1 Component details.

1.4 Closeout Submittals

.1 Submit maintenance data including monitoring requirements for incorporation into manuals specified in Section 01 78 00 - Closeout Submittals.

2. PRODUCTS (NOT USED)

2.1 Lists

.1 Refer to attached I/O List.

3. EXECUTION

3.1 General

.1 Install as per manufacturer’s recommendations.

PLC I/O INDEX

Drawing #	Type	Device #	Suffix	Location/System	I/O	Description
1-0600A-P0006-001-00	YLR	A5020		P-A502	DO	P-A502 Run Indicator Light
1-0600A-P0006-001-00	XMC	A5020		P-A502	DI	P-A502 Run Control
1-0600A-P0006-001-00	HS	A5020	1	P-A502	DI	P-A502 H-O-A
1-0600A-P0006-001-00	HS	A5020	2	P-A502	DI	P-A502 Emergency Stop
1-0600A-P0006-001-00	HS	A5020	3	P-A502	DI	P-A502 Emergency Stop
1-0600A-P0006-001-00	FA	A5021		P-A502	DI	P-A502 Flow Switch Alarm
1-0600A-P0006-001-00	YS	A5021		P-A502	DI	P-A502 Running
1-0600A-P0006-001-00	XA	A5021		P-A502	DI	P-A502 Fault Alarm
1-0600A-P0006-001-00	YLR	A5010		P-A501	DO	P-A501 Run Indicator Light
1-0600A-P0006-001-00	XMC	A5010		P-A501	DI	P-A501 Run Control
1-0600A-P0006-001-00	HS	A5010	1	P-A501	DI	P-A501 H-O-A
1-0600A-P0006-001-00	HS	A5010	2	P-A501	DI	P-A501 Emergency Stop
1-0600A-P0006-001-00	HS	A5010	3	P-A501	DI	P-A501 Emergency Stop
1-0600A-P0006-001-00	FA	A5010		P-A501	DI	P-A501 Flow Switch Alarm
1-0600A-P0006-001-00	YS	A5010		P-A501	DI	P-A501 Running
1-0600A-P0007-001-00	XMC	P5010	1	P-P501	DI	P-P501 Emergency Stop 1
1-0600A-P0007-001-00	XMC	P5010	2	P-P501	DI	P-P501 Emergency Stop 2
1-0600A-P0007-001-00	HS	P5010	3	P-P501	DI	P-P501 Unloading Switch 3
1-0600A-P0007-001-00	HS	P5010	4	P-P501	DI	P-P501 H-O-A
1-0600A-P0007-001-00	FS	P5010		P-P501	DI	P-P501 Flow Switch Alarm
1-0600A-P0006-001-00	FA	P5010		P-P501	DI	P-P501 Flow Switch Alarm
1-0600A-P0006-001-00	YS	P5010		P-P501	DI	P-P501 Running
1-0600A-P0007-001-00	HS	P5020		P-P502	DI	P-P502 H-O-A
1-0600A-P0006-001-00	FA	P5020		P-P502	DI	P-P502 Flow Switch Alarm
1-0600A-P0006-001-00	YS	P5020		P-P502	DI	P-P502 Running
1-0600A-P0007-001-00	XMC	P5020		P-P502	DO	P-P502 Run Control
1-0600A-P0007-001-00	HS	P5030	1	P-P503	DI	P-P503 Emergency Stop 1
1-0600A-P0007-001-00	HS	P5030	2	P-P503	DI	P-P503 Emergency Stop 2
1-0600A-P0007-001-00	XMC	P5030	3	P-P503	DI	P-P503 H-O-A
1-0600A-P0007-001-00	FS	P5030		P-P503	DI	P-P503 Flow Switch Alarm
1-0600A-P0006-001-00	FA	P5030		P-P503	DI	P-P503 Flow Switch Alarm
1-0600A-P0006-001-00	YS	P5030		P-P503	DI	P-P503 Running
1-0600A-P0007-001-00	XMC	P5040		P-P504	DI	P-P504 H-O-A
1-0600A-P0007-001-00	LSHH	G5050		TK-G505	DI	TK-G505 High High Level Alarm
1-0600A-P0007-001-00	LSHH	G5050		TK-G505	DI	TK-G505 High Level Alarm
1-0600A-P0007-001-00	LSL	G5050		TK-G505	DI	TK-G505 Low Level Alarm
1-0600A-P0007-001-00	LSLL	G5050		TK-G505	DI	TK-G505 Low Low Level Alarm

PLC I/O INDEX

Drawing #	Type	Device #	Suffix	Location/System	I/O	Description
1-0600A-P0007-001-00	XC	G5050		TK-G505	DO	TK-G505 Flow Control Solenoid
1-0600A-P0007-001-00	LA	G5050	1	TK-G5050	DI	TK-G5050 Leak Detection Fuel
1-0600A-P0007-001-00	LA	G5050	2	TK-G5050	DI	TK-G5050 Leak Detection Water
1-0600A-P0007-001-00	LSHH	G5000		TK-G500	DI	TK-G500 High High Level Alarm
1-0600A-P0007-001-00	LSHH	G5000		TK-G500	DI	TK-G500 High Level Alarm
1-0600A-P0007-001-00	LSL	G5000		TK-G500	DI	TK-G500 Low Level Alarm
1-0600A-P0007-001-00	LSLL	G5000		TK-G500	DI	TK-G500 Low Low Level Alarm
1-0600A-P0007-001-00	XC	G5000		TK-G500	DO	TK-G500 Flow Control Solenoid
1-0600A-P0007-001-00	LA	G5000	1	TK-P500	DI	TK-P500 Leak Detection Fuel
1-0600A-P0007-001-00	LA	G5000	2	TK-P500	DI	TK-P500 Leak Detection Water
1-0600A-P0007-001-00	LSHH	P5300		TK-P530	DI	TK-P530 High High Level Alarm
1-0600A-P0007-001-00	LSHH	P5300		TK-P530	DI	TK-P530 High Level Alarm
1-0600A-P0007-001-00	LSL	P5300		TK-P530	DI	TK-P530 Low Level Alarm
1-0600A-P0007-001-00	LSLL	P5300		TK-P530	DI	TK-P530 Low Low Level Alarm
1-0600A-P0007-001-00	XC	P5300		TK-P530	DO	TK-P530 Flow Control Solenoid
1-0600A-P0007-001-00	LA	P5300	1	TK-P530	DI	TK-P530 Leak Detection Fuel
1-0600A-P0007-001-00	LA	P5300	2	TK-P530	DI	TK-P530 Leak Detection Water
1-0600A-P0007-001-00	LA	G5100	1	TK-G510	DI	TK-G510 Leak Detection Fuel
1-0600A-P0007-001-00	LA	G5100	2	TK-G510	DI	TK-G510 Leak Detection Water
1-0600A-P0007-001-00	UF	CP-P5001		CP-P5001	DO	CP-P5001 PLC Alarm Input (SCADA)
				AI=	0	
				AO=	0	
				DI=	50	
				DO=	7	
				Total I/O =	**57**	