

## **Scope of Work for PLC 17 – VIR Clinker Handling – Hardware Retrofit.**

### **Pre-Shutdown Preparation**

Note: CEMEX will provide all required Modicon/Quantum hardware. Contractor is to provide all additional hardware such as FTBs, multi-conductor cable, etc.

- Validate concept and establish fabrication details and dimensions for Pre-fabricated Conversion Rack mounting pan as shown on drawing. CEMEX will provide one each 800 Series and Quantum Rack for use in design as needed.
- Fabricate eight total mounting pans, four will be used for the project and the remainder will be stocked by CEMEX for possible future use.
- Add Field Terminal Blocks, mount Quantum Rack and Modules to the four Conversion Rack Assemblies.
- Pre-wire multi-conductor cables to Quantum Module FTB Connectors complete with jumpers as shown on Digital I/O Output, Input Drawing. Connections as shown at the Quantum end of the cable are expected to serve either DI or DO upgrade modules.
- Install Quantum Module FTB Connectors to Modules and terminate multi-conductor wires to appropriate Field Terminal Blocks to complete Conversion Rack Assembly.
- Provide four additional Quantum Module FTB Connectors Assemblies with multi-conductor pigtails for future CEMEX use.
- Test and certify with a CEMEX Representative inputs and outputs to each type of replacement module included in the project.
  
- Survey existing installation of 200 Series I/O (Drop 1) in Unloading Station.
- Establish location for new Quantum Rack (Drop 11) near enough to existing 200 Series I/O to facilitate interconnection of five pre-wired cables between the two locations.
- Pre-wire five – DI (3), DO (2) cables between CEMEX furnished 200 Series Conversion TB Strips and Quantum Module FTB Connector Assemblies. Wiring per CEMEX 200 Series conversion standards.

### **Shutdown Procedure (one long day plus backup help second day for checkout and startup.)**

ER11(FM12) Unloading Station PLC & 800 Series Drop 13 (Quantum Drop 1) in cabinet on East wall.

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 800 Series Module connector assemblies – AI (1), AO (1), DI/O (not used); mark connectors as to slot and module type in slot.
- Remove modules, disconnect and pull away connector assemblies, and demo existing 800 Series Rack.
- Identify and mark all remaining wires (power supply power, COAX, etc.) to be disconnected from old and reconnected to new hardware.
- Demo existing 984 PLC Rack and modules.
- Install new Quantum PLC Rack – Drop 1, Cable Fast AI (1), AO (1), PS (1) Blocks, and Interconnect Analog Modules with their respective Terminal Block Assembly.
- Connect analog AI/O pairs one at a time from 800 Series connector assembly to the appropriate Cable Fast Block.

ER11(FM12) 200 Series Drop 7 & 8 in MCC sections.

- CEMEX Maintenance will upgrade existing P451 Power Supply with J290/291 Card to enable communication with the new Quantum PLC.

Unloading Station 200 Series Drop 1 (Quantum Drop 11)

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 200 Series Module connector assemblies – DI (3), DO (2), AI (1), AO (1), BCD (1).
- Remove modules, disconnect and demo existing 200 Series Power Supply. Existing 200 Series rails will remain in place.
- Mount new Quantum Rack and route pre-wired cables between DI/O terminals on 200 Series rails and new Quantum Modules.
- Install new Quantum PLC Rack – Drop 11, Cable Fast AI (2), AO (1), PS (1) Blocks, and Interconnect Analog Modules with their respective Terminal Block Assembly.
- Connect analog AI/O pairs one at a time from 200 Series connector assembly to the appropriate Cable Fast Block.
- Demo 200 Series BCD Module field wiring from I/O cabinet to the existing digital display at Operator Panel in Room. Replace with twisted pair instrument cable to new Digital Voltmeter display.

Unloading Station 800 Series Drop 3 (Quantum Drop 2)

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 800 Series Module connector assemblies –
- DI (6), DO (2); mark connectors as to slot and module type in slot.
- Remove modules, disconnect and pull away connector assemblies
- Identify and mark all remaining wires (power supply power, COAX, etc.) to be disconnected from old and reconnected to new hardware, and demo existing 800 Series Rack.
- Mount new pre-fabricated Quantum Conversion Rack Assembly.
- Move wires one at a time from old 800 Series connector assembly to the appropriate slot's new Field Terminal Block.

Clinker Storage 800 Series Drop 5 (Quantum Drop 3)

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 800 Series Module connector assemblies –
- DI (4), DO (1); mark connectors as to slot and module type in slot.
- Remove modules, disconnect and pull away connector assemblies
- Identify and mark all remaining wires (power supply power, COAX, etc.) to be disconnected from old and reconnected to new hardware, and demo existing 800 Series Rack.
- Mount new pre-fabricated Quantum Conversion Rack Assembly.
- Move wires one at a time from old 800 Series connector assembly to the appropriate slot's new Field Terminal Block.

## ER12 (FM11) 800 Series Drop 9 (Quantum Drop 5)

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 800 Series Module connector assemblies –
- DI (1), DO (1); mark connectors as to slot and module type in slot.
- Remove modules, disconnect and pull away connector assemblies
- Identify and mark all remaining wires (power supply power, COAX, etc.) to be disconnected from old and reconnected to new hardware, and demo existing 800 Series Rack.
- Mount new pre-fabricated Quantum Conversion Rack Assembly.
- Move wires one at a time from old 800 Series connector assembly to the appropriate slot's new Field Terminal Block.

## Power House 800 Series Drop 11 (Quantum Drop 6)

- Isolate all possible power entering the panel. Identify and mark wires that will be worked with power enabled.
- Tighten wires in 800 Series Module connector assemblies –
- DI (3), DO (2); mark connectors as to slot and module type in slot.
- Remove modules, disconnect and pull away connector assemblies
- Identify and mark all remaining wires (power supply power, COAX, etc.) to be disconnected from old and reconnected to new hardware, and demo existing 800 Series Rack.
- Mount new pre-fabricated Quantum Conversion Rack Assembly.
- Move wires one at a time from old 800 Series connector assembly to the appropriate slot's new Field Terminal Block.

Hardware Location	
ER	11 (FM12)
MCC	
Section	Unloading Station PLC
PC Channel	

Hardware Location		P451 w/J291
ER	11 (FM12)	
MCC	11	
Section	7	
PC Channel	17.7	

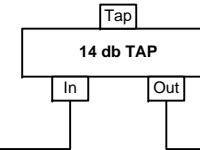
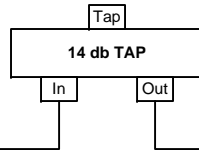
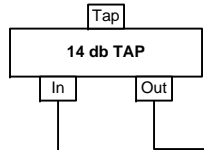
Hardware Location		P421
ER	11 (FM12)	
MCC	11	
Section	8	
PC Channel	17.8	

Hardware Location	
ER	Unloading Station
MCC	
Section	Remote I/O
PC Channel	17.1

### Spare (13)

### Drop 7 (7&8)

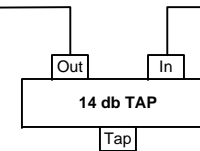
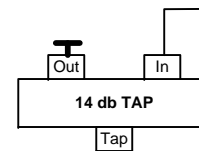
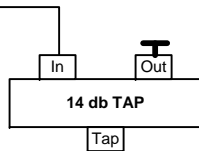
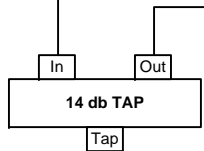
### Drop 11 (1)



Replaces Splitter

Hardware Location	
ER	11 (FM12)
MCC	
Section	Unloading Station PLC
PC Channel	

### RPLC17Q Quantum Drop 1



Note: Numbers in parentheses are existing drop numbers, they will be updated as shown upon installation of the new system.

### Drop 5 (9)

### Drop 6 (11)

### Drop 3 (5)

### Drop 2 (3)

Hardware Location	
ER	(FM 11)
MCC	
Section	Finish Mill 11
PC Channel	17.5

Hardware Location	
ER	Power House
MCC	
Section	
PC Channel	17.6

Hardware Location	
ER	Clinker Storage
MCC	
Section	Remote I/O
PC Channel	17.3

Hardware Location	
ER	Unloading Station
MCC	
Section	Remote I/O
PC Channel	17.2

### RPLC17Q Overview



RPLC17 RIO Drops New.vsd

fld 06/04/03

Updated Drop 7 & 8

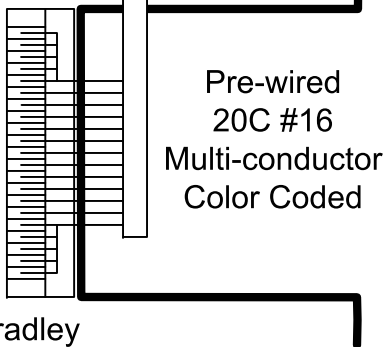
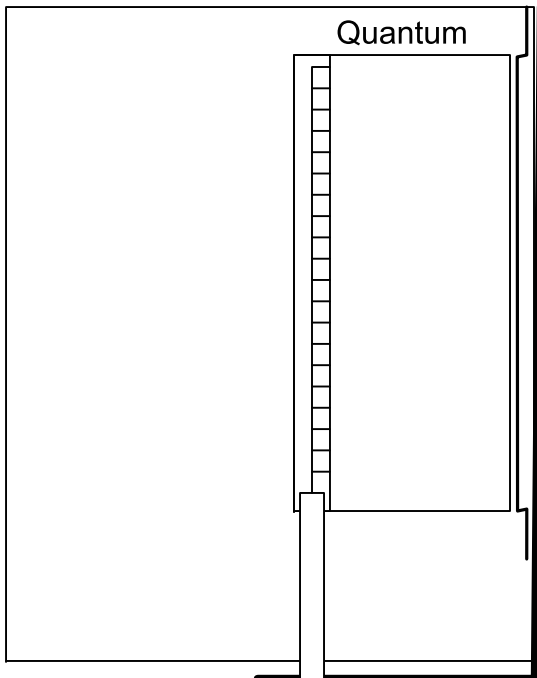
fld 09/01/04

**Victorville River Plant, CA**  
Clinker Transport Upgrade Project 2003

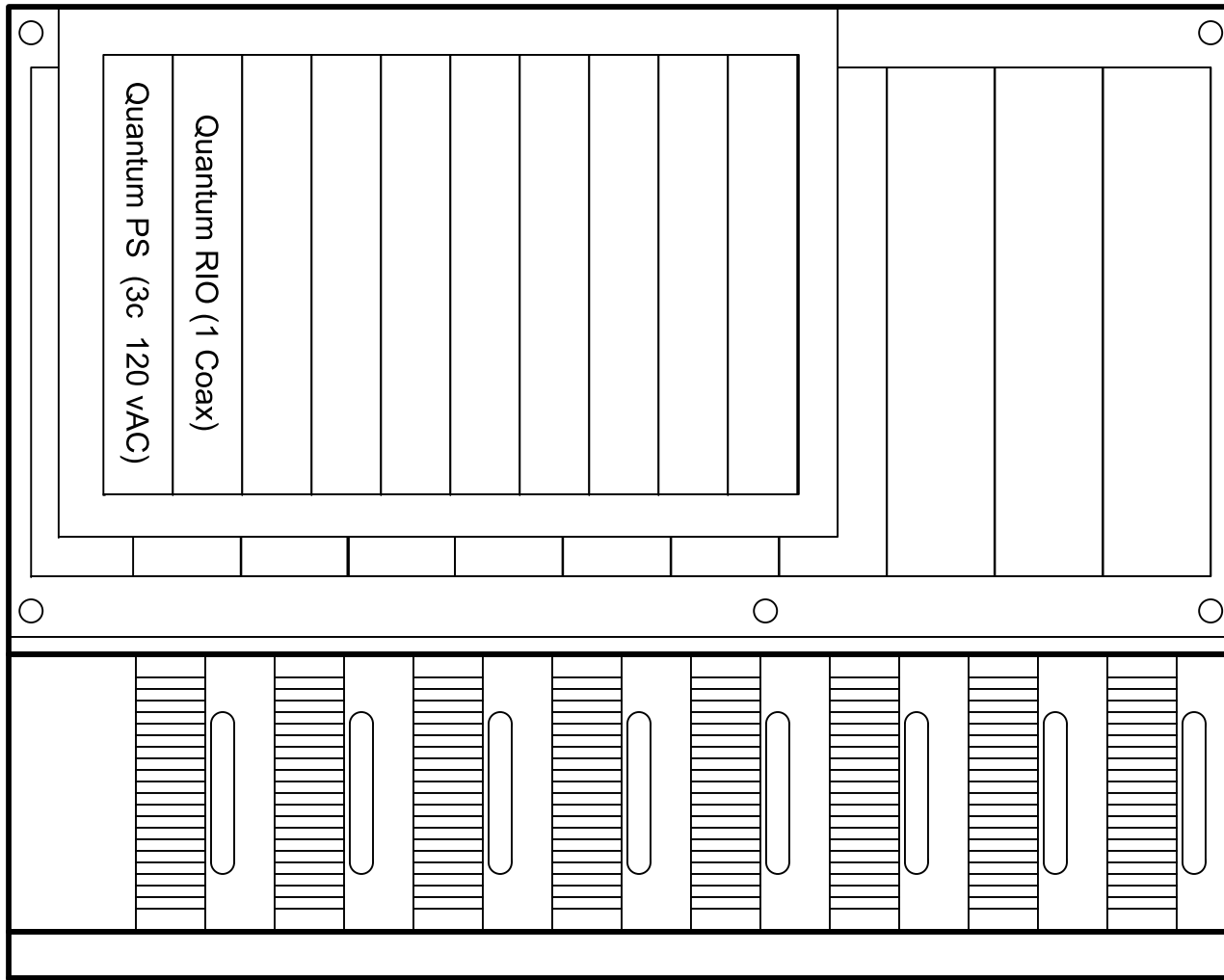
R/E

800 Series

Quantum



Allen-Bradley  
1492-HM1 or equal  
20 pt. Terminal Block



8 ea. 20 pt. FTBs mounted on approximate 3 in. centers.

Pre-fabricated Conversion Rack

**Victorville River Plant, CA**  
Clinker Transport Upgrade Project 2003



Module Rack Mounting.vsd

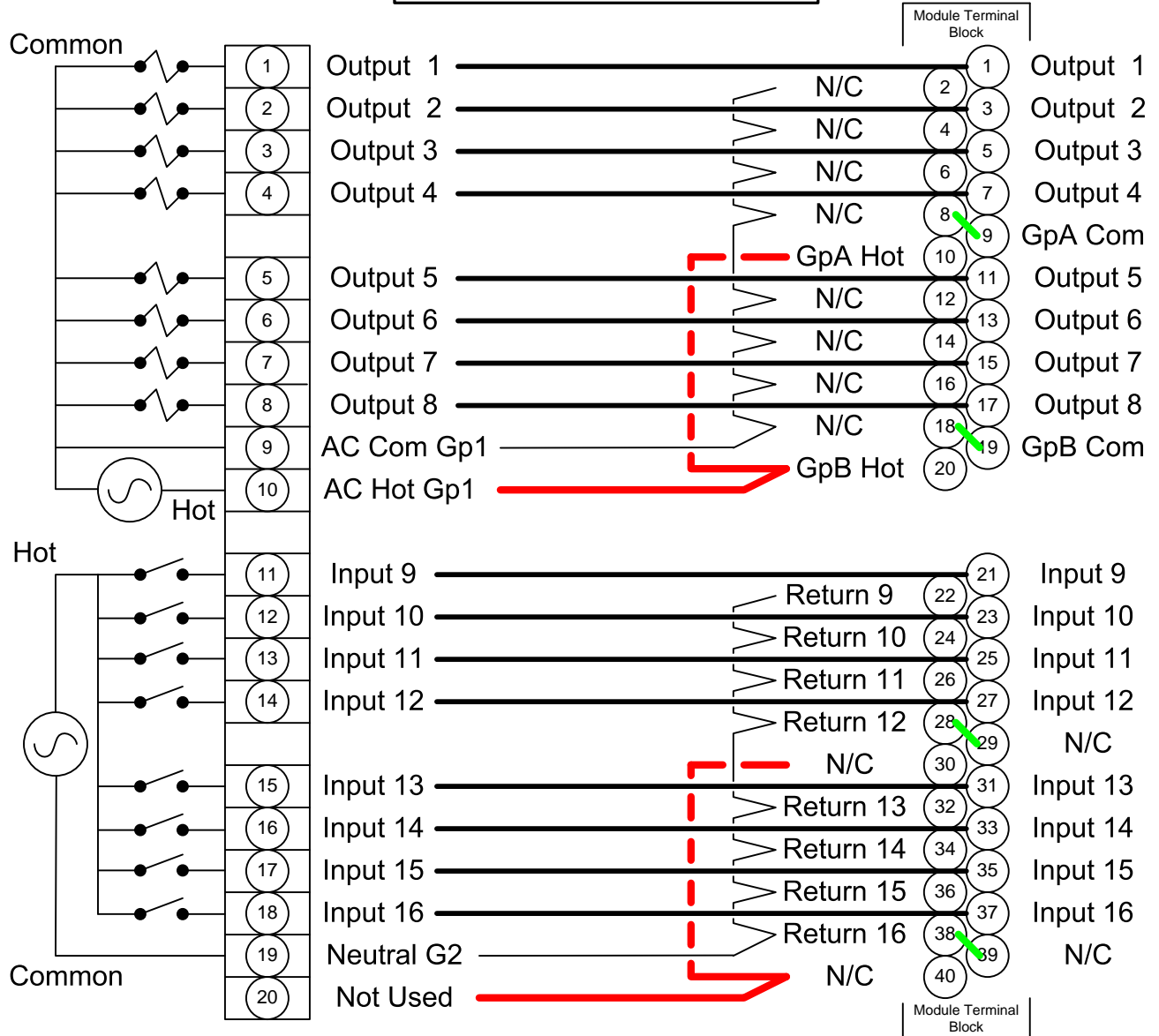
fld 10/28/03

R/A

800 Series Model: B804-116

Quantum Series Model: 140 DAO 842-10

**115 VAC Digital Output Module**



**115 VAC Digital Input Module**

800 Series Model: B805-016

Quantum Series Model: 140 DAI 540-00

DIO Conversion 800 Series to Quantum

fld 10/12/03

Digital I/O



**Victorville River Plant, CA**  
Clinker Transport Upgrade Project 2003

Drawing No.

R/A