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Maintain ABB System AC800M Controller and S800 IO Hardware

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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides an instruction set for maintenance activities of Asea Brown Boveri (ABB) systems associated with the Tank Farm Monitoring and Control System (TFMCS).

1.2 Scope

This procedure involves maintenance activities required to investigate issues, correct problems, and/or upgrade ABB systems associated with the TFMCS.

2.0 INFORMATION

2.1 Terms and Definitions

- **ABB** Asea Brown Boveri
- **HLAN** Hanford Local Area Network
- **HMI** Human Machine Interface
- **INIT** Initialize
- **LED** Light Emitting Diode
- **PCB** Printed Circuit Board
- **PRIM** Primary
- **RNRP** Redundant Network Routing Protocol
- **RWP** Radiological Work Permit
- **SCR** Software Change Request
- **TFLAN** Tank Farm Local Area Network
- **TFMCS** Tank Farm Monitor and Control System

2.2 General Information

2.2.1 System modules and computer program screens can be found in Figure 2 through Figure 12.

2.2.2 Reference information on system operation, alarms and LED readouts are contained in Attachment 1 through Attachment 3.
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

An Energized Electrical Work Permit (EEWP) is not required when working with energized parts that operate at less than 50 volts potential per DOE-0359, Hanford Site Electrical Safety Program. The maximum voltage encountered when changing out the battery and controller components within this procedure is approximately 24 VDC.

3.2 Equipment Safety

**CAUTION** - In a non-redundant configuration, pressing initialize (INIT) button on primary (PRIM) controller will cause equipment shutdown, system control, and observation from TFMCS to be disabled until the controller restarts.

**CAUTION** - Holding INIT button down for greater than 5 seconds on PRIM controller will require a configuration download to controller.

3.3 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit (RWP) following review by Radiological Control per the ALARA work planning procedure TFC-ESHQ-RP_RWP-C-03.
4.0 PREREQUISITES

4.1 Special Tools, Equipment and Supplies

The following supplies may be needed to perform this procedure:

- Kneeling Pad
- Screw driver
- Other tools, equipment and supplies as identified by Shift Manager/OE/FWS/User.

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- RPP-47937, AZ/AZ 702 MCS Operating and Maintenance Manual
- RPP-50119, TFMCS Operating and Maintenance Manual
- TO-060-350, Start, Stop, and Operate AY/AZ Tank Ventilation Primary Exhaust System
- TO-060-356, Perform 702-AZ Exhauster Monitor and Control Operations
- TO-025-002, Operate AN/AW MCS and Tank Farm MCS HMIs
- TO-060-106, Operate AN Tank Farm Primary Ventilation System (VTP)
- TO-060-107, Operate AW Tank Farm Primary Ventilation System (VTP)
- TFC-OPS-WM-C-26, Universal Waste/Recycling Area Set-up, Maintenance, and Handling
- H-14-042660, TFLAN Network Diagrams
- 7-MISC-902 Respond to TFMCS Asset Alerts
- Vendor Manual “ABB document 3BSE059394” System 800xA Maintenance.
4.3 Field Preparation

4.3.1 NOTIFY Shift Manager/Facility Manager which evolutions are to be performed.

4.3.2 IF working with AN Primary Exhauster, ENSURE Operations has configured plant in accordance with TO-060-106 during planned evolutions.

4.3.3 IF working with AW Primary Exhauster, ENSURE Operations has configured plant in accordance with TO-060-107 during planned evolutions.

4.3.4 IF working with the 702-AZ Primary or Building Exhausters, ENSURE Operations has configured plant in accordance with the following during planned evolutions:
   - TO-060-350
   - TO-060-356.

4.3.5 IF working with Tank Farm monitoring or transfer systems, ENSURE Operations has configured plant in accordance with TO-025-002 during planned evolutions.
5.0 PROCEDURE

NOTE - Sections and activities in this procedure may be performed in any logical order, in parallel or independently to complete individual task(s) as field conditions dictate or as specified in a released Work Package.

5.1 TFMCS System Power-Up / Log-On

5.1.1 IF TFMCS Server or HMI is not already powered ON, POWER-UP the HMI by performing the following:

5.1.1.1 PUSH the computer power button ON.

5.1.1.2 CONFIRM the computer starts by observing the Windows screen appearing.

5.1.2 PRESS Ctrl-Alt-Del keys at the same time to display the Windows login screen.

5.1.3 READ the Notice to Users.

5.1.4 IF agreeing to the terms of use, SELECT the OK button.

LOG ON to TFMCS

NOTE - The Maintenance password levels are:
• Instrument Technician (for normal Maintenance and Calibrations)
• Software Technician (for Software Downloads)
• Supervisor (access to Operations functions)
• Engineer (access to Administrator functions)

- Passwords are supplied by the Shift Manager or TFMCS administrator. It is their responsibility to ensure distribution of a password is only to users who require access.

- Once obtained, passwords are not to be shared and shall be controlled by the user with confidentiality consistent with HLAN computer system password.

5.1.5 ENTER the username and password supplied by Shift Manager or TFMCS administrator.
5.1 TFMCS System Power-Up / Log-On (Cont.)

5.1.6 IF the computer is locked and the username is not the required username, PERFORM the following:

5.1.6.1 CLICK on the “Cancel” button.

5.1.6.2 CLICK on the “Switch User” button.

5.1.6.3 ENTER the username and password supplied by Shift Manager or TFMCS administrator.

5.1.7 ENSURE the TFMCS software fully loads by confirming the following:

- System reaches the Maintenance Overview or Tank Farm Monitoring and Control System (TFMCS) Overview screen
- The logged in username is displayed in the lower right part of the screen.

NOTE - The following sections can be used if during maintenance, a user must perform a function that is not allowed by the normal maintenance level of access. These steps will request a temporary username and password which is good for only one day that has a higher level of privileges.

- The TFMCS Administrator will provide a username and password with elevated privileges to the Maintenance Technician which will expire in one day.

5.1.8 CONTACT the TFMCS Administrator AND REQUEST a one-day username and password with elevated privileges.
5.2 **TFMCS Maintenance Workspace**

NOTE - The Maintenance Overview screen is provided to facilitate access to system maintenance items as shown in Figure 1.

5.2.1 **FROM** the Left side of the Maintenance Overview screen, **SELECT** the Button which provides access to the following links:

<table>
<thead>
<tr>
<th>BUTTON NAME</th>
<th>PURPOSE OF THE LINK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Control Builder</td>
<td>Visible only to the Software Technician (SW_Technician). Used to open the ABB Control Builder application to download software to an ABB controller per Maintenance Procedure 2-GENI-810.</td>
</tr>
<tr>
<td>Open My Computer</td>
<td>Visible only to the Software Technician (SW_Technician). Used to open Windows Explorer for copying files between removable media and a computer.</td>
</tr>
<tr>
<td>TFMCS Overview</td>
<td>Provides access to an overview screen where graphics from any Tank Farm or Exhauster can be selected.</td>
</tr>
<tr>
<td>TFMCS Cabinet Details</td>
<td>Shows the health and status of Power Supplies and cabinet Temperatures.</td>
</tr>
<tr>
<td>200 East Network Diagram</td>
<td>Shows the health and status of Servers, HMIs, and Network Switches.</td>
</tr>
<tr>
<td>200 West Network Diagram</td>
<td></td>
</tr>
<tr>
<td>Open AMS-4 Cal Program</td>
<td>Opens the AMS-4 CAM program which is used during CAM calibration activities.</td>
</tr>
</tbody>
</table>
5.2 TFMCS Maintenance Workspace (Cont.)

Special Instructions
A red or orange box around the Asset Structure Tree View indicates Predictive Maintenance Asset Monitoring is off-line. If this occurs, contact Process and Control System Engineering for assistance.

5.2.2 FROM the Center Section of the Maintenance Overview screen, SELECT the plus symbol in the Asset Structure Tree View to open up and display the desired Predictive Maintenance Monitor:

<table>
<thead>
<tr>
<th>TREE NAME</th>
<th>PURPOSE OF THE MONITOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Assets</td>
<td>This is the general name for all Predictive Maintenance Monitors.</td>
</tr>
<tr>
<td>AN Farm Assets</td>
<td>Displays Predictive Maintenance Monitors for the Farm selected.</td>
</tr>
<tr>
<td>AW Farm Assets</td>
<td></td>
</tr>
<tr>
<td>AY/AZ Farm Assets</td>
<td></td>
</tr>
<tr>
<td>IT Assets</td>
<td>Displays Predictive Maintenance Monitors for Servers, Computers, and Network Switches</td>
</tr>
</tbody>
</table>

5.2.3 EXPAND the Plant Asset tree to show the health status for each Predictive Maintenance monitor.

5.2.4 SELECT AND

RIGHT CLICK on the appropriate monitor.

5.2.5 AT Farm Assets, SELECT the appropriate Asset Reporter or Faceplate to show the health alert details.

5.2.6 AT IT Assets, SELECT the appropriate Faceplate to show the health alert details.

5.2.7 REFER to procedure 7-MISC-902 for specific setpoints and responses to each Predictive Maintenance Monitor health alert.
5.2 TFMCS Maintenance Workspace (Cont.)

5.2.8 FROM the Right side of the Maintenance Overview screen, SELECT the Button which provides access to the following links:

<table>
<thead>
<tr>
<th>BUTTON NAME</th>
<th>PURPOSE OF THE LINK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller Hardware Status</td>
<td>These buttons show the health and status for the controller and input/output cards of the controller selected.</td>
</tr>
<tr>
<td>800xA Service Status</td>
<td>Opens a window with the ABB System Status Viewer which shows the health of the ABB software services.</td>
</tr>
<tr>
<td>RNRP Monitor</td>
<td>Opens a window with the ABB RNRP Monitor which shows the health and status of network connections to all Controllers, Servers, and HMIs.</td>
</tr>
</tbody>
</table>
5.3 Check the ABB Server System Status

5.3.1 FROM the Right side of the Maintenance Overview screen, SELECT the 800xA Service Status button.

5.3.2 CONFIRM all icons are GREEN.

5.3.2.1 IF icons are YELLOW (indicating the system is running in a degraded condition without backup capability) AND

IF degraded condition has an unknown cause, REQUEST Process and Control System Engineering support.

5.3.2.2 IF icons are RED (indicating the system and its backup have failed) AND

IF degraded condition has an unknown cause, REQUEST Process and Control System Engineering support.
5.4 Check the ABB RNRP Network Monitor Status

5.4.1 FROM the Right side of the Maintenance Overview screen, SELECT RNRP Monitor button.

5.4.2 CONFIRM primary and secondary network connection is active to all components by observing status for each controller, server, or HMI (If working properly it will show “up, up”).

5.4.2.1 IF one of “up” indications is missing, primary (left up) or secondary (right up) connection has been lost (indicating a degraded condition) AND

IF cause is not known, PERFORM the following:

a. USE H-14-042660 drawing set to assist in troubleshooting system for proper operation. Attempt to “ping” the degraded connection by its IP segment address referenced.

b. IF address is visible and network responding, PROCEED to troubleshoot/restart inoperative element.

c. REQUEST Process and Control System Engineering support.
5.5 Check Server, HMI, and Network Switch Status

5.5.1 FROM the Left side of the Maintenance Overview screen, SELECT the 200 East or 200 West Network Diagram button.

5.5.2 CONFIRM all icons have a green box symbol.

5.5.2.1 IF icons are a RED “X” (indicating Bad Quality) AND IF degraded condition has an unknown cause, PERFORM the following:

a. USE the H-14-042660 drawing set to assist in troubleshooting system for proper operation. ATTEMPT to “ping” the degraded connection by its IP segment address referenced.

b. IF address is visible and network responding, PROCEED to troubleshoot/restart inoperative element AND REQUEST Process and Control System Engineering support.

5.5.2.2 IF icons are a Black “X” on a RED background (indicating the item is in an Alert status), RIGHT CLICK on the item AND SELECT the faceplate for Alert details.

a. IF degraded condition has an unknown cause, USE the H-14-042660 drawing set to assist in troubleshooting system for proper operation. ATTEMPT to “ping” the degraded connection by its IP segment address referenced.

b. IF address is visible and network responding, PROCEED to troubleshoot/restart inoperative element AND REQUEST Process and Control System Engineering support.
5.6 Check ABB Controller Status

5.6.1 FROM the Right side of the Maintenance Overview screen, SELECT the controller Equipment Identification Number (EIN) to investigate.

5.6.2 CHECK all icons are GREEN.

5.6.2.1 IF icons are YELLOW (indicating the system is running in a degraded condition without backup capability) AND IF degraded condition has an unknown cause, REQUEST Process and Control System Engineering support.

5.6.2.2 IF icons are RED (indicating system and its backup have failed) AND IF degraded condition has an unknown cause, REQUEST Process and Control System Engineering support.

5.7 Check AN, AW, AY/AZ Farm Cabinet Equipment Status

5.7.1 FROM the Left side of the Maintenance Overview screen, SELECT the TFMCS Cabinet Details button.

5.7.2 SELECT the desired Farm Cabinet Details button to open up and display the desired Predictive Maintenance Monitor.

5.7.3 SELECT the desired equipment to open the Faceplate for additional details.

5.8 Check General Equipment Status

5.8.1 FROM the Left side of the Maintenance Overview screen, SELECT the TFMCS Overview.

5.8.2 NAVIGATE to the appropriate Farm, Exhauster, Tank, or Pit and LOCATE the desired equipment.

5.8.3 SELECT the desired equipment to open the Faceplate for additional details.
5.9 TFMCS Alarm Synchronization

5.9.1 DISABLE alarm manager service provider on 200E-MCS-300.
5.9.2 DISABLE alarm manager service provider on 200W-MCS-300.
5.9.3 DISABLE event collector service at highest level.
5.9.4 DISABLE event storage service at highest level.
5.9.5 DISABLE system message service provider on 200E-MCS-300.
5.9.6 DISABLE system message service provider on 200W-MCS-300.
5.9.7 DISABLE soft alarm service provider on 200E-MCS-300 (if applicable).
5.9.8 DISABLE soft alarm service provider on 200W-MCS-300 (if applicable).
5.9.9 WAIT for all Alarm Managers and Event collectors, System Message, and Soft Alarm service providers to go undefined.
5.9.10 ENABLE alarm manager service provider on 200E-MCS-300.
5.9.10.1 WAIT for it to come to service state or standby state.
5.9.11 ENABLE alarm manager service provider on 200W-MCS-300.
5.9.11.1 WAIT for it to come to service state or standby state.
5.9.12 ENABLE system message service provider on 200E-MCS-300.
5.9.12.1 WAIT for it to come to service state or standby state.
5.9.13 ENABLE system message service provider on 200W-MCS-300.
5.9.13.1 WAIT for it to come to service state or standby state.
5.9.14 ENABLE soft alarm service provider on 200E-MCS-300.
5.9.14.1 WAIT for it to come to service state or standby state.
5.9.15 ENABLE soft alarm service provider on 200W-MCS-300.
5.9.15.1 WAIT for it to come to service state or standby state.
5.9.16 ENABLE event storage service at highest level.
5.9.16.1 WAIT for all event storage providers to come to service state or standby state.
5.9 TFMCS Alarm Synchronization (Cont.)

5.9.17 ENABLE event collector service at highest level.

5.9.17.1 WAIT for all event collector providers to come to service state or standby state.

5.10 Check for Defragmented Aspect Database

NOTE - This section should be performed if graphic performance is slow due to “Multiple Human Machine Interfaces” (HMI). The program “afwsysinfo” checks to see if the Primary and Secondary ABB Aspect Servers are fragmented when compared to each other.

- This section is to be performed only on the ABB Aspect Server (200E-TMAC-MCS-300).

5.10.1 LOG ON (either directly or remotely) to 200E-TMAC-MCS-300 with Engineer/Administrator privileges.

5.10.2 OPEN a Command Line (Start>Run>Cmd).

5.10.3 TYPE afwsysinfo –csd AND PRESS Enter to prepare a check sum difference report of the two Aspect Servers.

5.10.4 TYPE afwsysinfo AND PRESS Enter to display the report.

Typical “afwsysinfo” Report
5.10 Check for Defragmented Aspect Database (Cont.)

NOTE - Defragmentation may impact system performance and should be performed when minimal operations are required.

5.10.5 IF the “DB Free portion” is greater than 50%, (see example above) CONTACT Process and Control System Engineering AND RECOMMEND the Aspect Servers be defragmented per ABB document 3BSE059394 (System 800xA Maintenance (Vendor Manual)).

5.11 Controller Reset on Redundant PM866 Units

CAUTION
In a non-redundant configuration, pressing initialize (INIT) button on primary (PRIM) controller will cause equipment shutdown, system control, and observation from TFMCS to be disabled until the controller restarts.

CAUTION
Holding INIT button down for greater than 5 seconds on PRIM controller will require a configuration download to controller.

5.11.1 PRESS AND HOLD INIT button for less than 5 seconds on the AC800M controller that does NOT have the “PRIM” LED lit (See Figure 12).

5.11.2 RELEASE button when Power LED begins to rapidly flash red.

5.11.2.1 IF INIT button was held down for greater than 5 seconds on PRIM controller, PERFORM a configuration download to controller per Section 5.18.

5.11.3 WAIT a few minutes for both controllers to synchronize and DUAL LED to be lit on both controllers (See Figure 12).
5.12 Controller Transfer on Redundant PM866 Units

CAUTION
In a non-redundant configuration, pressing initialize (INIT) button on primary (PRIM) controller will cause equipment shutdown, system control, and observation from TFMCS to be disabled until the controller restarts.

CAUTION
Holding INIT button down for greater than 5 seconds on PRIM controller will require a configuration download to controller.

5.12.1 CONFIRM DUAL LED is lit on both controllers, indicating they are synchronized (See Figure 12).

5.12.2 PRESS AND HOLD INIT button for less than 5 seconds on AC800M controller that has the “PRIM” LED lit (See Figure 12).

5.12.2.1 IF INIT button was held down for greater than 5 seconds on PRIM controller, PERFORM a configuration download to controller per Section 5.18.

5.12.2.2 CONFIRM “PRIM” LED is now lit on other controller.

5.12.2.3 WAIT a few minutes for DUAL light to become lit on both controllers to indicate they are again synchronized.
5.13 Controller Reset on Non-Redundant PM866 Units

**CAUTION**

In a non-redundant configuration, pressing initialize (INIT) button on primary (PRIM) controller will cause equipment shutdown, system control, and observation from TFMCS to be disabled until the controller restarts.

**CAUTION**

Holding INIT button down for greater than 5 seconds on PRIM controller will require a configuration download to controller.

5.13.1 **PRESS AND HOLD** INIT button for less than 5 seconds on the AC800M controller.

5.13.1.1 **IF** INIT button was held down for greater than 5 seconds **PERFORM** a configuration download to controller per Section 5.18.

5.13.2 **WAIT** a few minutes for the controller to re-load.

5.13.3 **CONFIRM** “PRIM” LED is lit to indicate controller is re-loaded and functional (See Figure 12).
5.14 Replacing a Redundant PM866 Controller

5.14.1 INFORM Shift Manager/OE of equipment replacement.
5.14.2 DETERMINE which controller needs to be replaced.
5.14.3 LIFT 24VDC fuse to remove power from controller being replaced.
5.14.4 CONFIRM all indicator lights are OFF.

NOTE - The primary controller will still retain power after the RCU Link cable is disconnected in Step 5.14.5, and should not result in any system shutdowns.

5.14.5 DISCONNECT RCU Link Cable from controller being replaced.
5.14.6 DISCONNECT BLACK Optical Module Bus Cable from controller being replaced.
5.14.7 RELEASE two captive screws (See Figure 2) AND WITHDRAW unit.
5.14.8 PULL old CPU from base.
5.14.9 INSERT replacement CPU in base.
5.14.10 TIGHTEN captive screws.
5.14.11 RECONNECT RCU Link Cable.
5.14.12 RECONNECT BLACK Optical Module Bus Cable.
5.14.13 INSERT fuse to restore power.
5.14.14 WAIT a few minutes for controller to reload.
5.14.15 CONFIRM “DUAL” LED is lit which indicates the controller is loaded and synchronized.
5.14.16 IF anomalies are present, such as the “FAULT” LED being lit, PERFORM a controller reset per Section 5.11 a maximum of two (2) times AND CONTINUE with this section.
5.14.17 CHECK Controller Hardware Status screen for additional anomalies.
5.15 Performing a Recovery Export

NOTE - Sections 5.15 thru 5.18 are typically performed in order during execution of a work package.

- This section (5.15) is performed to save an existing configuration prior to an import/download of new code. This backup is done as a good Operations/Engineering practice.

5.15.1 LOG ON with Engineer/Administrator privileges.

5.15.2 FROM the Maintenance Workspace OR Start Menu: (Start > All Programs > ABBIndustrialIT 800xA > System > Workplace) OPEN an Engineering Workplace (See Figure 3).

5.15.3 IF exporting a CI other than a library PERFORM Steps 5.15.6 thru 5.15.12. IF exporting a library PERFORM Steps 5.15.4 and 5.15.5.

5.15.4 IN the object Type Structure, NAVIGATE to the library to be exported.

5.15.5 FROM the Library Version Definition Aspect, SELECT the Export Library button.

5.15.6 FROM the Maintenance Workspace or Start Menu: (Start > All Programs > ABBIndustrialIT 800xA > System > Import Export) OPEN the Import/Export tool (See Figure 4).

5.15.7 IN the engineering workplace, SELECT the Configuration Item (CI) or Sub-Items to be exported as identified by the Software Change Request (SCR) or Work Package AND DRAG them into the left hand pane of the Import/Export tool.

5.15.8 ENSURE the checkboxes for “Include dependencies” is unchecked and “Include children” is checked.

5.15.9 SELECT the “OK” button.

5.15.10 SELECT the “DONE” button when the export is complete.

5.15.11 REVIEW the contents of the import AND CHECK contents match what is expected for CIs or Sub-Items exported.
5.15 Performing a Recovery Export (Cont.)

5.15.12 **REPEAT** as many times as necessary to drag all CI sub-items identified by the SCR or Work Package.

5.15.13 **SAVE** the export with the filename which matches the CI or indicates the Sub-Item being exported.

5.15.14 **REPEAT** as many times as necessary to export all CI items identified by the SCR or Work Package.

5.16 Performing an Import

**NOTE** - This process will load code from removable media (typically a jump drive) to the Production TFMCS system prior to downloading the code to a controller.

5.16.1 **LOG ON** with Engineer/Administrator privileges.

5.16.2 **FROM** the Maintenance Workspace or Start Menu: (Start > Programs > ABBIndustiralIT 800xA > System > Import Export) **OPEN** the Import/Export tool.

5.16.3 **FROM** the File Menu, **OPEN** the folder “SCRXXXXX-After” provided by the Process and Control System Engineer where SCRXXXXX matches the SCR identified in the work package.

5.16.4 **SELECT** the “.afw” file or files for import in the order directed by the work package.

5.16.5 **SELECT** the “OPEN” button.

5.16.6 **SELECT** the “DONE” button when it appears.

5.16.7 **REVIEW** the contents of the import **AND** **CHECK** that the contents match what is expected for the CIs or Sub-Items being imported.

5.16.8 **SELECT** the “Import All” button.

5.16.9 **WHEN** the Import Objects and Aspects box appears, **SELECT** the “Import Options” link **AND** **ENSURE** the following:

- “Include Dependencies” box is unchecked
- “Include Children” box is checked.
5.16 Performing an Import (Cont.)

5.16.10 SELECT the “FINISH” button to complete the import.

5.16.11 REPEAT this section as necessary to import the files as directed by the Work Package.

5.16.12 WHEN complete, CLOSE the Import/Export Tool.

5.17 Generate Configuration Data

Special Instructions
This section should only be done “after” an import or “prior” to a download to a controller.

Special Instructions
When this section is performed, download to the controller must occur or troubleshooting on-line is not possible.

5.17.1 IF this section is being performed due to power interruption or suspected power interruption, PERFORM the following:

5.17.1.1 CONFIRM with P&CSE Engineer that correct software is being downloaded to the controller.

NOTE - This next step ensures that incorrect software would not be prematurely generated and then installed on the controller.

5.17.1.2 CONFIRM with P&CSE Engineer that a software change request is not currently being processed for deployment.

5.17.2 ENSURE LOG ON with Engineer/Administrator privileges.

5.17.3 FROM the Maintenance Workspace OR Start Menu: (Start > All Programs > ABBIndustrialIT 800xA > System > Workplace) OPEN an Engineering Workplace.

5.17.4 FROM the ABB Functional Structure, SELECT the Functional Area associated with the Work Package or Software Change request.

5.17.5 SELECT the Diagram, Function Diagram, or Single Control Module imported from the previous Section or associated with the Work Package or Software Change request.

5.17.6 FROM the list of Aspects on the right side of the Engineering Workplace, SELECT “Allocatable Group” aspect.
5.17 Generate Configuration Data (Cont.)

5.17.7 PRESS the button “Generate Configuration Data (Full Build)”.

5.17.8 REPEAT this section for as many Diagrams, Function Diagrams, or Single Control Modules which were imported.

5.18 Downloading Configuration to a Controller

NOTE - An INIT download will reset Environmental totalizer values to zero and unless properly configured, a COLD download may also reset Environmental totalizer values to zero.

5.18.1 IF an INIT or COLD download is planned to an Exhauster Controller, PRINTOUT OR RECORD totalizer values prior to the download.

5.18.2 ENSURE LOG ON with Engineer/Administrator privileges.

5.18.3 FROM the Maintenance Workspace or Start Menu: (Start > All Programs > ABBIndustrialIT 800xA > Engineering > Control Builder M) OPEN Control Builder (See Figure 6).

5.18.4 FROM the File Menu, SELECT “OPEN Project”.

5.18.5 FROM the pop-up window that appears, SELECT the “Tank_Farms project” (See Figure 7).

5.18.6 SELECT the “OPEN” button.

NOTE - Project, libraries, and controllers will take a few minutes to load.

5.18.7 WAIT for “Opening Project Finished” to display at the bottom of the Control Builder M window.

5.18.8 EXPAND the controllers list.

5.18.9 SELECT each controller identified in the Software Change Request or Work Package for download (See Figure 8).

5.18.9.1 CONFIRM the system identity is a production system IP address for example: xxx.xxx.88.xxx.

5.18.9.2 RIGHT CLICK the controller.

5.18.9.3 SELECT “Download Project and Go Online” button.

5.18.9.4 IF re-authentication window appears, ENTER engineer login information and reason for download.
5.18 Downloading Configuration to a Controller (Cont.)

NOTE - The user performing the download will be potentially prompted with several warnings related to software differences, code sorting loops, simulation etc. These warnings vary depending on the controller and specific download task. These warnings should only be acknowledge if the user is familiar with the code being downloaded and understands the outcome of downloading with the associated warning being present.

Special Instruction

IF the user encounters any warnings that do not look familiar or are unrecognizable, consult engineering.

5.18.9.5 REVIEW and ACKNOWLEDGE download warnings.

5.18.9.6 CLICK on Continue button on Online Analysis-Online with Download Screen to proceed (See Figure 9).

5.18.9.7 INSPECT the Difference Report AND CONFIRM if the new configuration is desired to be downloaded.

5.18.9.8 WAIT for a confirmation message stating that “You are now online” to appear.

5.18.9.9 REPEAT steps 5.18.9 to 5.18.9.8 for each controller.

5.18.10 CONFIRM equipment is operating correctly as follows.

5.18.10.1 ON graphic screens associated with the download CHECK displayed values are consistent with the process conditions.

5.18.10.2 CHECK that alarms associated with the download controller are in their expected state (cleared, returned, or acknowledged).

5.18.11 PERFORM post installation testing as specified in the SCR or Work Package.

5.18.12 CLICK on “Go Offline” button.

5.18.13 REPEAT the steps in this section as identified in the SCR or Work Package to download to all controllers.

5.18.14 CLOSE the Control Builder M application (Answer YES for “Are you sure you want to stop Control Builder M Professional”).
5.19 Shutdown of Controllers (without or after Recovery Export)

Special Instructions

This section should only be performed if directed by the Field Work Supervisor (when general outage or service work requires a 1 or more controllers to be taken offline, or de-energized.) Controller battery backup check should be performed. Determine if the controller is backed up by an SB821 or SB822 Battery backup module. A fully charged (has been energized at least 48 hours) SB 822 is expected to maintain controller program for 7 days, and SB 821 with a new battery should also maintain controller program for 7 days.

Prior to de-energizing or disconnecting a controller with an SB 821 backup module, perform a battery check on the SB 821 Battery backup module with the battery removed from the module. Battery must be between 20 and 30 deg. C for testing. Battery can be checked with a 30 ohm load for 10 seconds, Battery voltage in 30 ohm circuit to remain at or above 3.21 V, alternately, battery can be checked with a 100 ohm load for 10 seconds. Battery voltage in 100 ohm circuit to remain at or above 3.35 V. If battery will not meet spec, replace the battery with a new cell.

5.19.1 INFORM Shift Manager/OE of Battery testing on subject controller.

NOTE - During this interval of battery testing, this controller can lose the program/lose monitoring for all devices on this controller if cabinet power is interrupted or if the operating controller enters a condition requiring an attempt to transfer automatically. During this testing with the battery removed, automatic transfer is disabled on ABB redundant controllers. IF Operations requires, install new battery per section 5.23.

5.19.2 PERFORM Battery check, IF pass, REINSTALL battery in SB 821 module.

5.19.3 PRIOR to a scheduled controller cabinet power outage, VERIFY controller status per section 5.6 above.
5.19  Shutdown of Controllers (without or after Recovery Export) (Cont.)

5.19.4  On single controller configurations, **VERIFY** “PRIM” LED is lit to indicate controller is functional

5.19.5  On redundant controller configurations, **VERIFY** DUAL LED is lit on both controllers, indicating they are synchronized (See Figure 12). **VERIFY** “PRIM” LED is lit on one controller and functional

5.19.6  **VERIFY** Network communications are in place with traffic indicator Lights flashing green on primary controller, and periodic traffic on redundant network.

5.19.7  **INFORM** Shift Manager/OE of ABB controller equipment ready for power down.

5.19.8  **LIFT** 24VDC fuse(s) to remove power from controller(s) being de-energized, **CONFIRM** all indicator lights are **OFF**. Otherwise power will be removed remotely from ABB cabinets.
5.20 Recovery

Special Instructions
This section should only be performed if directed by the Field Work Supervisor (when the results of a previous download were not as expected and the goal is to revert to the Recovery Export code taken in Section (5.15).

5.20.1 PERFORM the Section (5.19) ONLY at the direction of the Field Work Supervisor.

5.20.2 LOG ON with Engineer/Administrator privileges.

5.20.3 FROM the Start Menu: (Start > Programs > ABBIndustrialIT  800xA > System > Import Export) OPEN the Import/Export tool.

5.20.4 FROM the File Menu, OPEN the file that contains the CIs or Sub-Items that need to be imported.

5.20.5 SELECT “DONE” button when it appears.

5.20.6 REVIEW the contents of the import AND CHECK that the contents match what is expected for the CIs or Sub-Items being imported.

5.20.7 Per Engineering direction, SELECT the items to import, THEN SELECT the “IMPORT” button

OR

SELECT the “IMPORT ALL” button.

5.20.7.1 RECORD Engineering direction in work record.

5.20.8 WHEN the Import Objects and Aspects box appears, ENSURE the following:
• Include Dependencies box is unchecked
• Include Children box is checked.

5.20.9 SELECT “FINISH” to complete the import.

5.20.10 REPEAT this section as necessary to import the items as directed by Engineering.

5.20.11 WHEN complete, CLOSE the Import/Export Tool.
5.21 Replacing S800 IO modules

NOTE - Attachment 3 provides selected I/O module status indicator LED descriptions.

5.21.1 **ROTATE** plastic switch on side of module ≦ 90° Counter-clockwise (CCW) **UNTIL** “GREEN” LED goes out, (See Figure 10).

5.21.1.1 **CONFIRM** “RED” fault LED is LIT, indicating that module is disabled.

5.21.2 **PULL** module from its base.

NOTE - On the base of the unit there are 2 six position rotary keys marked A – F. (See Figure 11).

- Figure 11 displays both the Standard and Compact Termination Units (TU’s).

5.21.3 **MATCH** the new module with the existing base settings.

5.21.4 **PUSH** replacement module into base, until seated **AND**

**CONFIRM** “RED” fault LED is LIT.

5.21.5 **ROTATE** plastic switch on side of module ≦ 90° Clockwise (CW), **UNTIL** “RED” LED goes out.

5.21.5.1 **CONFIRM** a “GREEN” run LED is lit, indicating that module is Enabled.
5.22 Replacing the SB822 Rechargeable Battery Unit

NOTE - The Lithium Ion battery package is mounted inside SB822 unit and should be connected to 24 Vdc which allows it to charge.

- External batteries have a three to five year lifespan. Battery replacement is recommended when the battery light on the controller blinks, is red, or not lit.

5.22.1 DISCONNECT TK821V-020 cable connector.

5.22.2 DISCONNECT 24Vdc supply cable connector.

5.22.3 INSERT a screwdriver into locking mechanism (located on the left side of the SB822 unit) AND TURN Counter-clockwise (CCW) downward to unlock position.

5.22.4 RELEASE SB822 unit from the DIN-Rail.

5.22.5 REMOVE SB822 unit cover.

5.22.6 DISCONNECT battery package from the Printed Circuit Board (PCB).

5.22.7 REMOVE battery package.

5.22.8 INSERT new battery package.

5.22.9 CONNECT battery package to PCB.

5.22.10 INSTALL SB822 unit cover.

5.22.11 INSTALL SB822 unit on DIN-Rail.

5.22.12 INSERT a screwdriver into locking mechanism (located on the left side of the SB822 unit) AND TURN Clockwise (CW) upward to lock position.

5.22.13 CONNECT 24Vdc supply cable connector.

5.22.14 CONNECT TK821V-020 cable connector.

5.22.15 DISPOSE of old battery package at a battery recycling station per requirements of HNF-EP-0863.
5.23 Replacing the SB821 Non-Rechargeable Battery Unit

NOTE - The battery is mounted inside the SB821 unit.
- External batteries have a three to five year lifespan. A new D size cell 3.6V lithium battery is expected to hold controller program for more than 7 days. Battery replacement is recommended when the battery light on the controller blinks, is red, or not lit.

5.23.1 DISCONNECT TK821V-020 cable connector.
5.23.2 DISCONNECT 24Vdc supply cable connector.
5.23.3 INSERT a screwdriver into locking mechanism (located on the left side of the SB821 unit) AND
    TURN Counter-clockwise (CCW) downward to unlock position.
5.23.4 RELEASE SB821 unit from the DIN-Rail.
5.23.5 REMOVE SB821 unit cover.
5.23.6 REMOVE battery.
5.23.7 INSERT new battery.
5.23.8 INSTALL SB821 unit cover.
5.23.9 INSTALL SB821 unit on DIN-Rail.
5.23.10 INSERT a screwdriver into locking mechanism (located on the left side of the SB821 unit) AND
    TURN clockwise (CW) upward to lock position.
5.23.11 CONNECT 24Vdc supply cable connector.
5.23.12 CONNECT TK821V-020 cable connector.
5.23.13 DISPOSE of old battery package at a battery recycling station per requirements of HNF-EP-0863.
5.24 Clear Human Machine Interface Graphics Cache

**Special Instructions**

This section should only be performed on an HMI Client which provides “Operator/Maintenance graphics”.

**NOTE** - This section is used if HMI performance is slow to remove the graphics cache and allow a local copy of the graphics to be refreshed.

5.24.1 **DO NOT PERFORM** this Section (5.24) on a Server.

5.24.2 **LOG ON** with Engineer/Administrator privileges.

5.24.3 **FROM** the taskbar, **RIGHT CLICK** on the ABB icon **AND**

**START** the ABB Configuration Wizard.

5.24.4 **SELECT** Maintenance from the Configuration Wizard options.

5.24.5 **SELECT** “Stop all processes associated with the ABB 800xA Base” **THEN**

**SELECT** the “NEXT” button.

5.24.6 **SELECT** the “FINISH” button.

5.24.7 **SELECT** “OK” on the new dialog window.

5.24.8 **WAIT** for the ABB processes to stop and the ABB icon to turn grey.

5.24.9 **OPEN** Windows Explorer **AND**

**DELETE** the following folders:
- OperateITData1
- OperateITTemp1.

5.24.10 **CLOSE** Windows Explorer.

5.24.11 **FROM** the Start Menu, **RESTART** the HMI Client.

5.24.12 **AFTER** HMI restart, **LOG ON** as any TFMCS user.

5.24.13 **CONFIRM** a Workplace starts (or can be started).

5.24.14 **CONFIRM** on the TFMCS graphics that sensor data and trends function with expected values.
5.25 Reset TFMCS Human Machine Interface

5.25.1 PUSH power button on front of HMI computer until HMI shuts down.

5.25.2 PUSH power button again until HMI begins to restart.

5.25.3 IF Windows login screen does not appear, CONTACT Process and Control System Engineering for support.

5.25.4 LOG ON per Section 5.1.

5.26 Reset TFMCS Server

5.26.1 PRIOR to performing this section, CONFIRM Process and Control System Engineering support is available.

5.26.2 IDENTIFY the type of server to be re-started (Aspect Server, Connectivity Server).

5.26.3 FROM the 800xA Service Status button, CONFIRM the redundant server is available to take over for the server being re-started.

5.26.4 SELECT “RESTART” from the Windows menu, OR

PUSH the power button on the front of the Server and allow the Server to shut down.

5.26.5 IF the power button was used to shut down, PUSH power button again until Server begins to restart.

5.26.6 LOGIN at Windows login screen using password provided by Shift Manager or Administrator.

5.26.7 IF Windows login screen does not appear, CONTACT Process and Control System Engineering for support.

5.26.8 FROM the 800xA Service Status button, CONFIRM the services on the server are active and available.
5.27 Restore AY/AZ Tank Farm Temperature RTP Communications

NOTE - The purpose of this section is to describe steps to be taken to re-establish AY/AZ tank farm temperatures on the TFMCS HMI.

- The first step in determining why the temperatures are not updating is to ensure a communications path exists to the RTP controller currently located in AY801A
- The second step in determining why the temperatures are not updating is to ensure OPC clients are running and displaying proper information real time.

5.27.1 LOG ON with Engineer/Administrator privileges.

5.27.2 FROM the Start>Remote Desktop program, LOGIN to the 200E-MCS-302 Server.

5.27.3 SELECT “START”.

5.27.4 SELECT “RUN”.

5.27.5 TYPE in “Services.msc”.

5.27.6 SCROLL down to the RTP OPC service.

5.27.7 RIGHT CLICK AND

SELECT “RESTART”.

5.27.8 OPEN operator work place AND

SELECT on temperature reading from AY tank farm

5.27.9 ENSURE the temperature value updates on a periodic basis.

5.27.10 REPEAT the above steps as necessary to re-start the RTP OPC service.
5.28 Restoration

5.28.1 IF any problems were encountered, INFORM FWS.

5.28.2 ENSURE equipment system restoration by observing HMI graphic indications are consistent with expected field conditions.

5.28.3 NOTIFY Operations that testing is complete and system may be returned to desired configuration.

5.29 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values/Results are satisfactory.

5.30 Review

5.30.1 NOTIFY FWS test is complete.

5.30.2 FWS ENSURE any work requests needed as a result of this procedure are identified and generated.

5.31 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company Level Record Inventory and Disposition Schedule (RIDS), is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 – Maintenance Overview Screen
Figure 2 – PM866 Controller
Figure 3 – Engineering Workplace
Maintain ABB System AC800M Controller and S800 IO Hardware

Figure 4 – Import/Export Tool
Figure 5 – Open Project Screen

![Control Builder M Professional](image)

- File
- Edit
- View
- Tools
- Window
- Help
- New Project... Ctrl+N
- Open Project... Ctrl+O
- Print... Ctrl+P
- Documentation...
- Exit Alt+F4
Figure 6 – Control Builder
Maintain ABB System AC800M Controller and S800 IO Hardware

Figure 7 – Select Project Screen
Figure 8 – Selection of Controllers for Download/On-line
Maintain ABB System AC800M Controller and S800 IO Hardware

Figure 9 – Online Analysis (Online with Download Screen)
Figure 10 – S800 IO Module (Outside)

Rotate plastic switch
Maintain ABB System AC800M Controller and S800 IO Hardware

Figure 11 - S800 IO Module Base
Figure 12 - PM866 Controller Indications

- Primary
- Dual
- Fault
- Run
- Power
- Battery
- 4 x Tx and Rx LEDs
### Attachment 1 – PM866 Controller Normal LED Status

<table>
<thead>
<tr>
<th>Name</th>
<th>Color</th>
<th>Function</th>
</tr>
</thead>
</table>
| F(ault)  | Red   | Normal State – OFF  
|          |       | Self check OK      |
| Power    | Green | Normal state – ON  
|          |       | When lit, indicates that the CPU DC/DC converter is generating valid +5 V and +3.3 V DC supply voltages. No software control. |
| Battery  | Green | Normal state – ON  
|          |       | Lit when condition of internal or external battery is satisfactory. The LED is controlled by a software battery voltage test – BATTOK (1) |
| Tx       | Yellow| Data Transmission(2) for CN1,CN2,COM3 and COM4  
|          |       | Flashes in synchronization with Tx traffic |
| Rx       | Yellow| Data Reception(2) for CN1,CN2,COM3 and COM4  
|          |       | Flashes in synchronization with Rx traffic |
| PRIM(ary)| Yellow| Lit in single and redundant configuration.  
|          |       | Indicates Primary CPU in redundant configuration. Controlled by software |
| DUAL     | Yellow| Lit when the CPU is running in redundant configuration and synchronized state. |
## Attachment 2 - PM866 Controller Fault Conditions

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible Cause &amp; Corrective Action</th>
</tr>
</thead>
</table>
| F(ault) LED is ON | Controller Re-start, (INIT), in progress.  
  - Wait for Controller restart to finalize.  
  If condition persists:  
  - Check that the CEX-bus fuse is serviceable.  
  - Check for a module failure on the CEX-bus. |
| R(un) LED is OFF | No application loaded on the Controller.  
  - Load application.  
  - Restart Controller (INIT push button).  
  Controller application failed.  
  - Reload application.  
  - Restart Controller (INIT push button). |
| B(attery) LED is flashing | Battery power (Internal or External) is below an acceptable level or non-existent.  
  - Install new battery.  
  External battery cable disconnected.  
  - Connect external battery cable. |
| Rx is off | CN ports: Telegrams from other station cannot be received on the controller.  
  - Check IP addresses and Network cables.  
  COM ports: Telegrams from slaves are not received.  
  - Check COM port and protocol settings.  
  - Check serial cables and modems. |
| DUAL LED is OFF on both CPUs (PM861 and PM864 only) | The CPUs are in the process of being re-started or configured. Allow time for this to finalize.  
  RCU Link Cable disconnected.  
  - Connect the RCU Link Cable.  
  Different Control Software in the two CPUs.  
  - Upgrade the CPUs with the same control software. |
Attachment 3 – IO Module LED Status indicators

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
<td>F(ault) LED: Red indicates module fault or that device is in error state. Otherwise, not lit.</td>
</tr>
<tr>
<td></td>
<td>R(un) LED: Green indicates that device is in operational state. Otherwise, not lit.</td>
</tr>
<tr>
<td></td>
<td>W(arning) LED: Yellow indicates a process error such as open circuit or power supply fault. Otherwise, not lit.</td>
</tr>
</tbody>
</table>

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</tr>
<tr>
<td></td>
<td>O(SP) LED: Yellow indicates that the output value is set to OSP value.</td>
</tr>
</tbody>
</table>
## Attachment 3 – IO Module LED Status indicators (Cont.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
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</table>
| Indicators | F(ault) LED: Red indicates module fault or that device is in error state. Otherwise, not lit.  
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## Attachment 3 – IO Module LED Status indicators (Cont.)

<table>
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<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
<td>(S) Status LED: Red indicates module fault. Green indicates Module OK (FPGA configuration). Rx1 LED: Yellow indicates data received on opto port 1. Tx1 LED: Yellow indicates data transmitted on opto port 1. Rx2 LED: Yellow indicates data received on opto port 2. Tx2 LED: Yellow indicates data transmitted on opto port 2. Rx3 LED: Yellow indicates data received on opto port 3. Tx3 LED: Yellow indicates data transmitted on opto port 3.</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
<td>S(tatus) LED: Green indicates that the TB840 is operational. Red indicates a fault condition; Reset and communications errors on the electrical ModuleBus turns the LED on. P(ower ok) LED: Green indicates that the d.c./d.c. converter generates valid internal power and +5 V d.c. on the electrical ModuleBus. Rx1 and Rx2 traffic LEDs: Yellow (blinking) indicates that the TB840 is receiving data on the two optical ModuleBus channels respectively. ERx1 traffic LED: Yellow (blinking) indicates the TB840 is receiving data on the electrical ModuleBus A. ERx2 traffic LED: Yellow blinking, indicates that the TB840 is receiving data on the electrical ModuleBus B.</td>
</tr>
<tr>
<td>MTU Keying code</td>
<td>AB</td>
</tr>
</tbody>
</table>

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![Diagram of IO Module LED Status indicators](attachment.png)
**Attachment 3 – IO Module LED Status indicators (Cont.)**

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