DeltaV™ PK Standalone System Manufacturer Merge Guide

Designing a Skid or Subsystem That Will Eventually Be Merged, What Should You Consider?

The purpose of this document is to cover the aspects of the DeltaV PK Standalone system that an OEM, EPC, or Systems Integrator should consider when designing a skid or subsystem that will one day be merged into a larger DeltaV Balance of Plant (BoP) system. It is intended that this should act as a guide for aspects of the configuration that should be considered when engineering the Standalone system, to ensure a smooth merging of databases that results in the least amount of work or challenges for both the end user as well as the skid or subsystem vendor.

The document is divided into 3 sections: Section 1 covers general merge considerations that should be kept in mind while designing any DeltaV PK Standalone system that may one day be merged, Section 2 is a prescriptive section for engineering best practices when designing generic skid units or subsystems that may one day be merged into any end user system, and Section 3 is also a prescriptive section covering the aspects of engineering a skid or subsystem when one is working with an end-user prior to the design of that skid.

Additional information about the PK merge process can be found in the DeltaV PK Merge Utility Help documentation located by selecting the "?" icon in the top right corner of the DeltaV PK Merge Utility application found on any DeltaV Professional Plus workstation and in the DeltaV PK Standalone System End-User Merge Guide.

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General Merge Considerations

The purpose of this section is to cover aspects of the DeltaV PK Merge process that may apply to any system. It is intended that this acts as a guide when engineering the Standalone system, to ensure a smooth merging of databases that results in the least amount of work or challenges for both the end user as well as the skid or subsystem vendor.

1. Never Loaded Items (Items That Will Not Be Merged Into the Deltav Bop) - Special Attention Should Be Paid to This Section

1. **Alarm Priorities** – Alarm Priorities are never merged from a PK Standalone system into a DeltaV BoP. The DeltaV BoP Alarm Priorities are always considered to be critical and therefore the Alarm Priorities from a PK Standalone system cannot overwrite those in the larger DeltaV BoP system during a merge. The Alarm Priorities are listed in the *Check Readiness* step of the *DeltaV PK Merge Utility* as *Will Not Be Loaded* items with Item Name: Critical, Warning, Advisory, (custom name), etc., and Item Type: Alarm Annunciation.

    a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's Alarm Priority configuration, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

    b. If you do not have access to the end user's Alarm Priorities, it is recommended that you use the out-of-box (OOB) Alarm Priorities and not create custom values.

    c. If you have used custom Alarm Priorities in your PK Standalone system, keep track of what those Alarm Priorities are for each Standalone project and be sure to communicate this to your end user because they will need to create the analogous Alarm Priority in the DeltaV BoP system prior to moving past the Check Readiness step of the merge process. Any control modules that contain alarms that utilize these custom Alarm Priorities will fail to import, if the Alarm Priority is not present, which may cause unwanted behavior in the merged configuration.
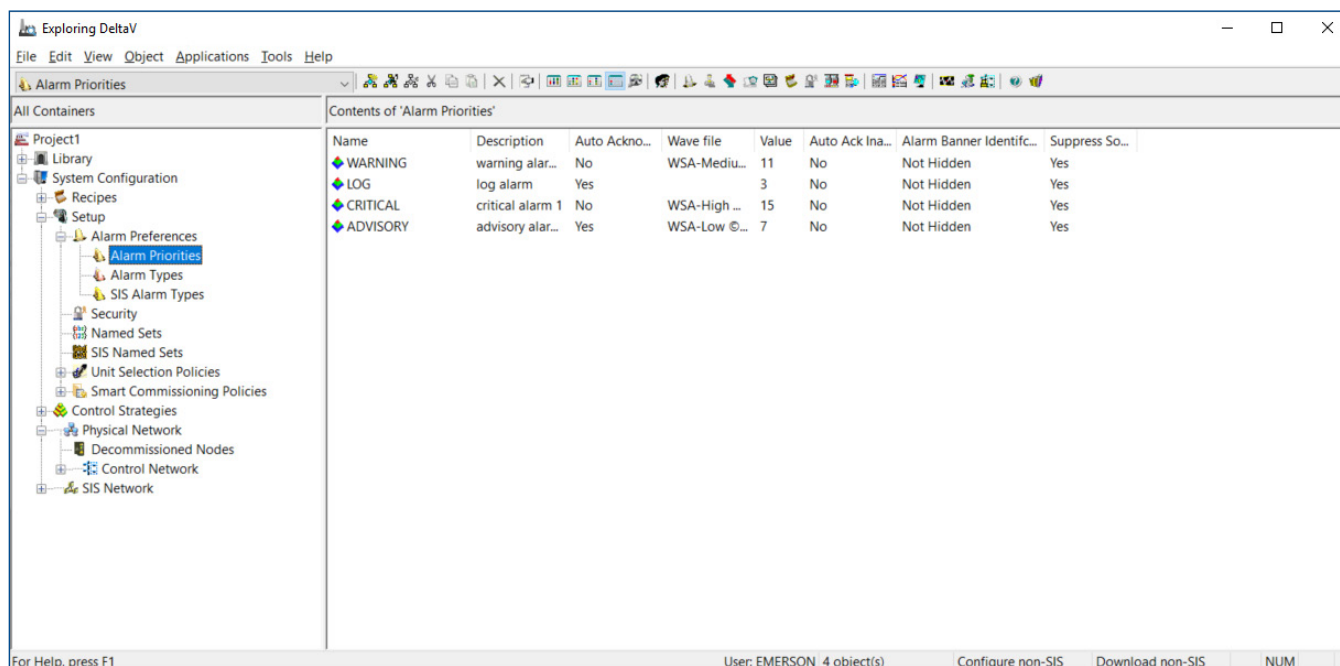

Figure 1.1.1.1

2. Out-of-Box Alarm Types (Also Applies to SIS) – OOB Alarm Types (default Alarm Types) and OOB SIS Alarm Types (default SIS Alarm Types) are not merged. The OOB Alarm Types/SIS Alarm Types are not modifiable in the PK Standalone system. If these have been modified in the DeltaV BoP system, be sure to understand how this will affect the configuration being merged.

   a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's Alarm Types/ SIS Alarm Types, it is recommended that you begin the skid or subsystem design utilizing their configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

   b. If you do not have access to the end user's Alarm Types/SIS Alarm Types, it is recommended that you use the OOB Alarm Types/SIS Alarm Types and not create custom values.

   c. If you have used custom Alarm Types/SIS Alarm Types in the PK Standalone system, they will be merged normally and will be flagged if they conflict with any custom items in the DeltaV BoP.

Figure 1.1.2.1

Figure 1.1.2.2

3. Out-of-Box Named Sets (Also Applies to SIS) – OOB Named Sets (default Named Sets) and OOB SIS Named Sets (default SIS Named Sets) are not merged. The OOB Named Sets/SIS Named Sets are not modifiable in the PK Standalone system. If these have been modified in the DeltaV BoP system, be sure to understand how this will affect the configuration being merged.

    a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's Named Sets/SIS Named Sets, it is recommended that you begin the skid or subsystem design utilizing their configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

    b. If you do not have access to the end user's Named Sets/SIS Named Sets, it is recommended that you use the OOB Named Sets/SIS Named Sets and not create custom values.

    c. If you have used custom Named Sets/SIS Named Sets in the PK Standalone system, they will be merged normally and will be flagged if they conflict with any custom items in the DeltaV BoP.
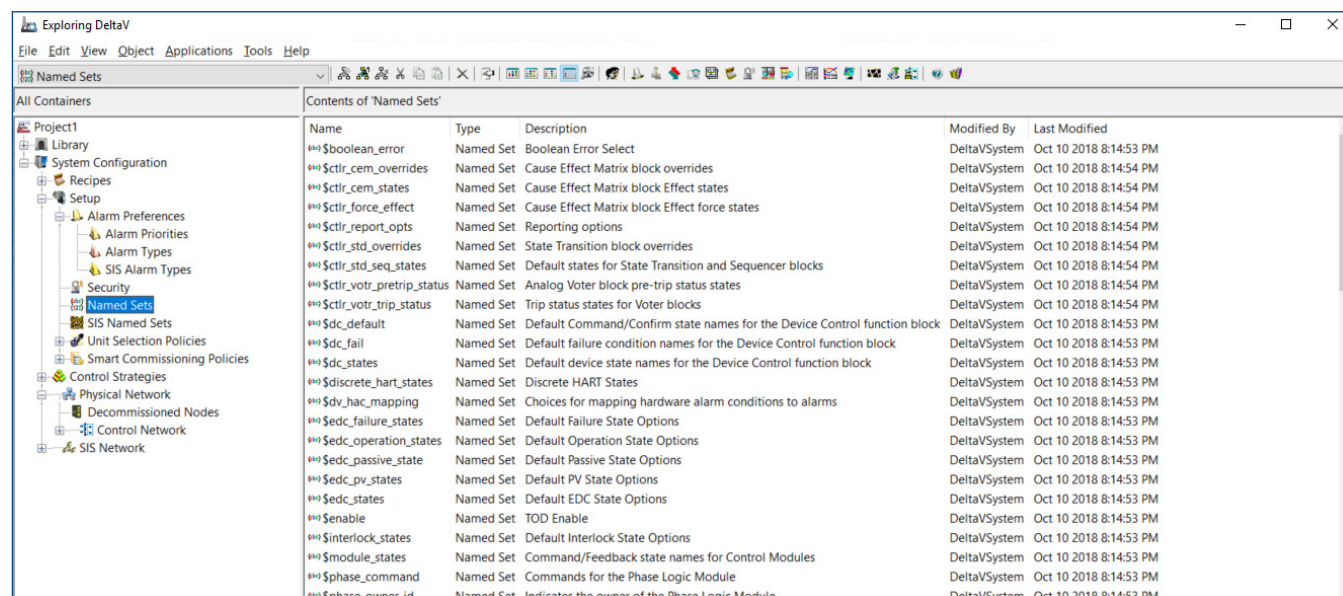
Figure 1.1.3.1
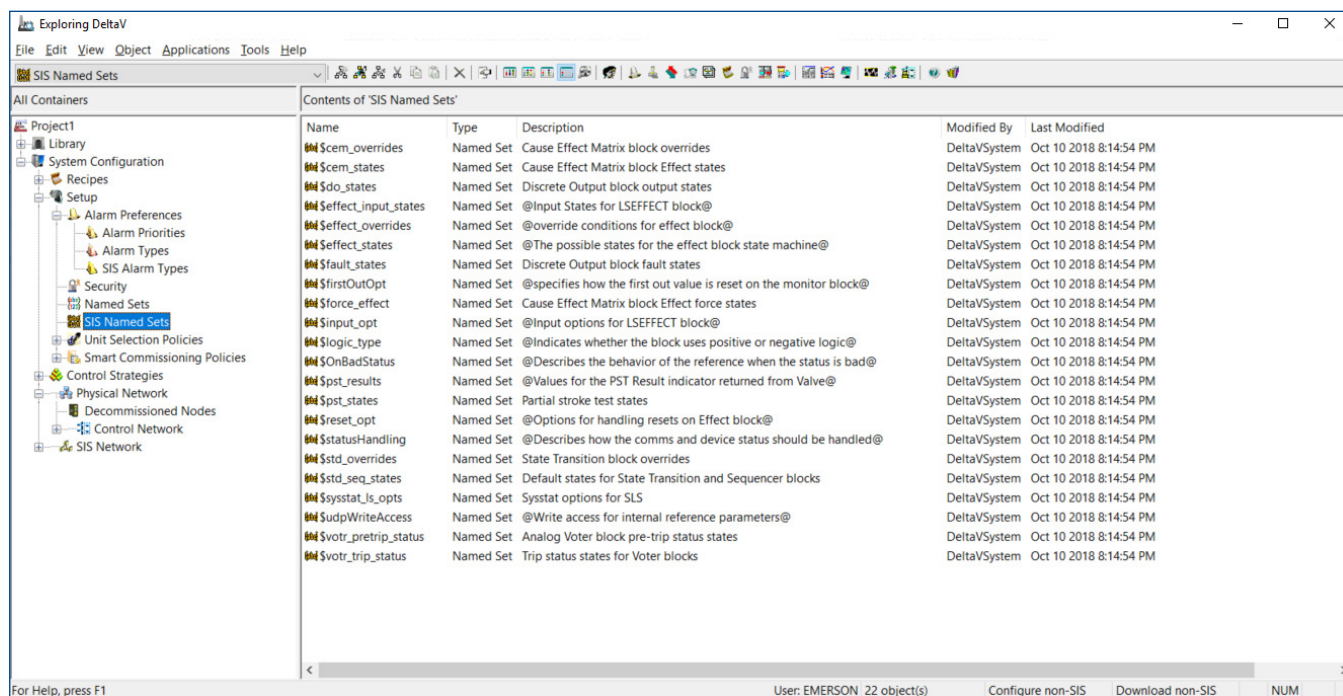
Figure 1.1.3.2

4. Setup: Engineering Units – OOB Engineering Units will not be merged. The Engineering Units field will always be listed as a conflicting item in the DeltaV PK Merge Utility since all DeltaV and DeltaV PK Standalone systems contain this object. However, custom Engineering Units will be merged if this object is included for loading into the DeltaV BoP system.

   a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's Engineering Units prior to configuring the skid or subsystem, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

      i. Because the DeltaV PK Merge Utility does not list Engineering Units explicitly, Engineering Units must be handled with special caution. If any custom Engineering Units are configured, keep track of what was added and be sure to communicate this to the end user to add those units to the BoP system prior to merging the skid.
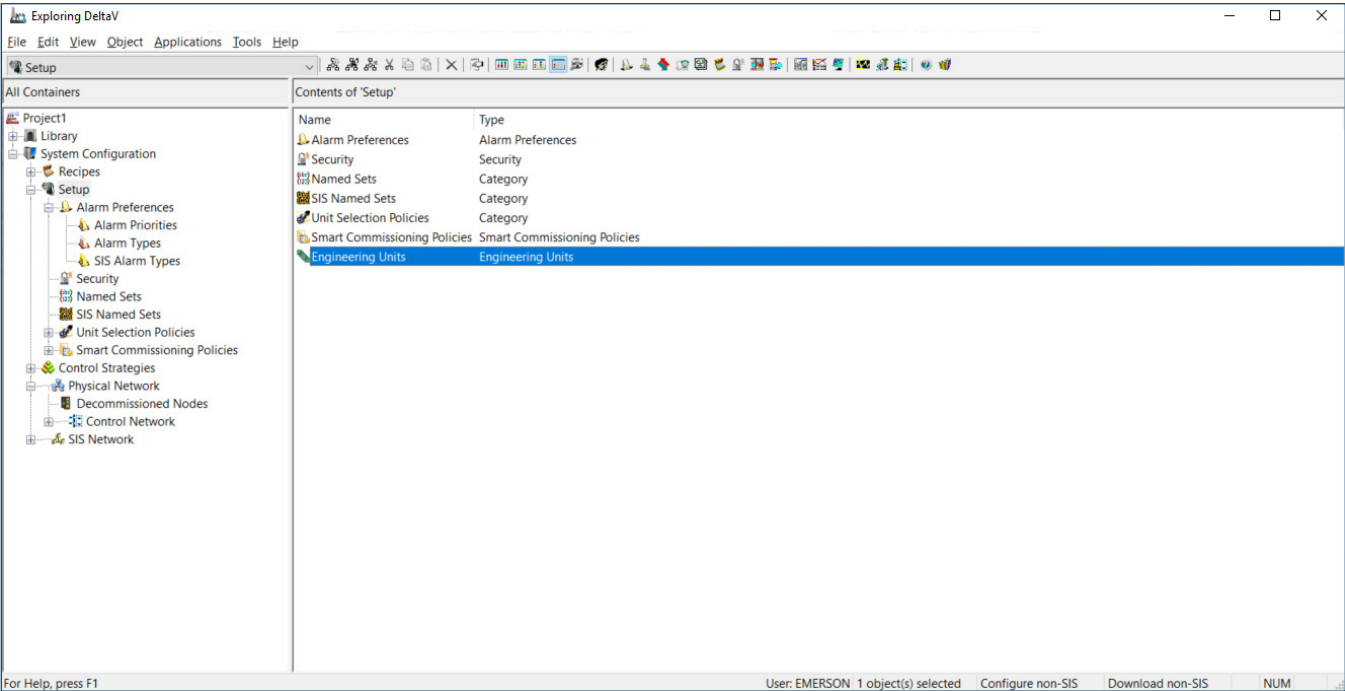
Figure 1.1.4.1

5. **Security: Default Lock for Parameter Security (Also Applies to SIS)** – The Default Lock for Parameter Security and SIS Parameter Security will not be merged. These will be listed as *Will Not Be Loaded* items on the *Check Readiness* screen of the *DeltaV PK Merge Utility* with Item Name: Parameter Security/SIS Parameter Security, and Item Type: Default Lock/SIS Default Lock respectively. The DeltaV BoP Default Lock for Parameter Security/SIS Parameter Security is always considered to be critical and therefore we never want the configuration from a skid or subsystem to be capable of overwriting that in the larger DeltaV BoP system.

   a. If you have changed the Default Lock for the Parameter Security/SIS Parameter Security, be sure to communicate this to make the end user aware of changes in behavior that may occur when the skid or subsystem is merged into their DeltaV BoP with a potentially different setting for these fields.
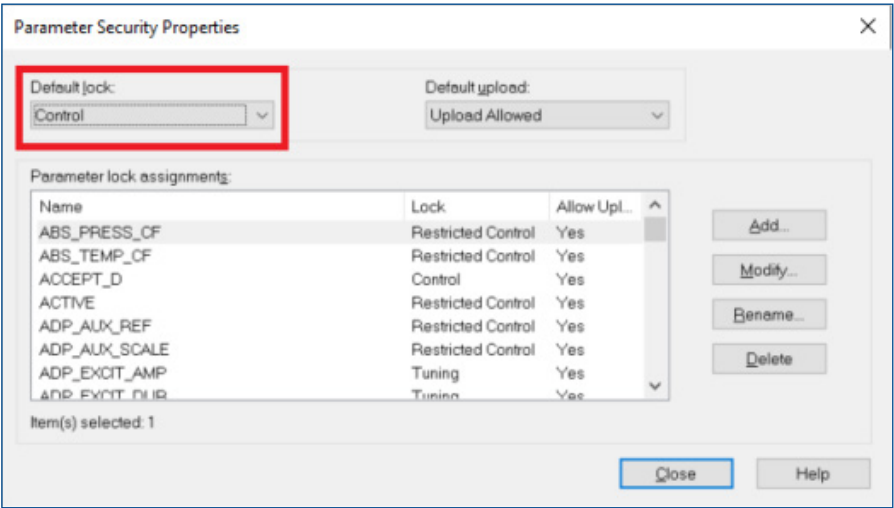
Figure 1.1.5.1
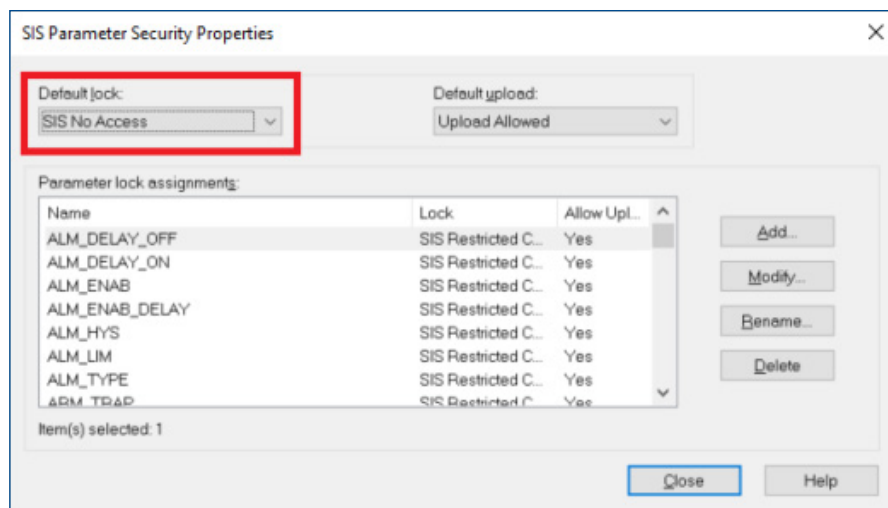
Figure 1.1.5.2

6. Security: Parameter Security (Also Applies to SIS) – Parameter Security and SIS Parameter Security is not merged. These will be listed as Will Not Be Loaded Items on the Check Readiness screen of the DeltaV PK Merge Utility with Item Name: Parameter Security/SIS Parameter Security, and Item Type: Parameter Security/SIS Parameter Security respectively. The DeltaV BoP Parameter Security/SIS Parameter Security is always considered to be critical and therefore we never want the configuration from a skid or subsystem to be capable of overwriting that in the larger DeltaV BoP system.

a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's Parameter Security/SIS Parameter Security prior to configuring the skid or subsystem, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

b. If you do not have access to the end user's Parameter Security/SIS Parameter Security, it is recommended that you use the OOB Parameter Security/SIS Parameter Security and not create custom values.

c. If you have used custom Parameter Security/SIS Parameter Security in the PK Standalone system that the DeltaV BoP does not have, you must communicate the Parameter Security/SIS Parameter Security changes that were made to the end user to add the analogous fields in the DeltaV BoP system after completing the merge to retain the same functionality.

Figure 1.1.6.1

7. **Security: Field Security (Also Applies to SIS)** - Field Security and SIS Field Security is not merged. These will be listed as Will Not Be Loaded Items on the Check Readiness screen of the DeltaV PK Merge Utility with Item Name: Field Security/SIS Field Security, and Item Type: Field Security/SIS Field Security respectively. The DeltaV BoP Field Security/SIS Field Security is always considered to be critical and therefore we never want the configuration from a skid or subsystem to be capable of overwriting that in the larger DeltaV BoP system.

   a. If you have access to the end user's Field Security/SIS Field Security prior to configuring the skid or subsystem, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

   b. If you do not have access to the end user's Field Security/SIS Field Security, it is recommended that you use the OOB Field Security/SIS Field Security and not create custom values.

      i. If you have used custom Field Security/SIS Field Security in the PK Standalone system that the DeltaV BoP does not have, you must communicate the Field Security/SIS Field Security changes that were made to the end user to add the analogous fields in the DeltaV BoP system after completing the merge to retain the same functionality.

Figure 1.1.7.1

8. **Security: Function Security (Also Applies to SIS)** - Function Security and SIS Function Security is not merged. These will be listed as Will Not Be Loaded Items on the Check Readiness screen of the DeltaV PK Merge Utility with Item Name: Function Security/SIS Function Security, and Item Type: Function Security/SIS Function Security respectively. The DeltaV BoP Function Security/SIS Function Security is always considered to be critical and therefore we never want the configuration from a skid or subsystem to be capable of overwriting that in the larger DeltaV BoP system.

    a. If you have access to the end user's Function Security/SIS Function Security prior to configuring the skid or subsystem, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system

    b. If you do not have access to the end user's Function Security/SIS Function Security, it is recommended that you use the OOB Function Security/SIS Function Security and not create custom values.

    c. If you have used custom Function Security/SIS Function Security in the PK Standalone system that the DeltaV BoP does not have, you must communicate the Function Security/SIS Function Security changes that were made to the end user to add the analogous fields in the DeltaV BoP system after completing the merge to retain the same functionality.
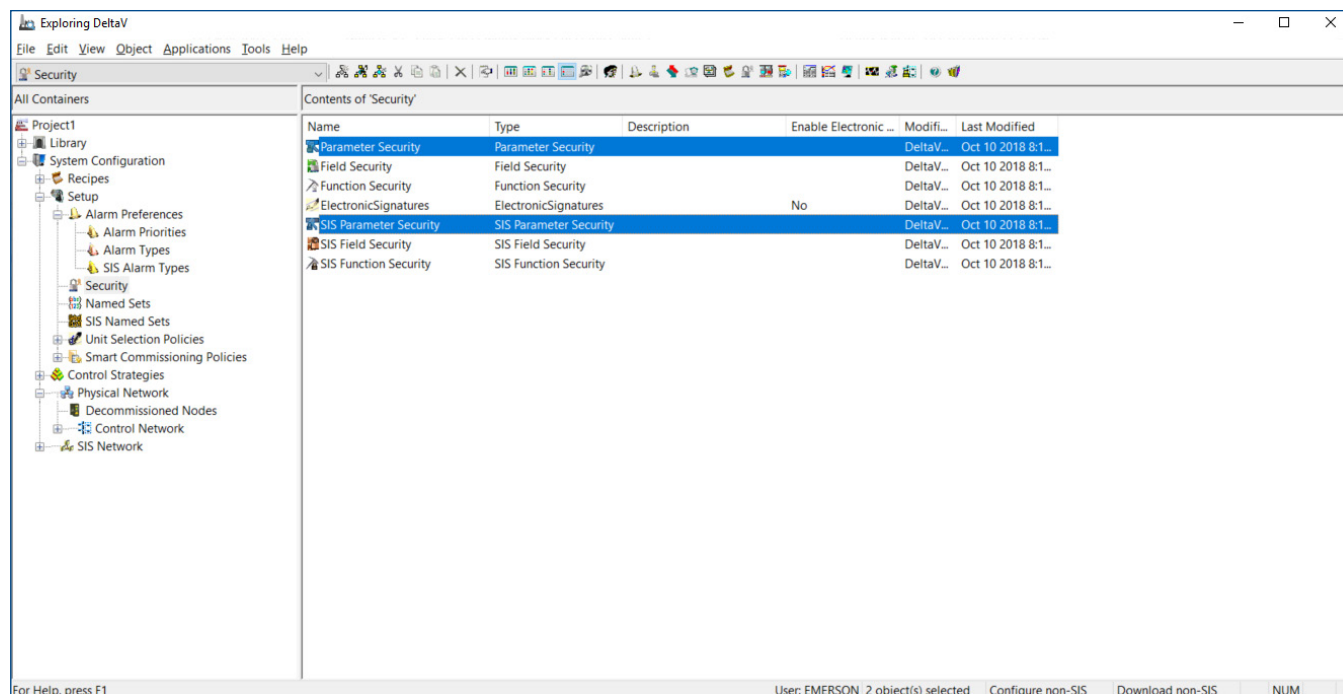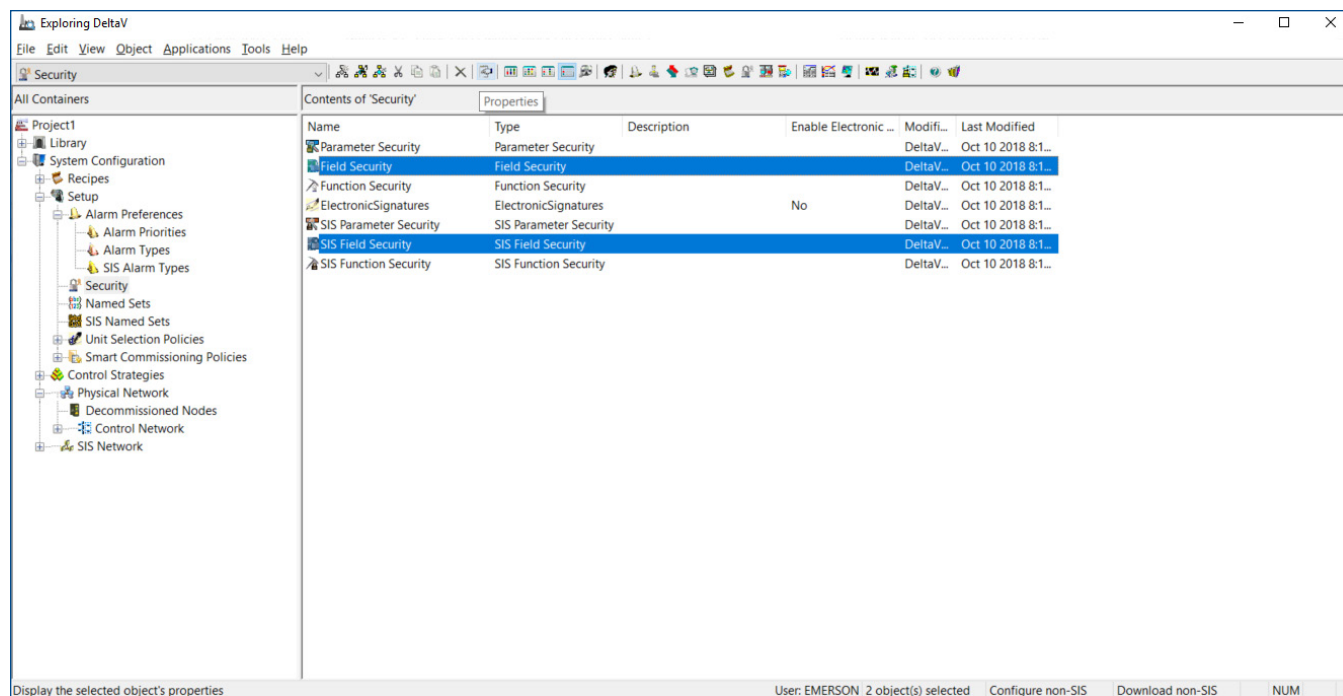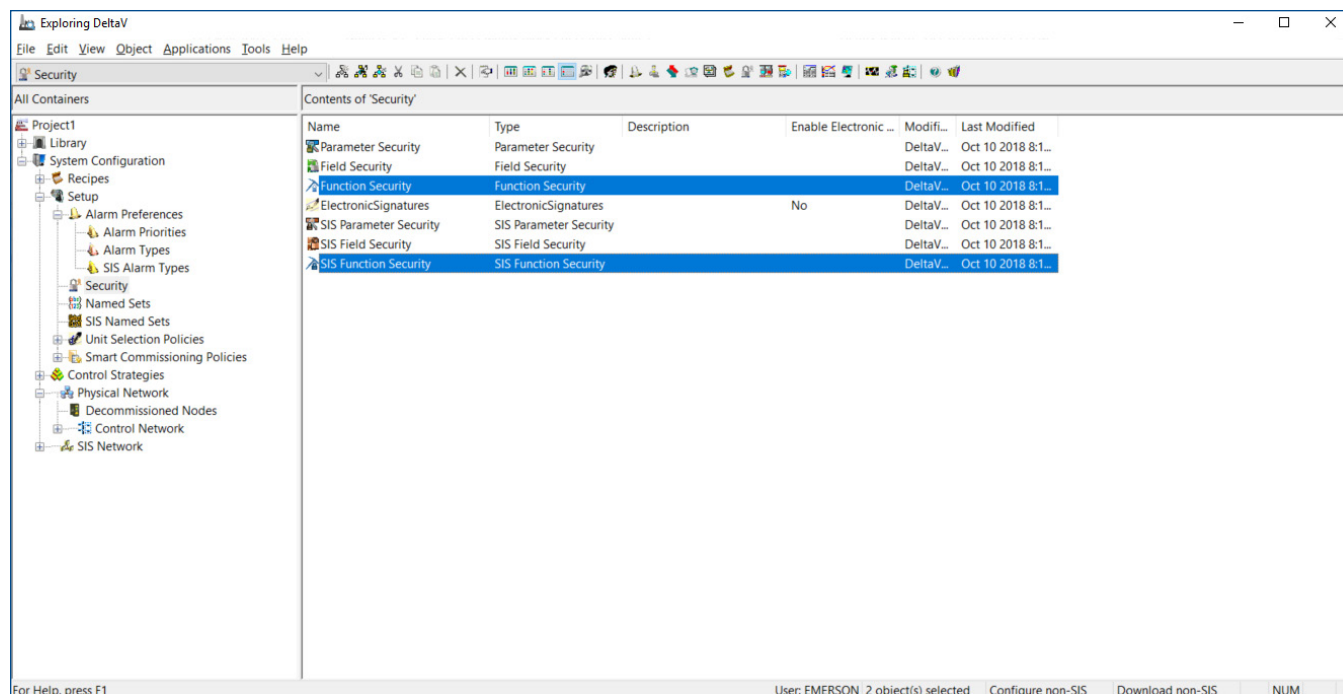
Figure 1.1.8.1

9. **Engineering Laptop/Pro+ Node** – The Engineering Laptop node will not be merged from the PK Standalone project into the DeltaV BoP Pro+ node. Any configuration that has been performed on the properties of the Engineering Laptop or any of its subsystems in the PK Standalone project will remain with the Engineering laptop and will not be carried into the DeltaV BoP and made part of the Professional Plus.

10. **DeviceNet and Profibus Device Definitions** – Any DeviceNet or Profibus Device Definitions that are modified or imported (anything not OOB from the DeltaV Library) will not be merged. These will be listed as *Will Not Be Loaded* Items on the *Check Readiness* screen of the *DeltaV PK Merge Utility* with Item Name: *"DeviceNet/Profibus Device Name"*, and Item Type: DeviceNet Device Revision or Profibus Device Revision respectively.

    a. If you are designing a skid or subsystem that will eventually be merged and you have access to the end user's DeviceNet and/or Profibus Device Definitions, it is recommended that you begin the skid or subsystem design utilizing the end user's configuration to avoid any unexpected behavior following the merge of the skid or subsystem into the DeltaV BoP system.

    b. If you do not have access to the end user's DeviceNet and/or Profibus Device Definitions, it is recommended that you use the out-of-box (OOB) DeviceNet and/or Profibus Device Definitions and not import or modify OOB items.

    c. If you have used custom DeviceNet and/or Profibus Device Definitions in the PK Standalone system, keep track of what those DeviceNet and/or Profibus Device Definitions are for each Standalone project and be sure to communicate this to your end user because they will need to import or modify the analogous DeviceNet and/or Profibus Device Definitions in the DeltaV BoP system prior to moving past the *Check Readiness* step of the merge process. Any devices that utilize these imported or modified DeviceNet and/or Profibus Device Definitions will fail to import, if the imported or modified DeviceNet and/or Profibus Device Definitions is not present, which may cause unwanted behavior in the merged configuration.

11. DeltaV User Accounts

    a. DeltaV user accounts that are created and used in the Standalone system will not be merged into the DeltaV BoP.

    b. If you have created any unique user accounts for the Standalone system that you believe should be carried over to the DeltaV BoP, please communicate this to your end user. A DeltaV BoP Administrator must create new user accounts for any new potential users who are expected to have access to the DeltaV BoP system.

        i. There are four new node-based keys that can be used to restrict access of these new users to only the merged nodes if this is desirable.

        ii. The four new keys are: CAN_EDIT, CAN_CONFIGURE_DEVICES, SIS_CAN_EDIT, and SIS_CAN_CONFIGURE_DEVICES. See DeltaV BOL topic, "Parameter, field, and function security" for additional details regarding these new node-scoped keys.

2. Naming Best Practices

1. All items in the DeltaV database are subject to a 16-character limit. When naming items in the PK Standalone system database, be mindful of what the ultimate name will be in the DeltaV BoP after merge. The merge allows for conflicting names to be resolved by prepending a unique identifier to the item's name. The final name (including a unique identifier) cannot exceed 16 characters. If the end user must prepend unique identifiers on the names, the names cannot ultimately exceed the 16-character limit, or they will fail to import during the *Load* step of the merge process.

    a. Consider having a name character limit on all items less than 12 characters to allow end users to have space for the unique identifiers added during the merge.

3. PK Controller SD Card

1. The PK controller SD card can store the configuration of the PK Standalone project as configured by the PK Standalone Engineering software. When performing a merge into a DeltaV BoP, the end user can retrieve the PK Standalone project from the SD card of the PK controller to initiate the merging of that project.

2. The contents of the SD card are cleared whenever the PK controller undergoes the process of decommissioning (either by being decommissioned via DeltaV Explorer or by a forced decommission via the physical removal and reseating procedure for decommissioning a controller). At the end of the PK merge process the final step is to decommission the controller prior to recommissioning it as part of the DeltaV BoP system. Keep in mind that when that step takes place, the contents of the SD card will be erased.

    a. When producing a skid or subsystem it is recommended that, in addition to the SD card backup that is stored on the PK controller itself, one also makes a drive backup that can be supplied to the end user along with the skid or subsystem should the contents of the SD card be erased.

3. Once merged the SD card no longer stores any project backups and is only used for Simplex PK controller replacement operations. If you are using redundant PK controllers, it is feasible that the SD cards can be removed and re-used in a separate PK Standalone deployment.

4. PK Standalone Engineering Workstation

1. The PK Standalone Engineering workstation is only capable of making modifications to a Standalone PK controller. Once a PK controller is merged, the PK Standalone engineering software can no longer modify, diagnose, download, etc. the PK controller that it originally deployed.

5. Regional and Localization Settings

1. The regional (locale) settings and localized language version (English, Russian, Japanese, etc.) of your DeltaV BoP system must match the regional and localized language settings of the PK Standalone project being merged, or the merge will fail. For example, a DeltaV PK Standalone project using the English version of DeltaV cannot be merged into a Russian DeltaV BoP system or vice versa.

    a. What happens if they are not the same?

        i. If the locale and/or language settings are different the user will be given a warning dialog when mapping to a project at the start of the merge process and will be prevented from proceeding.

    b. If you are a vendor producing PK Standalone systems that may be sold in different world areas, or even different countries, ensure that you are always using a consistent DeltaV language version between the PK Standalone Engineering software and the DeltaV BoP software.

6. Network Settings

1. PK controller deployed as independent Standalone systems

    a. The IP addressing that the DeltaV PK Engineering software assigns to the Standalone PK controller and any of the Area Control Network (ACN) nodes is appropriate and automatically managed for an independent individual PK Standalone system.

    b. In general, a PK Standalone System cannot have any DeltaV ACN IP address conflicts with a DeltaV BoP system since the PK Standalone system only uses odd numbered IP addresses and the DeltaV BoP only uses even numbered IP addresses.

    c. Because the IP addresses are managed automatically by the DeltaV PK Engineering software, the IP addresses allocated between separate PK Standalone projects on the same or different PK Engineering workstations will be the same by default. Do not connect multiple Standalone DeltaV PK controller systems together or to the DeltaV BoP ACN when the controllers and their respective ACN nodes have been allocated IP addresses automatically by the PK Engineering workstation, as this will cause IP address conflicts.

        i. Each Standalone PK controller is assigned the 10.4.0.9 primary DeltaV IP address (and 10.8.0.9 secondary DeltaV IP address) by default. This is done intentionally for Standalone PK controllers that are intended for use as distinct Standalone controllers. Therefore, if more than one is connected on the same network simultaneously there will be communication problems. Setting custom IP addresses for the ACN is allowed in PK Standalone systems and is described in further detail in the next section.

2. Standalone PK controllers deployed on the same PK controller network (custom ACN IP addressing)

    a. If you network multiple default Standalone DeltaV PK controllers (those at the 10.4.0.9 address), IP address conflicts will occur. Therefore, you can manually modify the ACN IP addresses of the nodes in a PK Standalone system such that all nodes on the shared PK controller ACN network have different ACN IP address.

        i. When configuring Standalone PK controllers for use in a Networked PK solution, you can configure the ACN IP addresses of the nodes on the ACN only when they are in the decommissioned state. NOTE: See the DeltaV BOL topic, "Reserved DeltaV IP Addresses" for IP addresses that should not be used when configuring custom addresses.

    b. You must manually track all the IP addresses you assign across all PK Standalone projects/systems that are connected, so that you avoid any IP address conflicts. It is important that one keep track of the IP addresses so as not to create IP address conflicts in the system. DeltaV will not be managing the IP addresses in this case and this can increase the risk of creating IP address conflicts somewhere on the network.
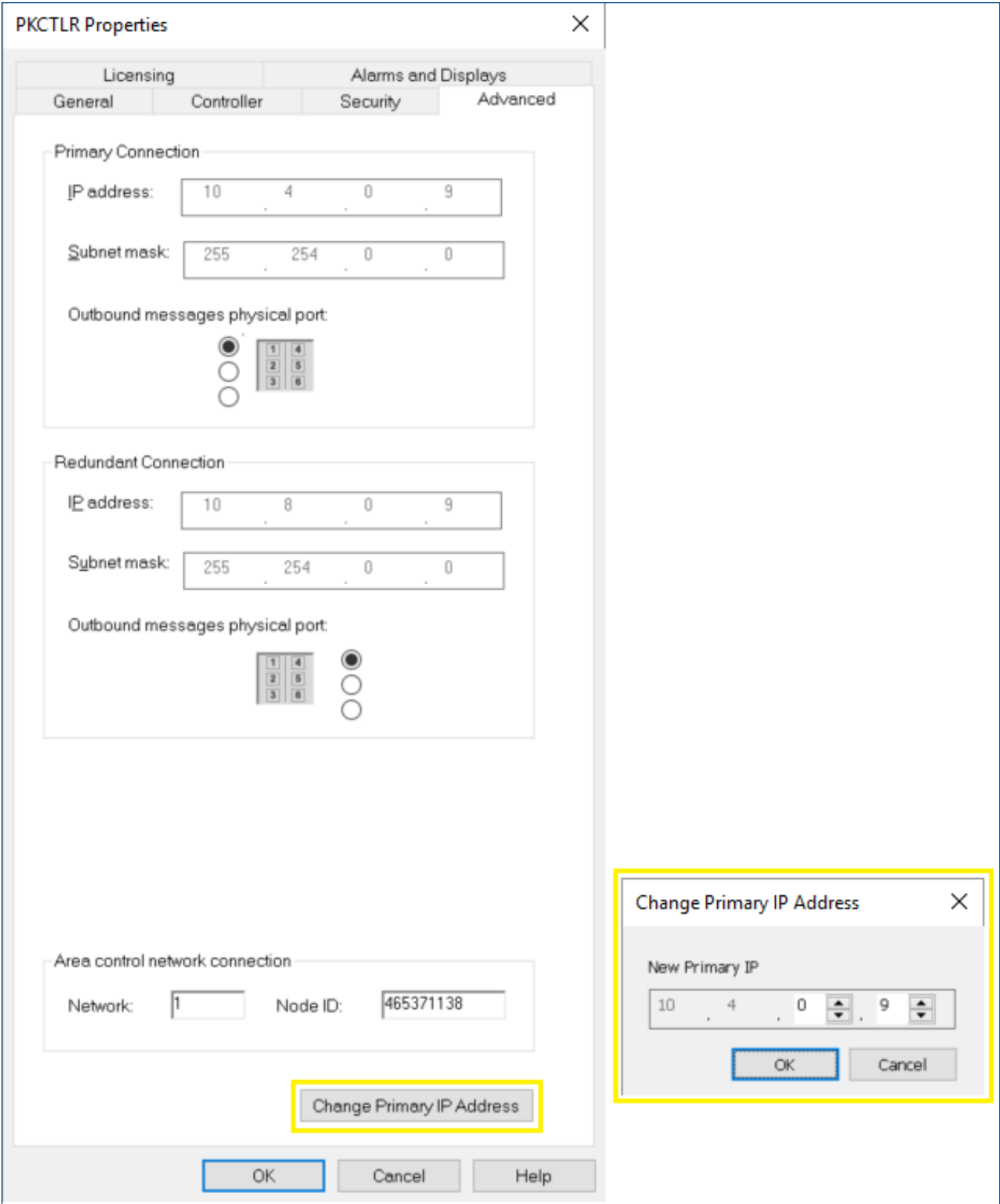
Figure 1.4.2.1

c. If you have made any modifications to the PK controller IP addressing, you should communicate to the end user the table of IP addresses so that potential IP address conflicts can be avoided when connecting the PK controller network to the BoP system.

7. Locked PK Controller and Other DeltaV Nodes

1. Locked PK controllers will not decommission. Locked controllers are protected from making any configuration changes. Therefore, you must unlock the PK controller prior to shipping to the end user site if that controller is intended on being merged. If the controller is locked when shipped to site, a user with the PK Standalone Engineering software must connect to the controller and unlock it prior to performing the *Decommission* step of the merge process.

   a. Please see BOL topic, "DeltaV PK controller Unlock Inhibit and Unlock Allow," "Locking controllers, CIOCs, WIOCs," and "Logic Solver Lock and Unlock functions" for more information for more information regarding locking the PK controller and other DeltaV nodes.

2. Locked DeltaV nodes (CIOC, WIOC, SZ, etc.) attached in a Standalone DeltaV PK controller system will not decommission. Locked DeltaV nodes are protected from making any configuration changes. Therefore, you must unlock all attached nodes prior to shipping to the end user site if the skid is intended on being merged. If the nodes are locked when shipped to site, a user with the PK Standalone Engineering software must connect to the system and unlock them prior to performing the decommissioning step of the merge process.

   a. Please see BOL topic, "DeltaV PK controller Unlock Inhibit and Unlock Allow," "Locking controllers, CIOCs, WIOCs," and "Logic Solver Lock and Unlock functions" for more information for more information regarding locking the PK controller and other DeltaV nodes.

8. DeltaV Standalone Operator Station and 3rd Party HMI/Historian Considerations

1. When configuring a DeltaV Standalone Operator workstation that will later be merged, the DeltaV and Windows User accounts as well as the DeltaV Server Administration password need to be considered to help ease the process of merging. The following section covers the behavior when merging into a Domain vs. Workgroup DeltaV BoP system and therefore provides guidance on what to consider when configuring the Local Panel HMI in a PK Standalone system. Please see the BOL topic, "Workgroups and domains" for additional information.

   a. Domain – The DeltaV Standalone Operator workstation becomes a traditional DeltaV Operator workstation upon merge into a DeltaV system. Therefore, if your DeltaV BoP system is a Domain system the workstation will need to be joined to the Domain following standard practices for joining a new DeltaV Operator workstation to the DeltaV domain.

   b. Workgroup – When joining to a Workgroup system, it is important that there are matching DeltaV User accounts added to the Standalone Operator workstation User account setting between Local Panel HMI and Pro+ system. DeltaV Admin password, Windows account settings, etc.

2. The PK Standalone licenses used by the PK Standalone Operator station do not merge. End users are required to use traditional DeltaV Licensing after merging. Because of this, when configuring a skid or subsystem that is using a DeltaV Standalone Operator station, you may want to communicate to the end user which licenses are being used on that station. The license checks will be performed automatically during the *Check Readiness* step of the merge process but knowing ahead of time will give them the opportunity to acquire the proper licenses prior to merging the skid or subsystem.

3. 3rd party HMIs or Historians that are configured for use with the PK controller (through either the OPC UA or Modbus TCP interface) will merge and therefore require no special configuration considerations in the Standalone system.

   a. Whenever using the embedded OPC UA Server on the PK controller with security certificates special consideration must be paid to the management of those certificates. Please see Appendix 1 for a full explanation of how to manage OPC UA certificates during a PK merge.

9. Standalone Batch

1. For PK Standalone systems, Advanced Batch operations are supported when using the DeltaV PK Standalone Operator workstation. Advanced Batch operations are not supported on integrated DeltaV Operator stations (they are only supported on Application stations and the Pro+). If you were using the PK Standalone Operator workstation as a Batch Executive and/or Batch Historian, after merging the skid or subsystem the end user will have to move those functionalities into their plant-wide Batch Executive(s) and/or Batch Historian(s). It is recommended that an explanation of what is assigned to the Batch Executive and Batch Historian be included as information to the end user as they will need to assign those pieces manually after completing the merge.

10. DeltaV SIS in the Standalone System

1. From the engineering perspective, all DeltaV SIS components can be merged if the user performing the merge on the DeltaV BoP side has the proper SIS configuration privileges to merge these items.

   a. The user performing the merge requires the SIS Can Configure key to merge the configuration database and the SIS Can Download key to assign, commission, and download the SIS nodes once they are merged into the DeltaV BoP system.

   b. It is important to note that all SIS CRCs (Module, IO, Download, Configuration, etc.) may change during the merge process if the objects are renamed as they are being imported into the larger system database.

   c. If the skid or subsystem contains DeltaV SIS components, be sure to communicate this to the end user as they will require specialized personnel to perform the merge of the skid or subsystem into their DeltaV BoP.

2. Simulated Logic Solvers cannot be retrieved from another project and cannot be merged into a balance-of-plant DeltaV system. If you are using simulated 1508 logic solvers to validate safety logic on the PK engineering laptop, please delete these prior to creating a project backup to ensure that the project backup is compatible with other engineering laptops or for merging.

11. AMS Device Manager

1. The AMS Device manager database from the PK Standalone system is not merged to the larger AMS database in the DeltaV BoP system. If you have configured any custom User Configurations for device templates for use on the PK Standalone system, it is recommended that you export those and provide them to the end user along with the skid or subsystem delivery.

Generic Skid Design (For Merge Into Any End-User System). What Should Not Be Changed?

The purpose of this section is to give suggestions for designing skids or subsystems to ensure that they are as generic as possible. It is intended that this acts as a guide when engineering the Standalone system, to ensure a smooth merging of databases that results in the least amount of work or challenges for both the end user as well as the skid or subsystem vendor. Please see *Section1: General Merge Considerations* prior to reading this section as it covers many aspects of the Standalone system that should be considered when planning a system that will later be merged.

1. Use Out-of-Box (OOB) Items For Library and Setup Data As Much As Possible.

1. OOB Library items should remain unchanged.

   a.For Library items, do not modify any OOB items. It is acceptable to create new items in any category as unique objects will easily be handled by the PK Merge Utility (see *Naming best practices* section above for additional recommendations).

2. OOB Setup Data items should remain unchanged.

   a. Most OOB items should not allow modification in the Standalone system so you are protected from making modifications to these items. As a best practice, it is recommended that you do not add any custom items to the Never Loaded categories covered in Section 1 of this document. If custom items are added to any of those categories, be sure to track what those are and be sure to communicate this to the end user upon purchasing of the skid. It is important that they are aware of the custom items so they can reconcile any differences prior to merging the skid into their system. For all other categories, it is still suggested that you use OOB configuration as much as possible to avoid any conflicts with the end user system Setup Data. See the *Never Loaded Items* section above for additional information in this area.

2. DeltaV Live Best Practices

1. OOB items should remain unchanged.

   a. For DeltaV Live Gems, Faceplates, Displays, etc., it is recommended that you do not modify any OOB objects in the Standalone system. It is perfectly acceptable to create copies of those items and then make modifications so that the instances are unique.

2. Custom items for all categories can be created without any special considerations as these are all handled by the *DeltaV PK Merge Utility*.

3. DeltaV Operate (iFix) Best Practices

1. OOB items should remain unchanged.

   a. For DeltaV Operate Dynamos, Faceplates, Graphics, etc., it is recommended that you do not modify any OOB files in the Standalone system. It is perfectly acceptable to create copies of those items and then make modifications so that the instances are unique.

2. Custom items for all categories can be created without any special considerations as these are all handled by the *DeltaV PK Merge Utility*.

Skid Designed While Working With End-User Specifications. What Do You Need?

The purpose of this section is to give suggestions for those designing skids that will be customized based on end user site specifications. It is intended that this should act as a guide for aspects of the system that should be considered when engineering the Standalone system, to ensure a smooth merging of databases that results in the least amount of work or challenges for both the end user as well as the skid or subsystem vendor. Please see *Section1: General Merge Considerations* prior to reading this section as it covers many aspects of the Standalone system that should be considered when planning a system that will later be merged.

1. Use End-User Library and Setup Data As Much As Possible.

1. Library items from the end user should be obtained and loaded into the Standalone system project prior to beginning any engineering work.

   a. By beginning the Standalone project engineering using the end user Library, all modules configured will be based on their system specifications. During the merge process, many items from the Library will appear as conflicting, since they will contain the same names, but the end user can confidently elect to not merge all conflicting items and only bring in those that are non-conflicting knowing that the conflicting items are already present in their system

2. OOB and user obtained Library items should remain unchanged.

   a. Do not modify any OOB Library items or Library items that were received from the end user. It is acceptable to create new items in any category as unique objects will easily be handled by the PK Merge Utility (see *Naming best practices* section above for additional recommendations).

3. End user DeltaV BoP Setup Data should be obtained and loaded into the Standalone system project prior to beginning any engineering work.

   a. By beginning the Standalone project engineering using the end user Setup Data for the site where the skid will be merged, all configuration will be based on their system specifications. During the merge process, any items from the *Never Loaded* list can confidently be cross checked to already pre-exist in the DeltaV BoP site and therefore the user will not need to create any custom items manually. Many other Setup Data items will appear as conflicting, since they will contain the same names, but the end user can confidently elect to not merge all conflicting items and only bring in those that are non-conflicting knowing that the conflicting items are already present in their system.

4. OOB and user obtained Setup Data items should remain unchanged.

   a. Most OOB items should not allow modification in the Standalone system so you are protected from making modifications to these items. Do not make any modifications to the items that you receive from the end user or you risk unexpected behavior after merge.

   b. As a best practice, it is recommended that you do not add any custom items to the *Never Loaded* categories covered in Section 1 of this document. If custom items are added to any of those categories, be sure to track what those are and be sure to communicate this to the end user upon purchasing of the skid. It is important that they are aware of the custom items so they can reconcile any differences prior to merging the skid into their system. For all other categories, it is still suggested that you use OOB configuration as much as possible to avoid any conflicts with the end user system Setup Data. See the Never Loaded Items section above for additional information in this area.

2. DeltaV Live Best Practices

1. End user Gems, Faceplates, Layouts, etc. should be obtained and loaded into the Standalone system project prior to beginning any engineering work.

   a. By beginning the Standalone project DeltaV Live engineering using the end user Gems, Faceplates, Layouts, etc. for the site where the skid will be merged, all configuration will be based on their system specifications and will provide them the most consistent experience after merging.

2. OOB and user obtained items should remain unchanged.

   a. For DeltaV Live Gems, Faceplates, Displays, etc., it is recommended that you do not modify any OOB and/or user obtained objects in the Standalone system. It is perfectly acceptable to create copies of those items and then make modifications so that the instances are unique. Do not make any modifications to the items that you receive from the end user or you risk unexpected behavior after merge.

3. DeltaV Operate (iFix) Best Practices

1. End user Dynamos, Faceplates, Graphics, etc. should be obtained and loaded into the Standalone system project prior to beginning any engineering work.

   a. By beginning the Standalone project DeltaV Operate engineering using the end user Dynamos, Faceplates, Graphics, etc. for the site where the skid will be merged, all configuration will be based on their system specifications and will provide them the most consistent experience after merging.

2. OOB and user obtained items should remain unchanged.

   a. For DeltaV Operate Dynamos, Faceplates, Graphics, etc., it is recommended that you do not modify any OOB and/ or user defined files in the Standalone system. It is perfectly acceptable to create copies of those items and then make modifications so that the instances are unique. Do not make any modifications to the items that you receive from the end user or you risk unexpected behavior after merge.

4. Configuration Naming Best Practices

3. Work with the end user to determine a naming convention for all unique logic items. Doing this prior to beginning configuration of the PK Standalone system will limit the amount of rename work that needs to take place during the merge process.

Appendix 1: Managing OPC UA Certificates During a PK Merge

To ensure the security of certificates, OPC UA certificates and related information are not included in DeltaV .fhx export files or PK Standalone project backup files (backup to SD card or backup to Drive) used during the merge process. This includes all certificate types, issuers, revocation lists and so on. Therefore, during the merging of a PK controller, if you are using certificates for security management of the OPC UA connection, you must manually export and import all OPC UA certificates and related information. The following steps outline this process.

Note: Future DeltaV versions will manage this process automatically

1. Identify All OPC UA Certificates & Certificate Revocation Lists (CRL's)

1. Login as a DeltaV Administrator to the PK laptop used to configure OPC UA Server on the Standalone PK controller.

2. Open DeltaV Explorer and navigate to the PK controller OPC UA Server subsystem

3. Right click on the PK controller OPC UA Server subsystem and select "Properties"

4. The certificates & Certificate Revocation Lists (CRL) currently used by the PK controller OPC UA Server will appear in the following locations:
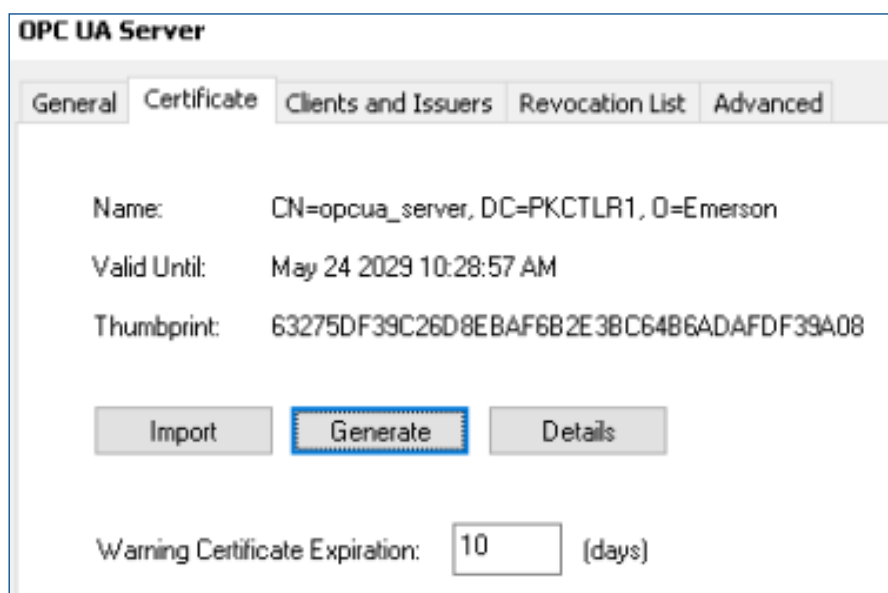
    a. PK controller's own certificate

Figure 4.1.4.1

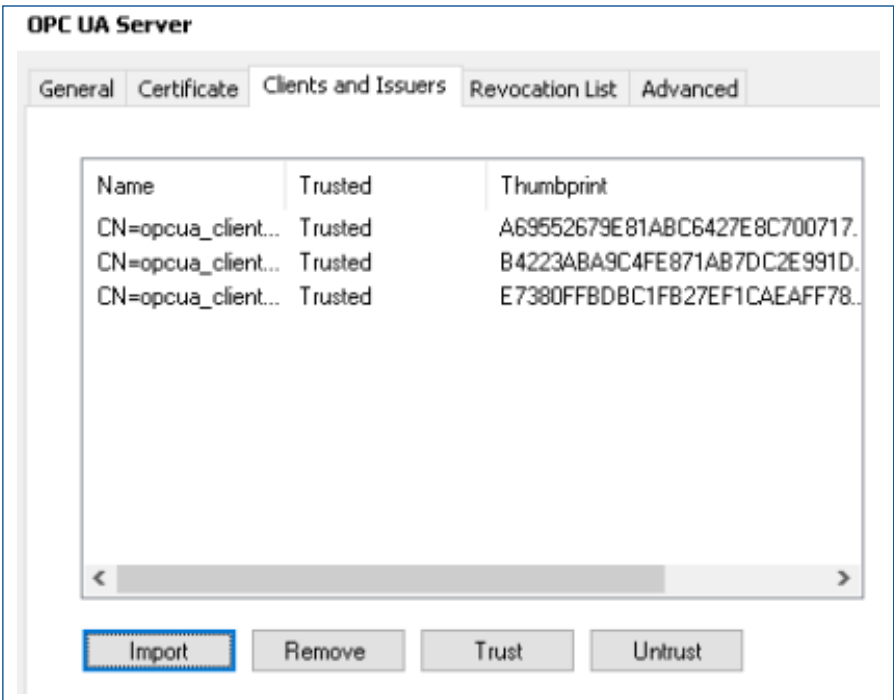b. Clients and Issuers certificates
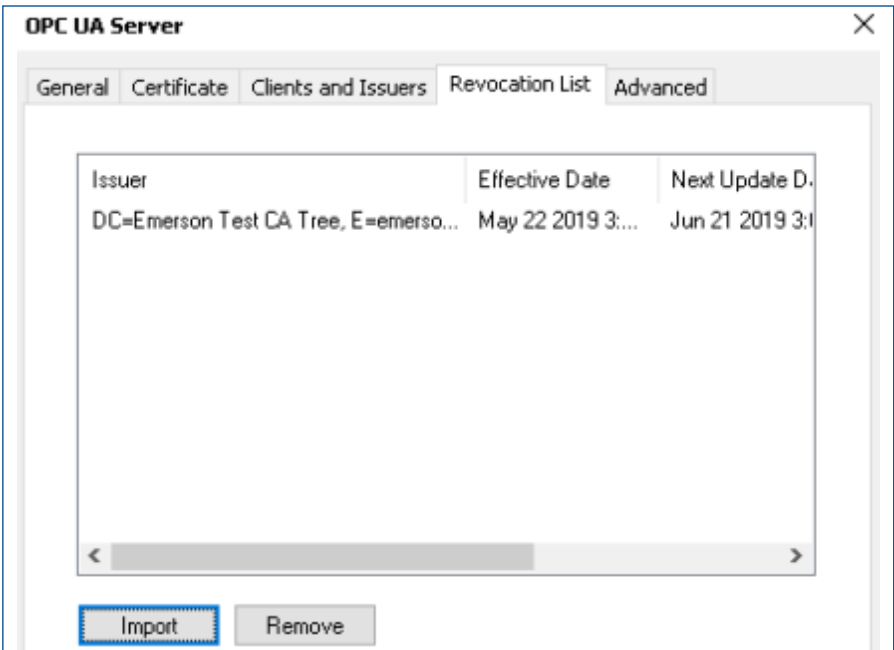

Figure 4.1.4.2

c. Certificate Revocation Lists (CRLs)

Figure 4.1.4.3

2. Export the PK Controller's Own OPC UA Server Certificate from the Microsoft Certificate Store

1. Open the Start menu and navigate to "Windows System" → "Run" to open a Run prompt

2. In the Run prompt, type "mmc" and hit Enter. A new console root should open.

3. In the console, go to "File" → "Add/Remove Snap-in"

4. Select the "Certificates" snap-in and click "Add"

5. On the "Certificates snap-in" dialogue, select "Computer account" then click Next.
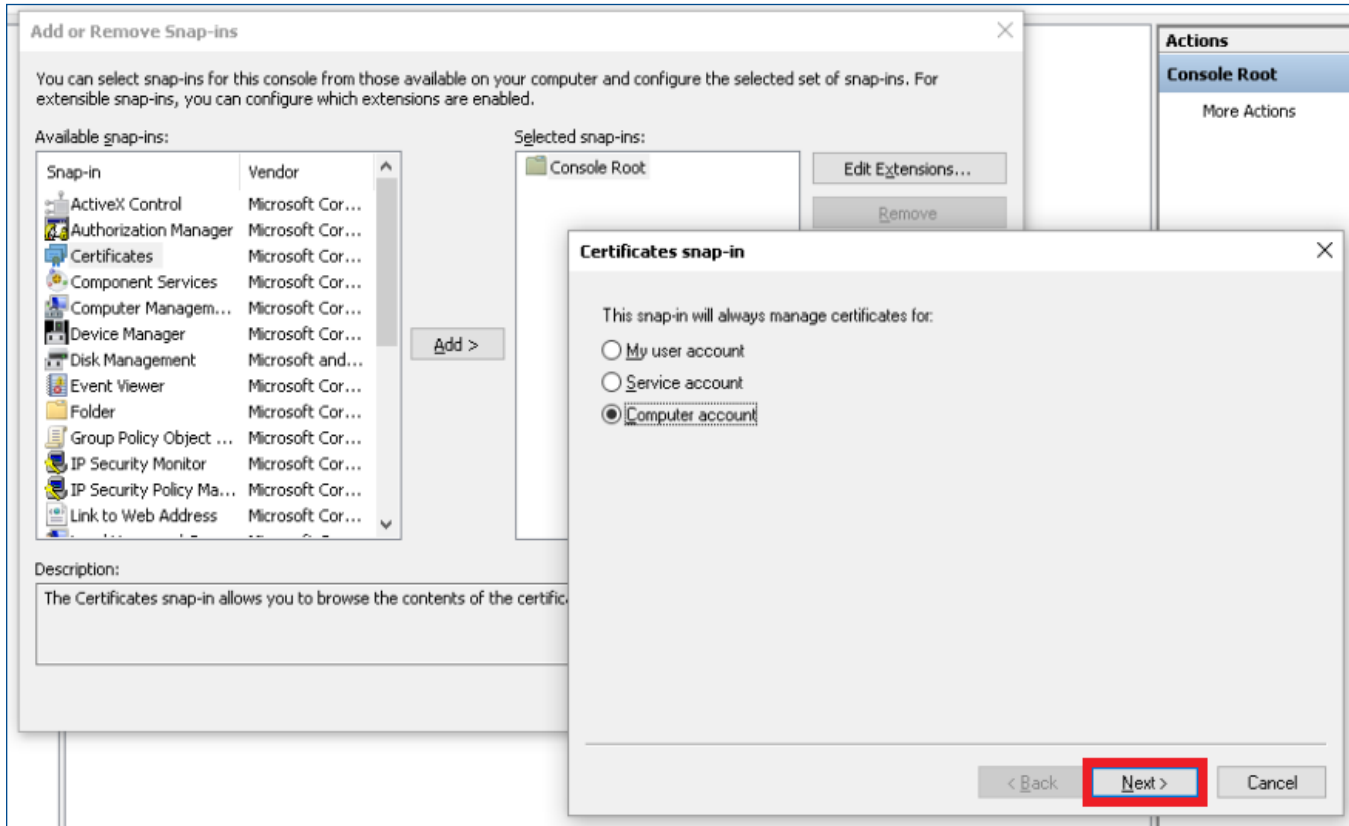
Figure 4.2.5.1

6. On the next dialogue box, select "Local computer: (the computer this console is running on)" and then Finish.
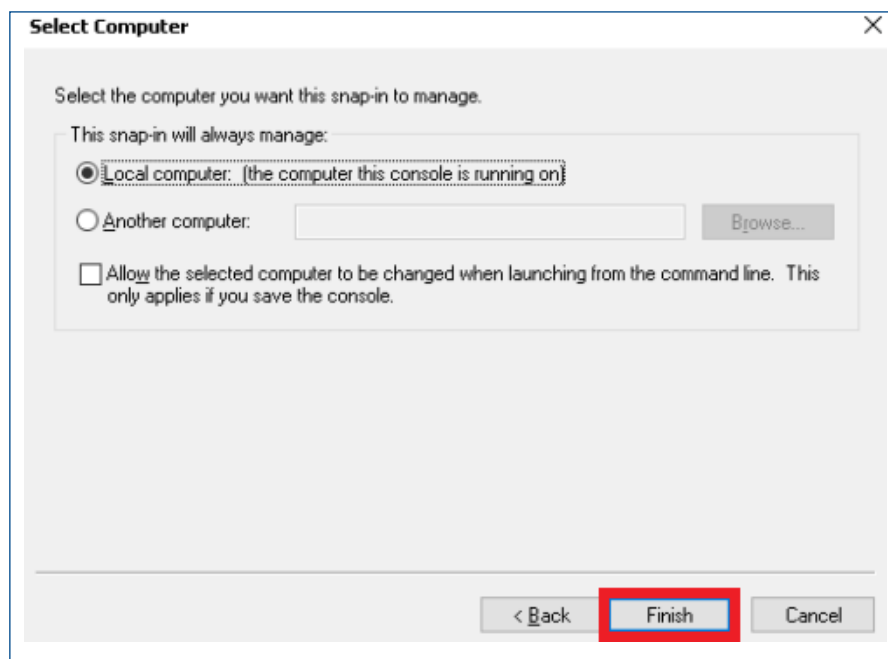
Figure 4.2.6.1

7. Click "OK" to finish adding the Certificates snap-in

8. Expand the "Certificates (Local Computer)" dropdown on the left to view all certificate folders

    a. All Emerson OPC UA certificates will be found in the following folder locations:

        i. Emerson Trusted UA Applications

        ii. Emerson Trusted UA Users

        iii.Emerson UA Applications

        iv.Emerson UA Certificate Store

9. To export the PK controller OPC UA Server's own certificate, locate the certificate in the Emerson folders and verify that the thumbprint of the certificate matches the PK's own certificate in DeltaV Explorer.
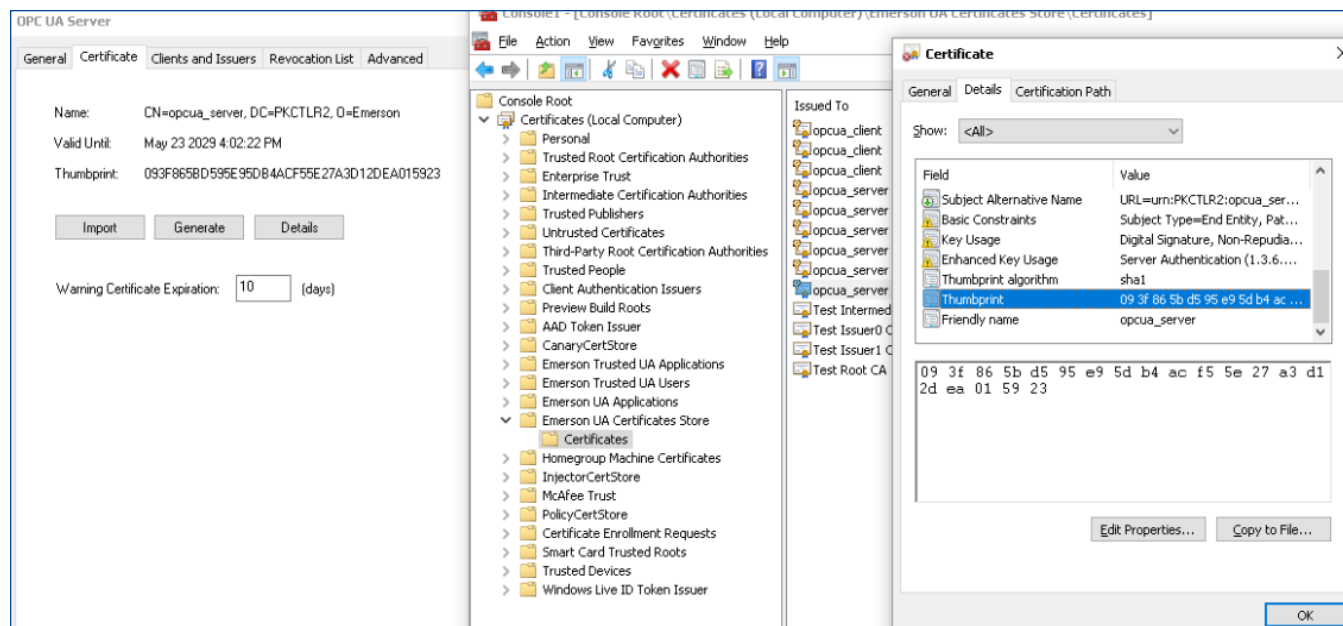
Figure 4.2.9.1

10. Close the Certificate Details dialogue, right click on the certificate and select "All Tasks"

11. Choose "Export…" to open the Certificate Export Wizard.

12. Select "Yes, export the private key" on the preceding dialogue

13. Verify "Personal Information Exchange – PKCS #12 (.PFX)" is selected and "Include all certificates in the certification path if possible" is selected. Click Next.
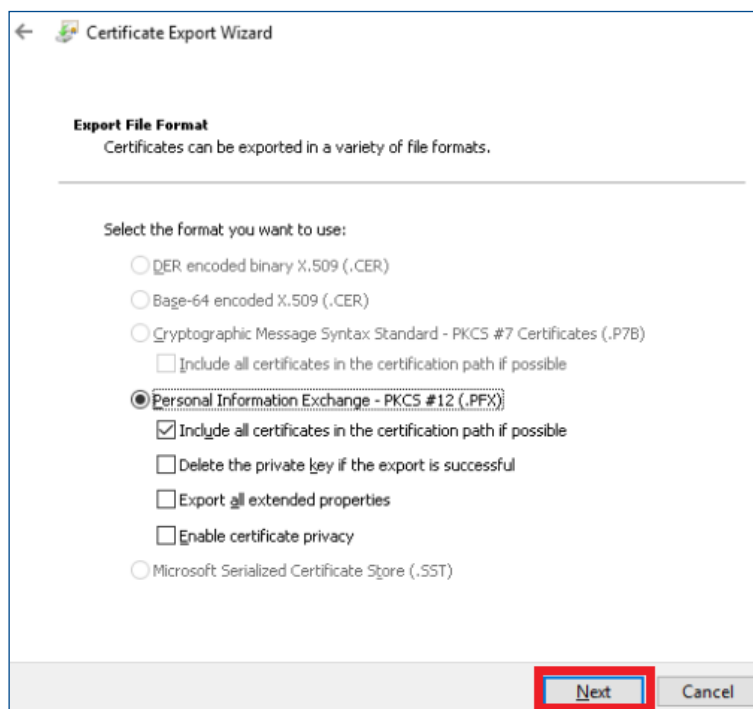

Figure 4.2.13.1

14. Select the password check box and enter a password to proceed. **Note**: This password is used to protect the private key and will be required when importing this certificate into any other system in the future. Be sure to communicate this password to anyone who will need to import these certificates. Click Next.

15. Chose a name and location to export the certificate and select Next followed by Finished. A dialogue will appear saying that the certificate was exported successfully.

3. Export the Clients and Issuers OPC UA Certificate from the Microsoft Certificate Store

1. Repeat steps 1 – 9 in the preceding section to open the Microsoft Certificate Store

2. Compare the thumbprints in DeltaV Explorer with the thumbprints of the certificates in the Emerson folders of the certificate store. This is done to verify the correct certificates have been selected.
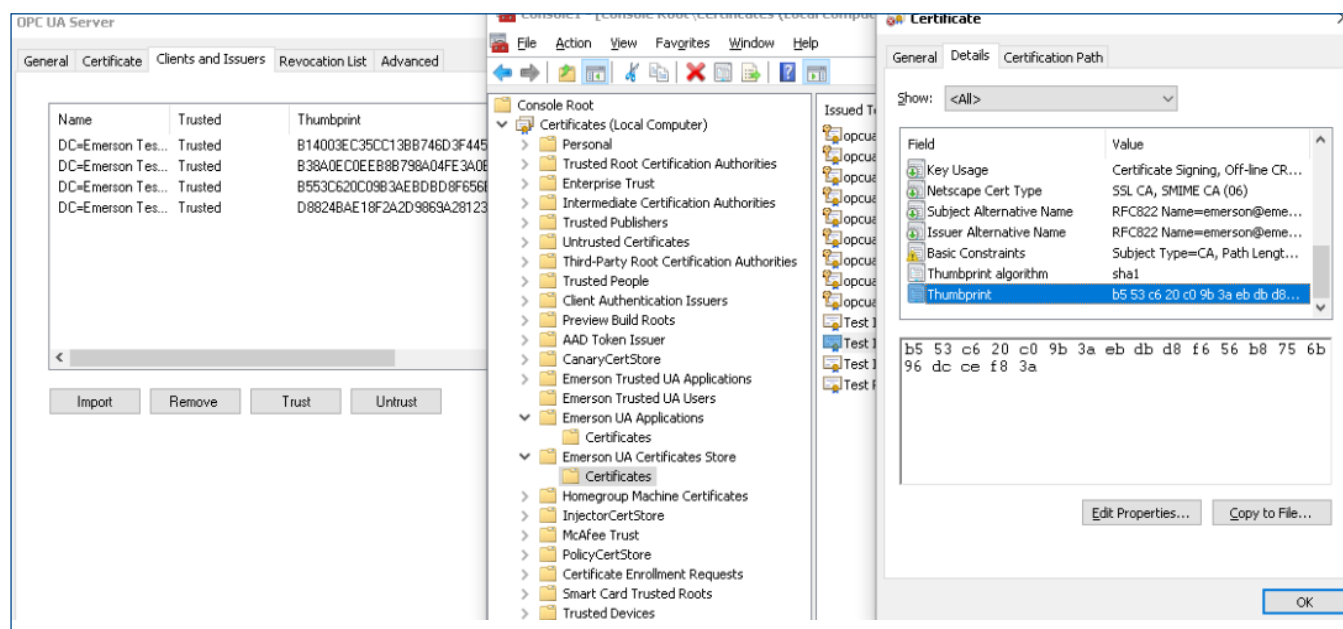

Figure 4.3.2.1

3. Close the certificate details dialogue, right click on the certificate and select "All Tasks"

4. Choose "Export..." to open the Certificate Export Wizard.

5. Verify "DER encoded binary X.509 (.CER)" is selected

    a. **Note:** A private key is not exported with the Clients and Issuers certificates. The private key is only included when exporting the PK controller's own certificate. The exported Clients and Issuers certificates should have the extension .CER or .DER. The PK controller's own certificate will have the file extension .PFX.

6. Chose a name and location to export the certificate and select Next followed by Finished. A dialogue will appear saying that the certificate was exported successfully.

7. Repeat this section for all certificates in the "Clients and Issuers" tab of DeltaV explorer that will be migrated to the new system.

4. Migrate OPC UA Certificate Revocation Lists (CRLs)

1. Unlike the PK controller's own certificate and the Clients & Issuers certificates, Certificate Revocation Lists (CRLs) are not stored in the Microsoft Certificate Store. CRLs can be copied from the following location and imported into the new DeltaV system before, during, or after the merge: *C:[or D:]\DeltaV\DVData\OPCUA\Server\CertificateStores\Emerson Trusted Issuers\crlSaved*

5. Export the PK OPC UA Server Certificate Logon Certificate

If "Certificate Logon" user authentication is being used by the PK controller OPC UA Server, the certificate associated with the PK controller OPC UA user must be exported and imported back into the PK controller once it is commissioned into the new system following its merge. The following are the steps to do this:

1. Open DeltaV Explorer and navigate to the PK controller OPC UA server

2. Right click on the PK OPC UA server and select "Properties"

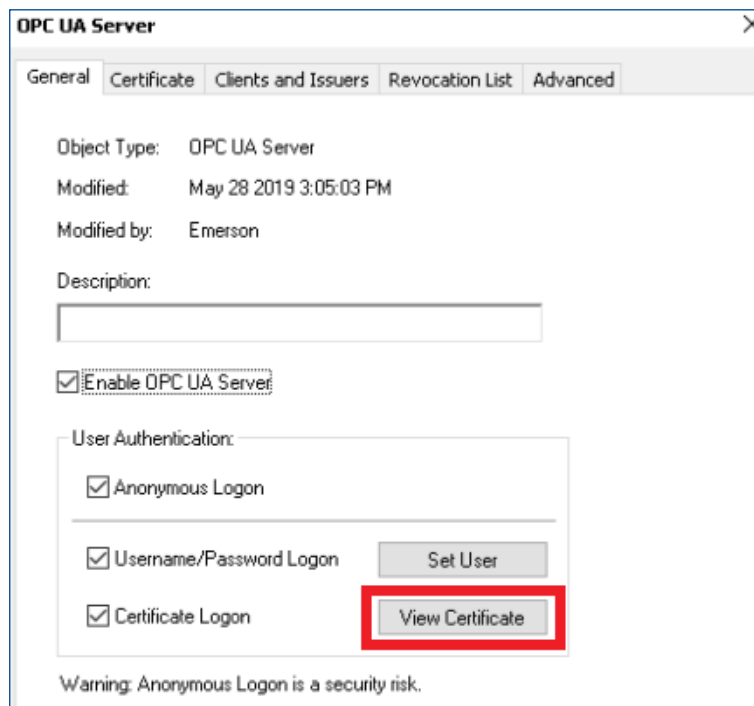3. On the "General" tab, select the "View Certificate" button under the User Authentication section

Figure 4.5.3.1

4. The "View User Certificate" dialogue will open and allow the user to export the certificate logon certificate directly from DeltaV Explorer (Microsoft Certificate Store is not needed for this certificate).

5. Enter a password and verify that "Public key only" is **NOT** checked
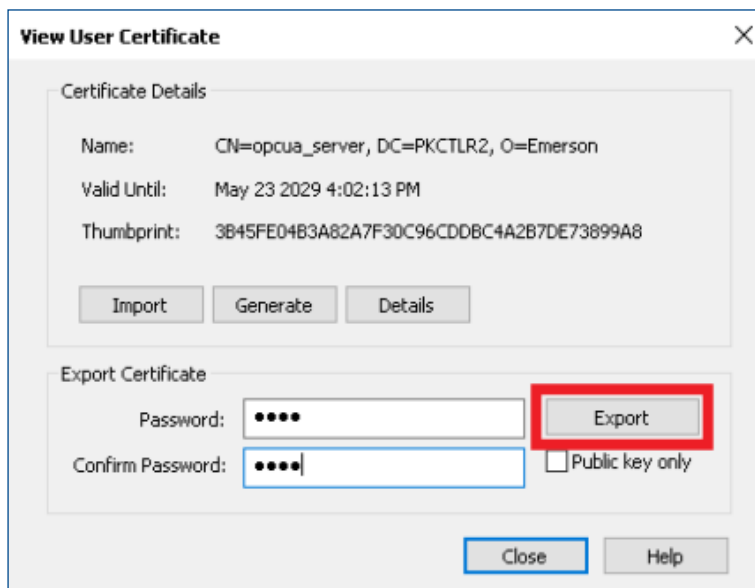

Figure 4.5.5.1

6. Click "Export" and specify a file location to export the certificate. The certificate will be exported as a .PFX (combined private and public key).

After following this procedure, all the necessary certificates and CRL's should be in the following formats:

1. PK controller's own certificate as a password protected .PFX file

2. Clients and Issuers Certificates as .CER or .DER files

3. Certificate Revocation Lists (CRL's) as .CRL files

4. PK controller certificate logon certificate as a password protected .PFX file

These certificates are now ready to be imported into the new DeltaV system before, during, or after the merge using the steps outlined in the "Managing OPC UA security certificates" section of DeltaV Books Online.

Glossary and Acronyms:

- OEM – Original Equipment Manufacturer

- EPC – Engineering and Procurement Contractor

- BoP – Balance of Plant

- OOB – Out-of-box

- BOL – DeltaV Books Online

- ACN – Area Control Network

- CRL – Certificate Revocation List

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