# Power775 System Drain Procedure
# Last Modified 3/6/2012 2:05 PM

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# 1 GENERAL

## 1.1 Release / Revision History

| Document Name | Date | PDF name | Description |
|---|---|---|---|
| Power775 System Drain Procedure | 3/6/2012 | "p775_sys_drain.pdf" | Initial Release |

**Table 1 Release / Revision History**

## 1.2 Where to find this document, and contents of the parent PDF

The current "Power775 System Drain Procedure" document is "p775_sys_Drain.pdf" which is to be downloaded from:
InfoCenter Website: http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7ee2/p7ee2kickoff.htm
Click "PDF files for the IBM Power 775 (9125-F2C) removing and replacing parts"
Under "Fill and Drain Tool (FDT) procedures to support R&V FRUs", click "System" to download PDF "p775_sys_drain.pdf"

This is the only valid source for the latest "Power775 System Drain Procedure" document.

## 1.3 Required Documents

| Document | Doc Number | Location |
|---|---|---|
| Safety Notices http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf | G229-9054 | InfoCenter |

**Table 2 Required Documents**

## 1.4 Abbreviations

| Abbreviation | Definition | Details |
|---|---|---|
| BPA | Bulk Power Assembly | |
| BPD | Bulk Power Distributor | |
| CEC | Central Electronic Complex | Also referred to as the “node”. |
| DCCA | Distributed Conversion and Control Assembly | The power supplies for the CEC and DE are called the CEC DCCA and DE DCCA respectively. |
| DE | Disk Enclosure | |
| FRU | Field Replaceable Unit | |
| HPIC | High Power Interface Cable | DCCA power cable |
| LED | Light Emitting Diode | |
| LIC | Licensed Internal Code | |
| SAS | Serial Attached SCSI | Protocol used for direct attached storage |
| SSR | Systems Services Representative | IBM Service personnel |
| UEPO | Unit Emergency Power Off | |
| UPIC | Universal Power Interface Cable | Cable used for power and communication to the Power 775 Fill and Drain Tool (FDT). |
| RDHX | Rear Door Heat Exchanger | This is the Rear Door Heat Exchanger. |
| WCU | Water Conditioning Unit | Up to 4 of these are located in the bottom of the system frame. |

**Table 3 Abbreviations**

# 2 POWER775 SYSTEM DRAIN PROCEDURE

## 2.1 Safety Notices

Read "Safety Notices" available from InfoCenter:
http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf

The following cautions apply to all Power775 service procedures:

**CAUTION:**
**Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)**

**CAUTION:**
**The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)**

**CAUTION:**
**Servicing of this product or unit is to be performed by trained service personnel only. (C032)**

The following notices specifically pertain to this Power775 service procedure.

**CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)**

**CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

**DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)**

**CAUTION: Protective eyewear is needed for the procedure. (L011)**

**DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)**

**CAUTION: Chemical resistant gloves are needed for this procedure. (L014)**

**DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)**

## 2.2 Background:

This document contains the procedure for draining a **IBM Power 775** system with conditioned water using an **IBM Power 775** Fill and Drain Tool (FDT).
Due to high packaging density and heat load, many components within the **Power 775** system are water cooled. The system and water cooled sub-components contain internal plumbing to route cooling water towards and carry heat away from these critical power components. In the event that a **Power 775** system is to moved or shipped the system must be drained prior to being moved.
The **IBM Power 775** system needs to be drained and void of system water prior to shipping as the water could freeze and cause plumbing damage along with damage due to shock and vibration. The system Drain procedure should be used to completely drain the system and have it ready for shipping

Due to the large system volume on a fully configured **Power 775** system, up to six (6) empty system water containers may be needed for draining the FDT as the system drain procedure is performed. The FDT internal volume is approximately 9 gallons; when water is being transferred from the system into the FDT during a system drain procedure, the FDT may be emptied up to three (3) times. This will require up to three (3) **IBM Power 775 Fill and Drain Tool (FDT) Tank Drain Procedures**, depending on system configuration, at some point in the system drain procedure. While the FDT is draining water from the system, status will indicate the water level state within the FDT, and this procedure will identify when the FDT requires draining based on that status.

***Reference Information:***

| | |
|---|---|
| **IBM Power 775** FDT P/N: | **45D6928** |
| Hose assemblies/adapters required: | **HA1** (45D8561) |
| | **HA2** (45D8562) |

Approximate system water volume (minimum configuration): 46.8 L (12.4 U.S. gal)
Approximate system water volume (maximum configuration): 88.8 L (23.5 U.S. gal)

Estimated time to fully fill **IBM Power 775** system with FDT: 1 to 2 hours

***NOTE:*** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

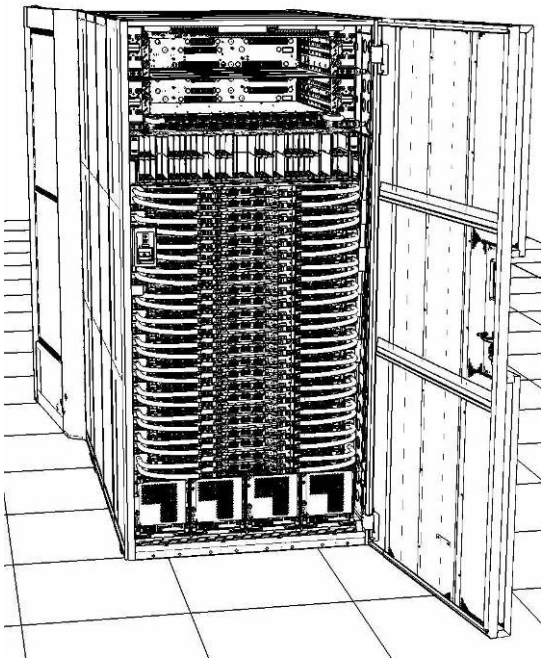
## 2.3 Procedure:

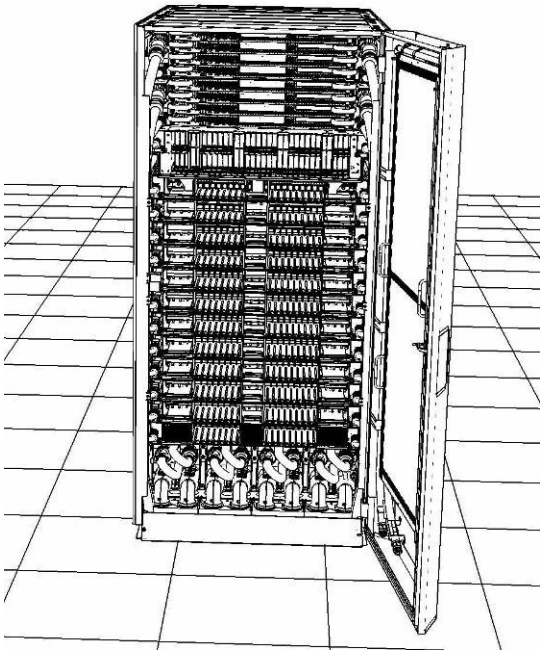
**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires draining.

   Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

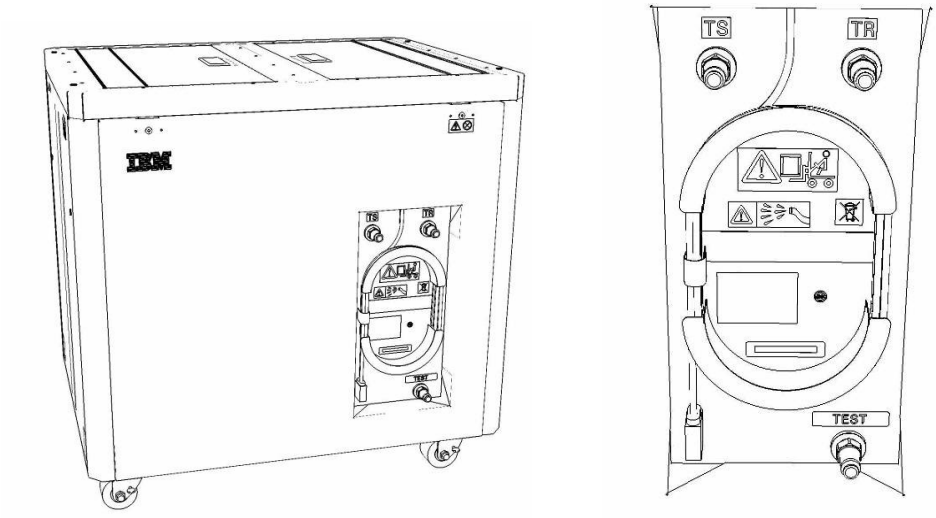
2. Open front and rear doors of the **Power 775** frame that requires service.



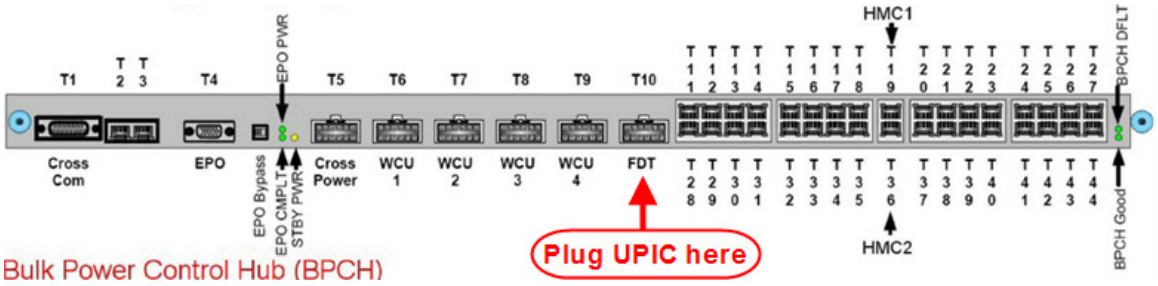


3. Bring the FDT to the front side of the **Power 775** frame that requires service.
4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

   This side of the tool should be facing the front of the frame.



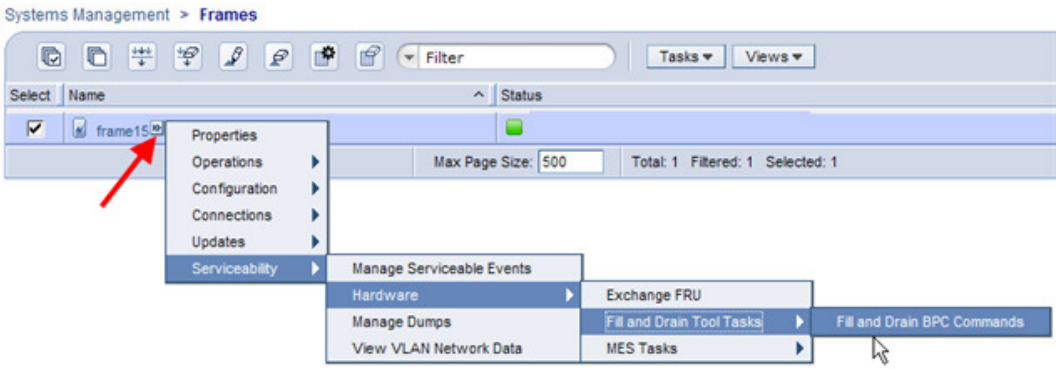

5. Un-wrap the FDT UPIC cable from the storage loop on the FDT.
6. Select BPC port for FDT
   - If the lower BPA is not targeted for service, and is functional:
     Plug the FDT UPIC cable into **port T10 of the lower BPC**.
   - If the lower BPA is targeted for service, or is not functional:
     Plug the FDT UPIC cable into **port T10 of the upper BPC**.



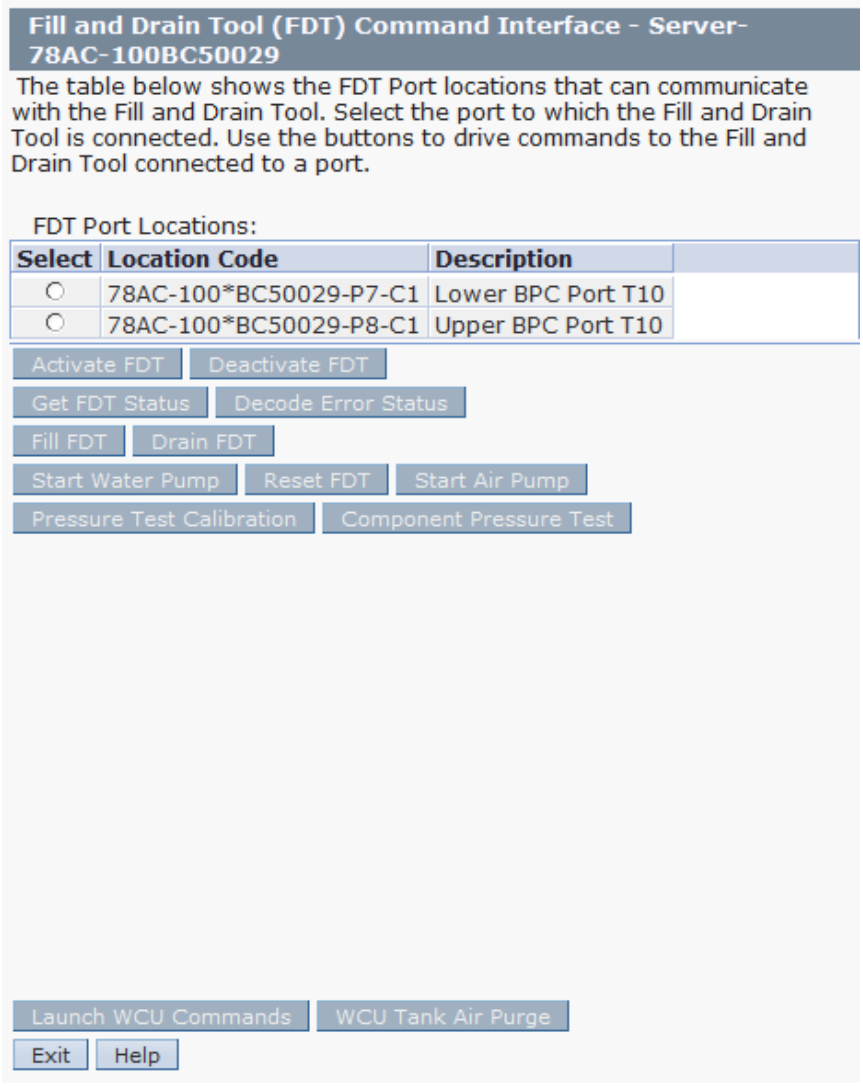

7. Login to the HMC with the User ID **`hscroot`**.
   Use the HMC that is connected to the BPA where the FDT is plugged.
8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.
   Verify frame serial number for the frame to be serviced.
9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.

10. Verify that the frame **Status** is **Rack Standby/Rack Standby**.
    - If frame **Status** reads **Rack Standby/Rack Standby** – OK. Continue to next step.
    - If frame **Status** does not read **Rack Standby/Rack Standby** – action required.
        1) Save all data and close applications running on all partitions.
        2) Turn off CEC logic power on all drawers in the system.
        3) Put the system in Rack Standby with the command

           bpccmd –c 425F0000
11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**




**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).




12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.
13. *Click* the **Activate FDT** button.
    - If the Activate FDT command is successful – OK. Wait 30 seconds and continue to next step.
    - If the **Activate FDT** command fails – action required.

      *Click* the **Deactivate FDT** button.

      Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact your next level of support.

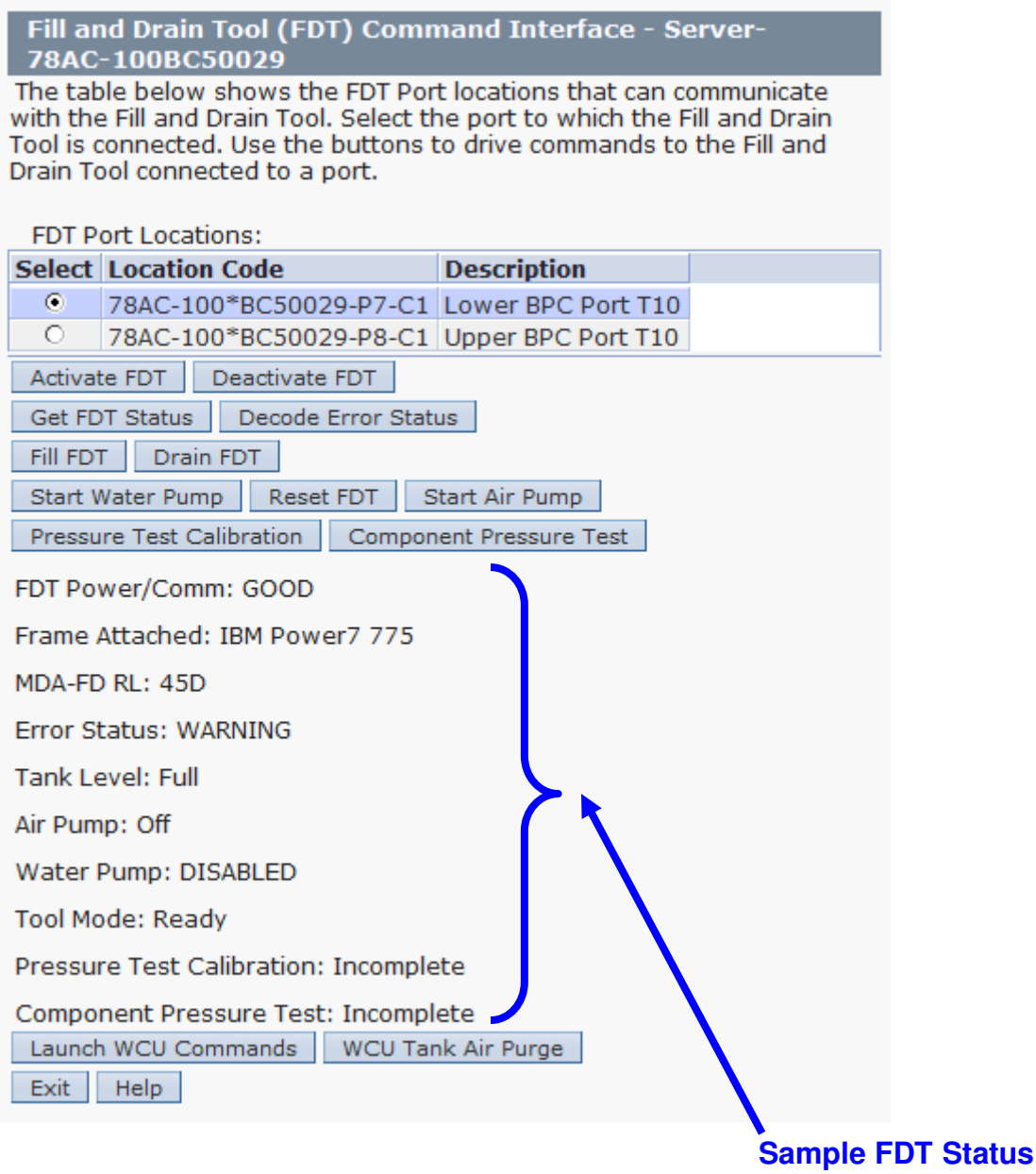
14. *Click* the **Get FDT Status** button.

- If the **Get FDT Status** command is successful – OK.

  See below for a sample status (does not reflect expected state)

- If the **Get FDT Status** command fails – action required.

  Repeat **Step 14**. If the **Get FDT Status** command fails again, contact your next level of support.



15. Review the FDT status screen and ensure that the following status items are OK:

| Status Item | State | Action |
|---|---|---|

- **Tool Mode:** **Ready** – OK. Check next Status item.
- **Error Status:** **NONE** – OK Check next Status item.

  **WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

  **CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact your next level of support.
- **Tank Level:** **Empty** – OK. Check next Status item.

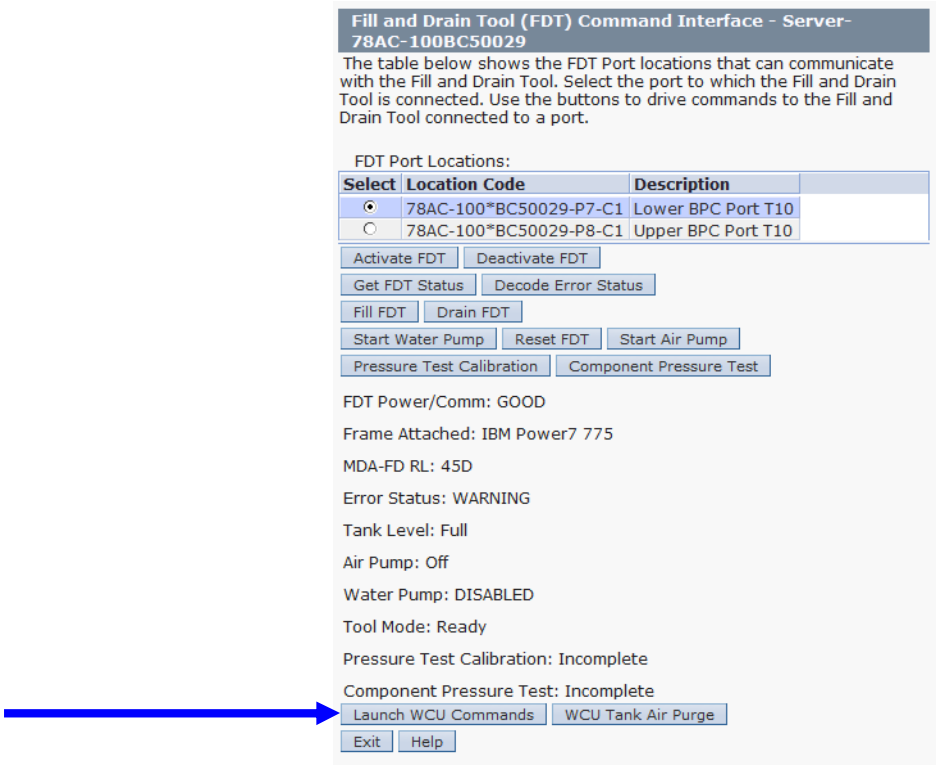
  **Lower, Upper Full** – action required.

  Exit this procedure and perform the **Power 775 Fill and Drain Tool (FDT) Tank Drain Procedure**. (in Section 3 of this document)

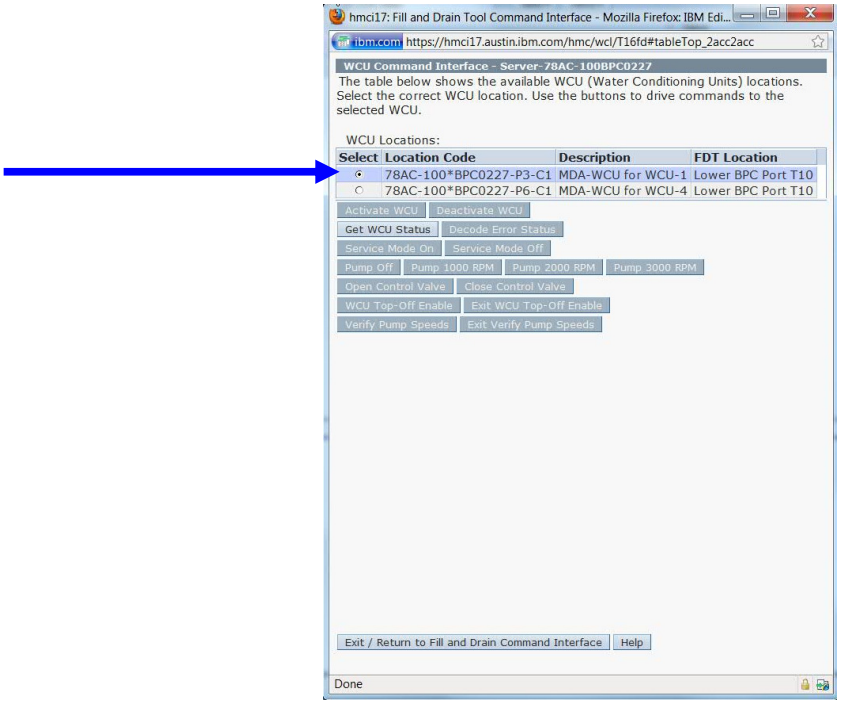
  Once FDT tank level is **Empty**, return to this step and continue with procedure.

16. Verify that all CEC drawer water connections are **NOT** connected.
17. Verify that all DE water connections are NOT connected
18. Verify that the BPAs water connections from the rack manifolds are NOT connected.
19. Disconnect the System Water connections (upper) on all WCUs in the frame.
20. Disconnect the Customer Water connections (Lower) on all WCUs in the frame.
21. Disconnect the Rear Door Heat Exchanger hoses at the manifolds.
22. The following steps 23 – 33 will get all the WCUs in the system setup for a drain.

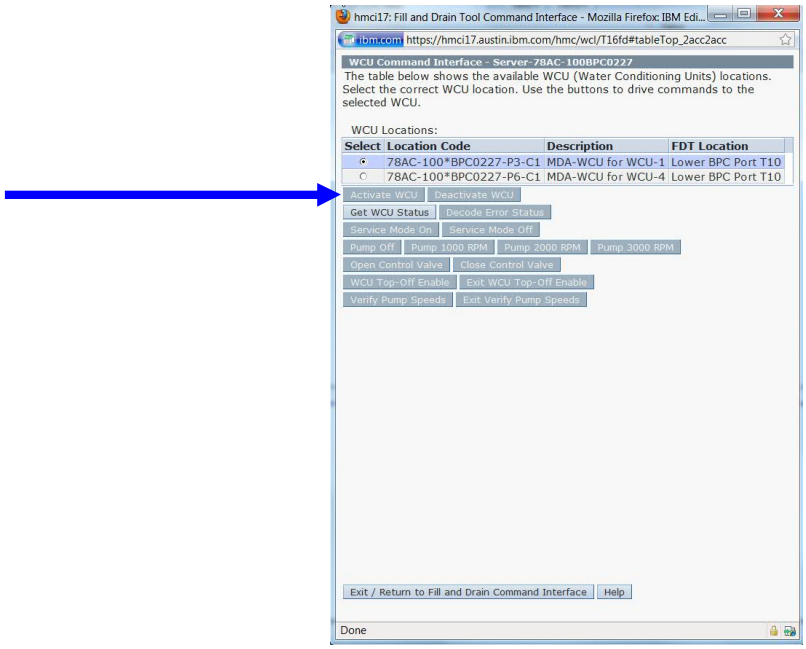
23. Click the **Launch WCU Commands** button:



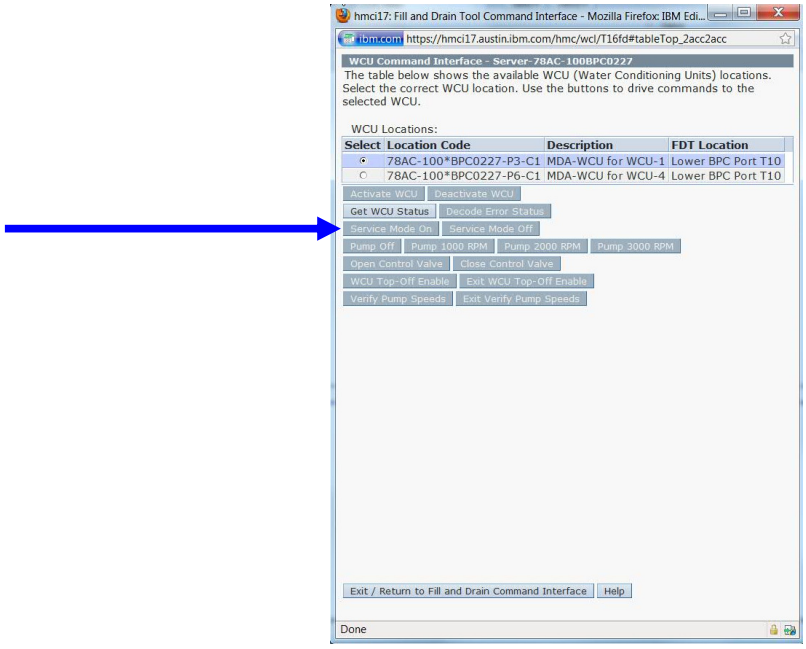

24. In the **WCU Command Interface** window, select **WCU-1**, from the WCU locations:



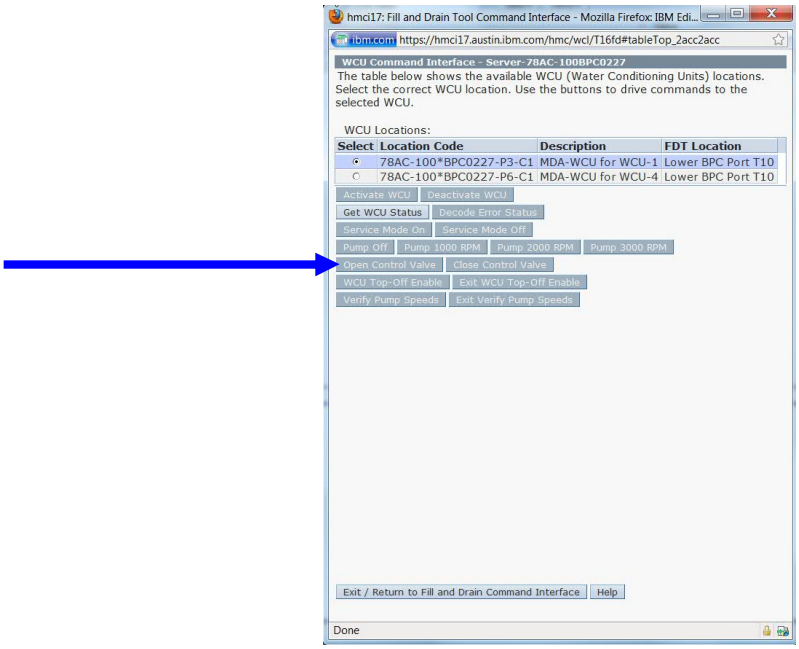
25. *Click* the **Activate** button, and wait 30 seconds before proceeding to **Step** Error! Reference source not found.**4**.



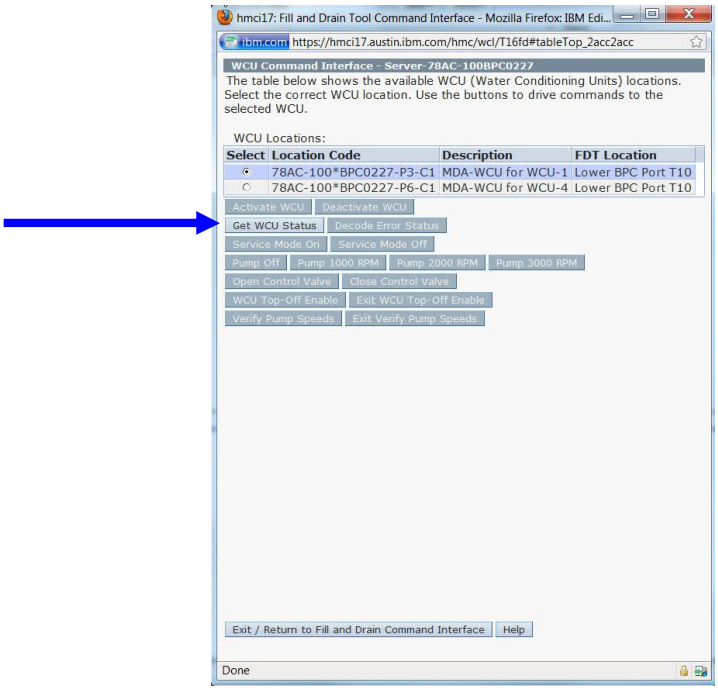

26. *Click* the **Service Mode On** button.



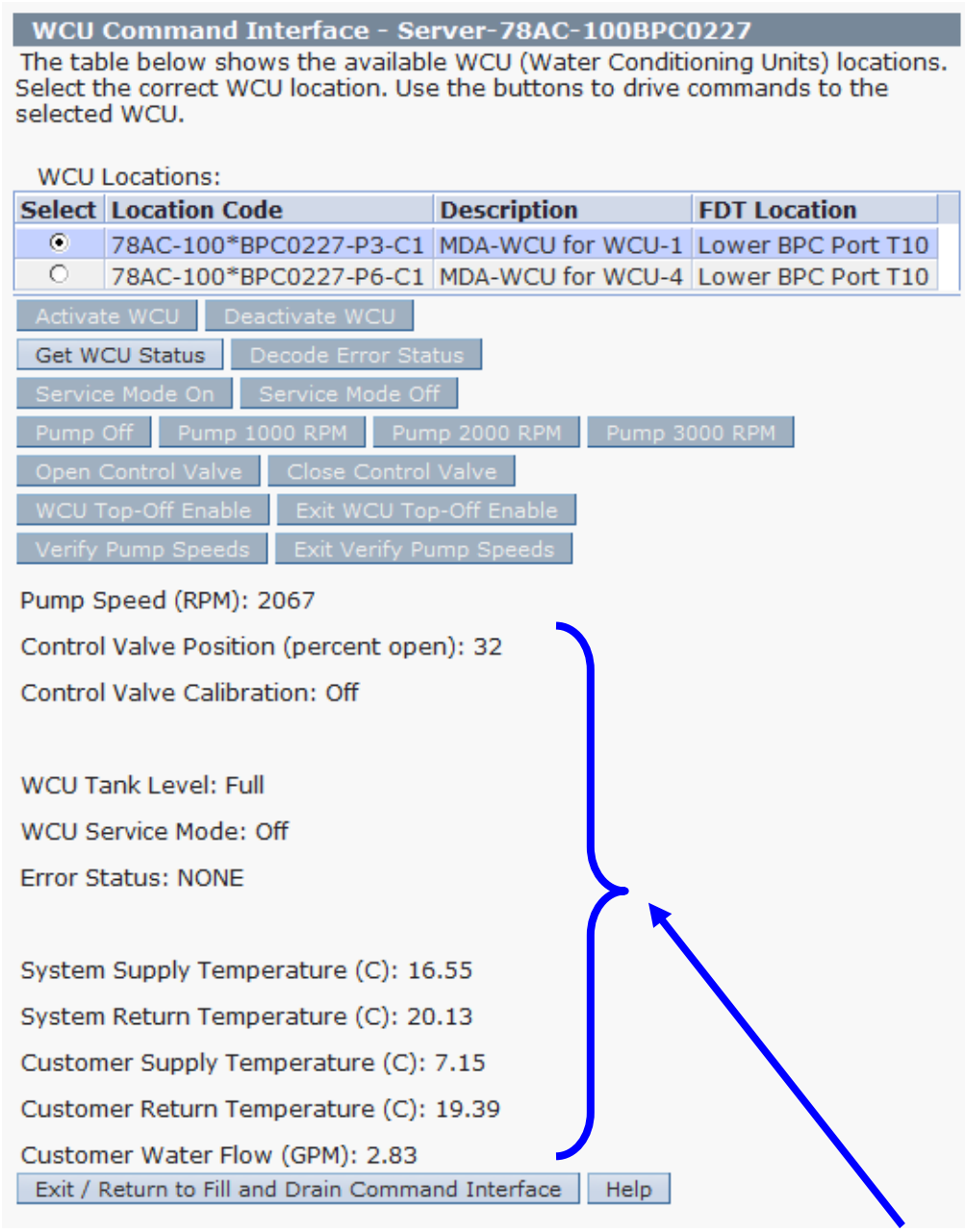

27. *Click* the **Open Control Valve** button, and wait 30 seconds before proceeding to **Step** Error! Reference source not found.**5**.




28. Click the **Get WCU Status** button and ensure the control valve position is greater than 200. If the position is less than 50% repeat steps 24 – 25 as the valve may be opening and the value increasing.

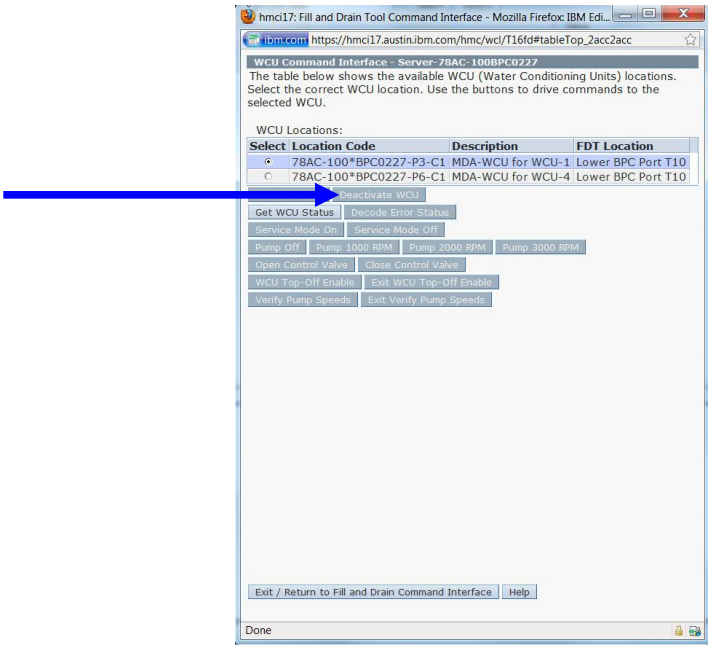


29. Review the WCU status screen and ensure the following status items are correct:
    1) Pump Speed is zero.
    2) Control Valve Position is greater than 50%.
    3) Control Valve Calibration is OFF.
    4) WCU Service Mode is OFF.
    5) Error Status is NONE.
    6) Customer Water Flow is 0 or a negative number.




**Sample WCU Status**

30. Click the **Deactivate WCU** button then proceed to **Step** Error! Reference source not found.**7**.




31. If **WCU-2** is installed in the system:

    Repeat **Step 22** through **Step** Error! Reference source not found.**6** (selecting **WCU-2** in **Step 22).**

32. If **WCU-3** is installed in the system:

    Repeat **Step 22** through **Step** Error! Reference source not found.**6** (selecting **WCU-3** in **Step 22).**

33. If **WCU-4** is installed in the system:

    Repeat **Step 22** through **Step** Error! Reference source not found.**6** (selecting **WCU-4** in **Step 22).**

34. Exit the **WCU Command Interface** window.

35. During the following operations if the FDT should become full, the FDT will NOT allow any more draining of the system. Proceed to the **P775 FDT Drain Procedure** in section 3 of this document and return to this part of the system drain procedure. The Get FDT Status can be clicked and checked and when the tool is full it must be

drained to continue. Draining of a full FDT will require two EMPTY blue water containers.

36. Perform a **Power 775 WCU Drain Procedure** on each WCU installed.
37. Perform a **Power 775 CEC Drain Procedure** on each CEC installed.
38. Perform a **Power 775 DE Drain Procedure** on each DE installed.
39. Perform a **Power 775 BPD Drain Procedure** on each BPD installed.
40. Perform a **Power 775 BRR Drain Procedure** on each BPR installed.
41. Perform a **Power 775 BPE Drain Procedure** on each BPE installed.
42. Perform a **Power 775 RDHX Drain Procedure** on each BPE installed.
43. The following steps will drain the Rack manifolds.
44. Connect HA1 to TS on the FDT.
45. Connect HA2 to TR on the FDT.
46. Connect the unconnected end of HA1 to adapter A3.
47. Connect HA1/A3 hose assembly to the supply manifold (left side) top hose which has been removed from the BPE plug.

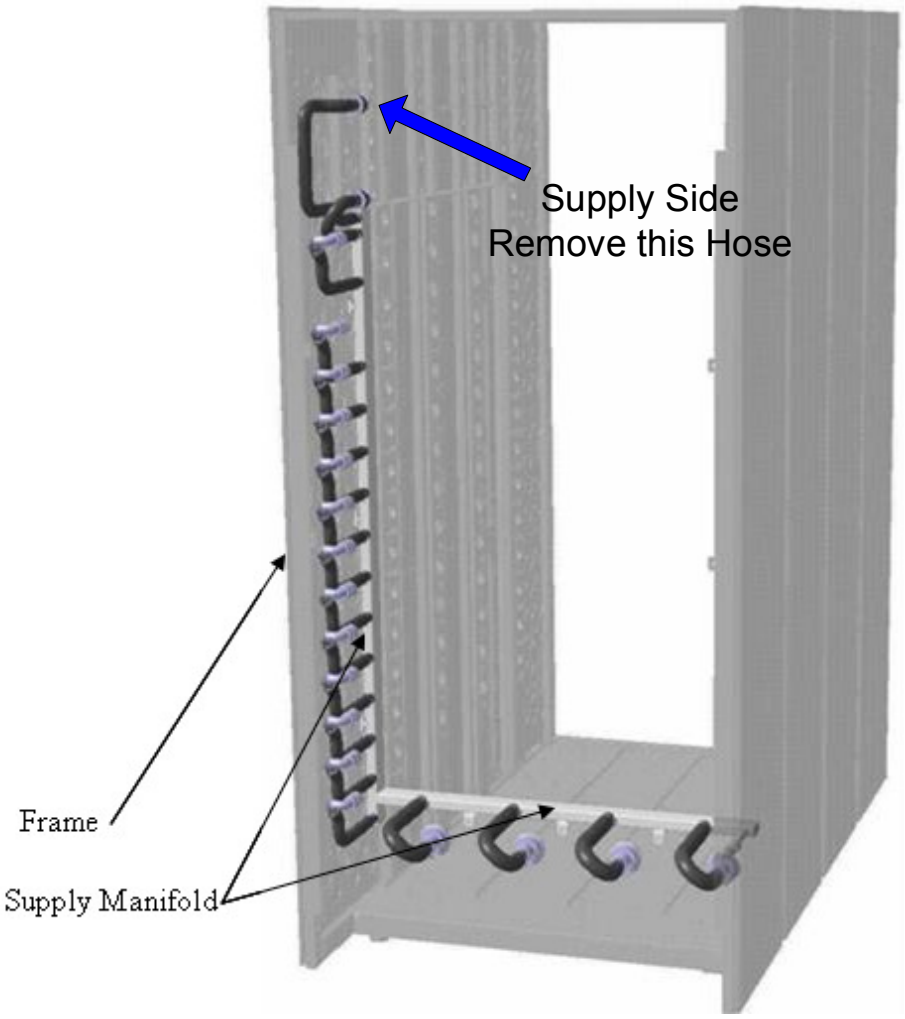



**Figure 1 Supply Manifold BPE Hose Location**

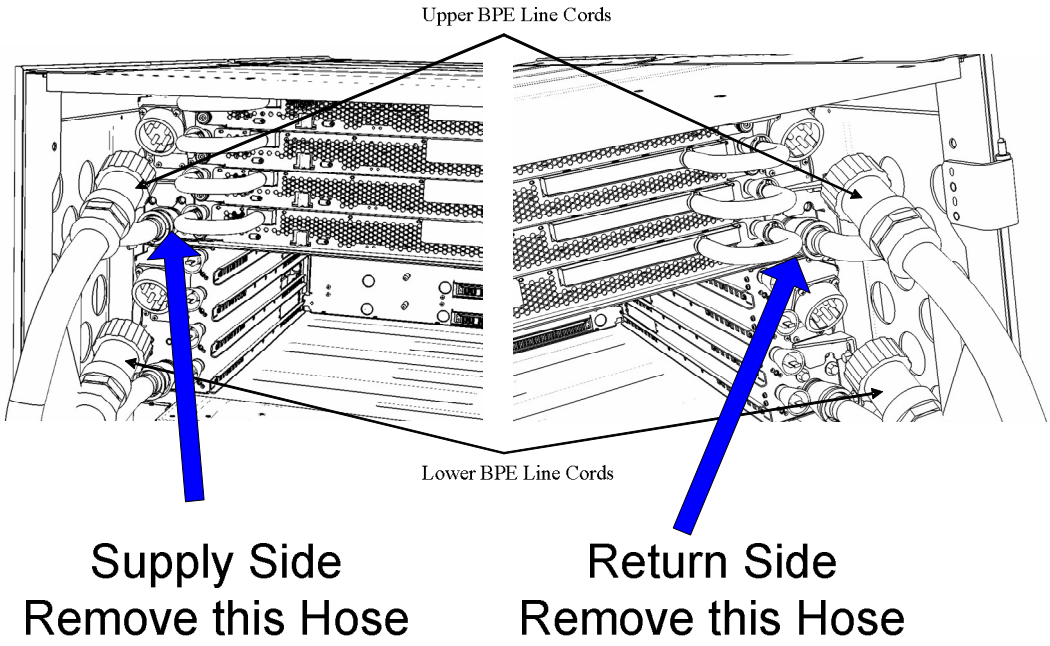



**Figure 2 BPE Supply Hose Location**

48. Connect the HA2 unconnected end to the Supply Manifold plug for the Rear Door Heat exchanger. This is the upper manifold connector in the lower right side of the frame.

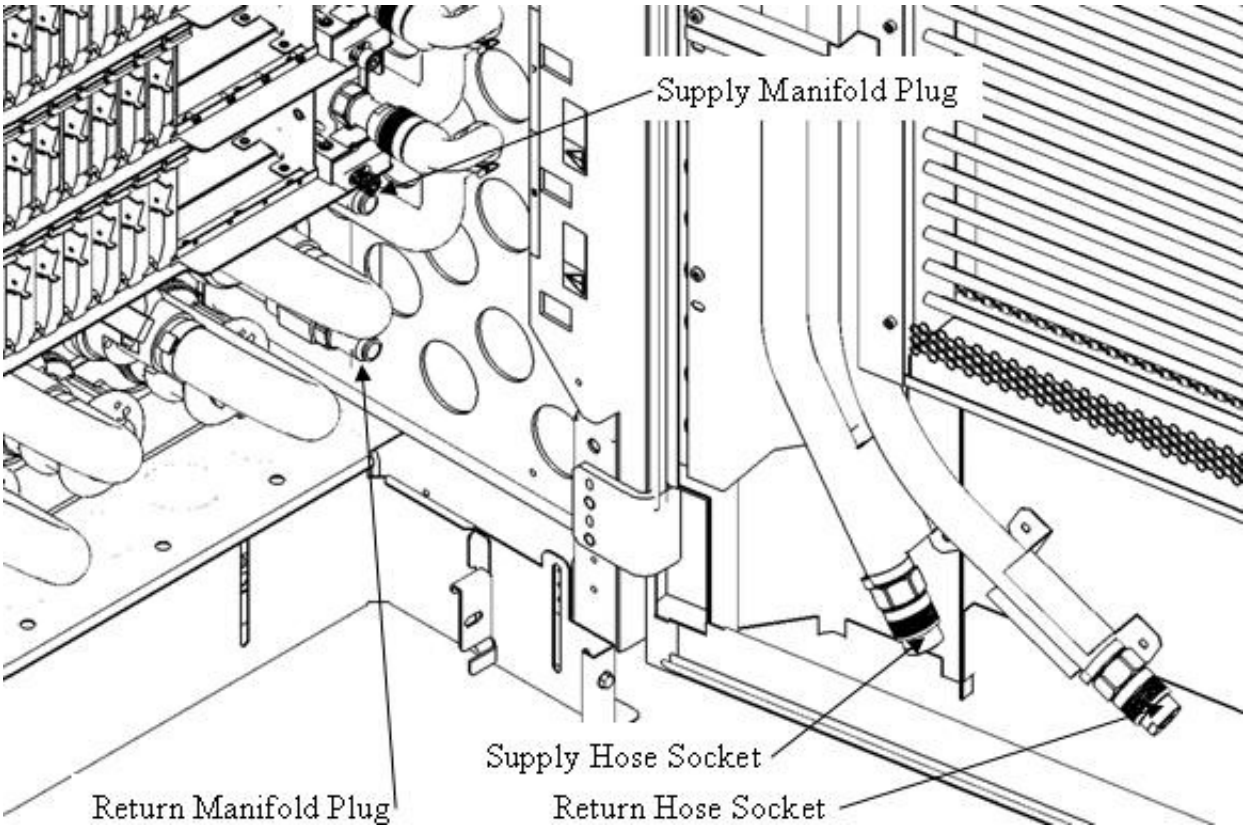



**Figure 3 RDHX Hose and Manifold Plug Locations**

49. Click the Start Air pump button on the FDT panel.
50. View the site glass on HA2 and verify that no more water is being removed from the rack manifold. If the FDT stops, ensure that it's not full and click the start air pump button again. If the tool becomes full and stops, perform a Power 775 FDT Drain Procedure and then repeat steps 44 – 49.
51. Move HA1/A3 hose assembly to the return manifold (right side) top hose which has been removed from the BPE plug.

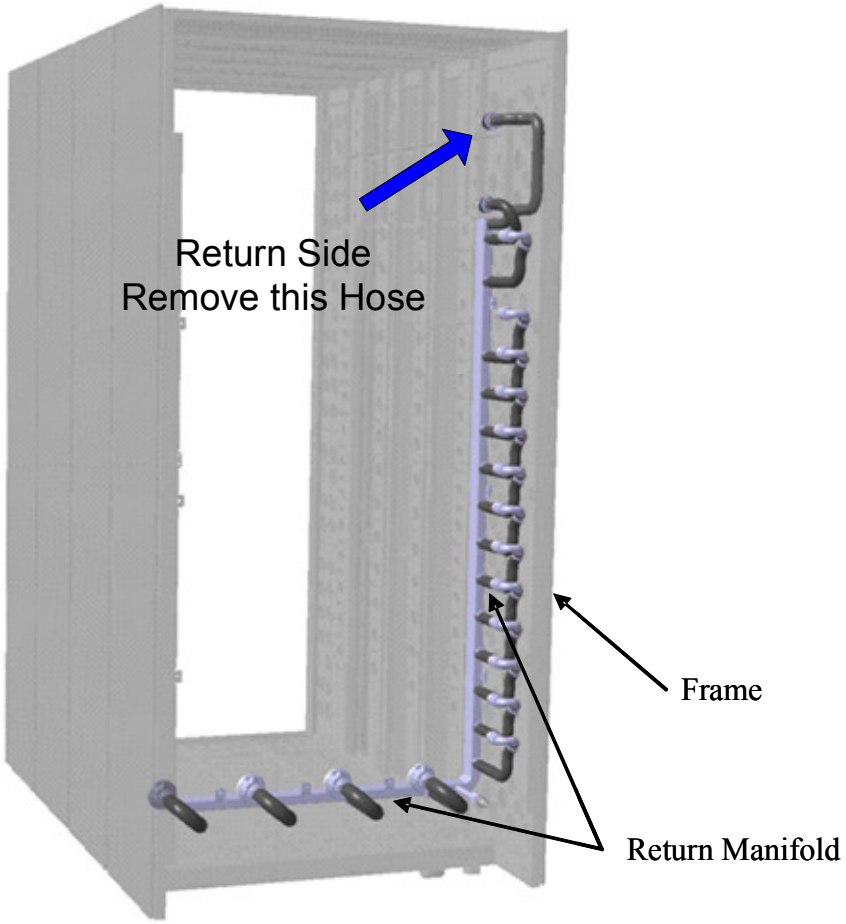



**Figure 4 Supply Manifold BPE Hose Location**

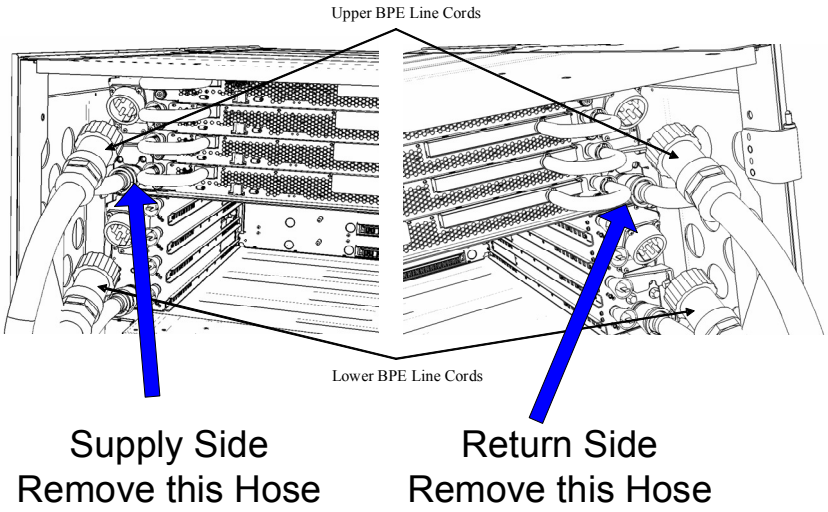



**Figure 5 BPE Supply Hose Location**

52. Move the HA2 unconnected end to the Return Manifold plug for the Rear Door Heat exchanger. This is the lower manifold connector in the lower right side of the frame.

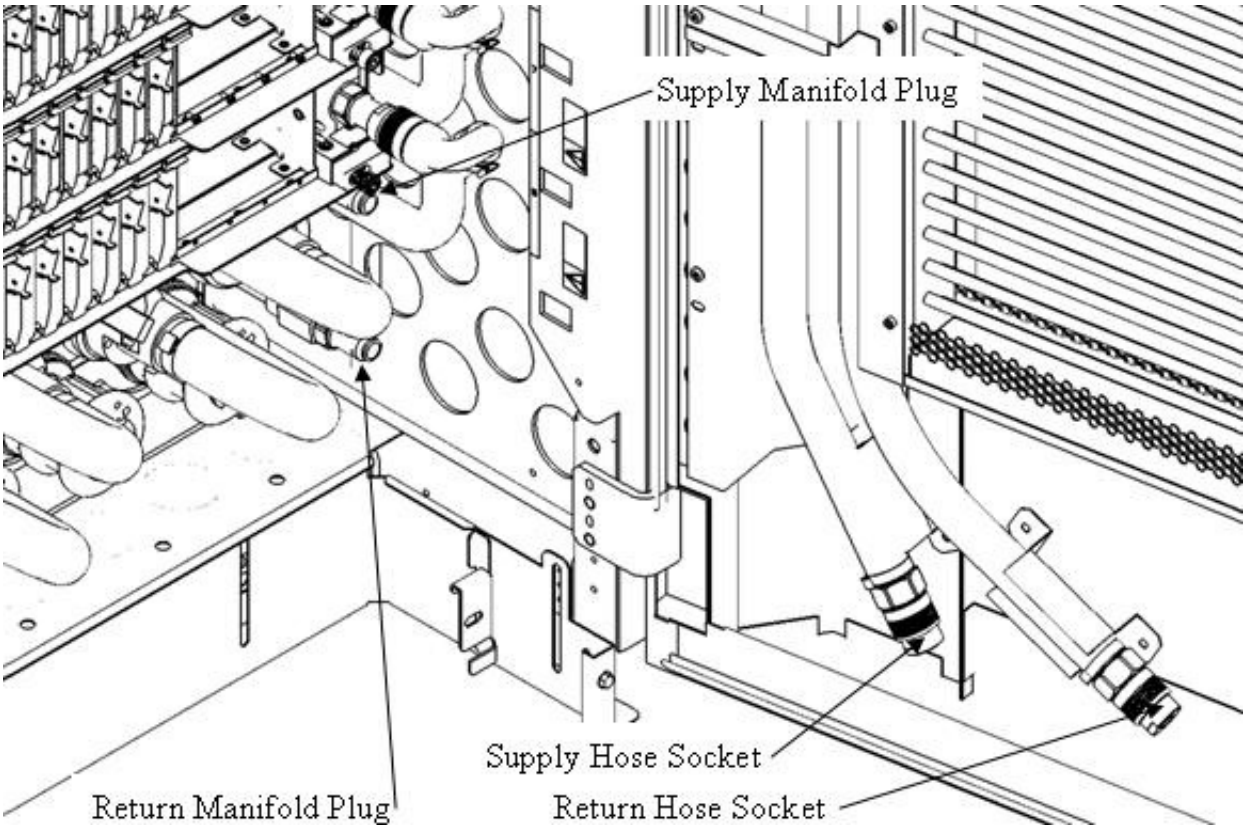



**Figure 6 RDHX Hose and Manifold Plug Locations**

53. Click the Start Air Pump button on the FDT panel.
54. View the site glass on HA2 and verify that no more water is being removed from the rack manifold. If the FDT stops, ensure that it's not full and click the start air pump button again. If the tool becomes full and stops, perform a Power 775 FDT Drain Procedure and then repeat steps 51 – 53.
55. Deactivate the FDT.
56. Remove the UPIC connector.
57. Place all hoses and adapter in the FDT storage compartment.

# 3 POWER775 FILL AND DRAIN TOOL (FDT) TANK DRAIN PROCEDURE

## 3.1 Safety Notices

Read "Safety Notices" available from InfoCenter:
http://publib.boulder.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdx/G229-9054.pdf

The following cautions apply to all Power775 service procedures:

**CAUTION:**
**Energy hazard present and Shorting might result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)**

**CAUTION:**
**The doors and covers to the product are to be closed at all times except for service by trained service personnel. All covers must be replaced and doors locked at the conclusion of the service operation. (C013)**

**CAUTION:**
**Servicing of this product or unit is to be performed by trained service personnel only. (C032)**

The following notices specifically pertain to this Power775 service procedure.

**CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)**

**CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

**DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)**

**CAUTION: Protective eyewear is needed for the procedure. (L011)**

**DANGER: Heavy equipment—personal injury or equipment damage might result if mishandled. (L013)**

**CAUTION: Chemical resistant gloves are needed for this procedure. (L014)**

**DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)**

## 3.2 Background:

This document contains the procedure for draining the water out of the internal reservoir of an **IBM Power 775** Fill and Drain Tool (FDT).

The FDT is used to transfer water into and out of various components of the **IBM Power 775** system. When a system component or the entire system is drained, the water will be transferred into the tank (internal reservoir) within the FDT. During drain operations, the FDT tank may become full, and if so, will need to be periodically emptied into the supplied system water containers. The FDT Tank Drain Procedure instructs the user to properly transfer water out of the FDT Tank and into an empty system water container.

During system or component drain operations, if the FDT senses that the internal reservoir has become full, it will terminate any running drain routine, as well as prevent any further drain routines from being executed. This may occur during a system or component drain procedure; if so, the system or component drain procedure must be paused, and this FDT Tank Drain Procedure must be completed before system/component draining can resume. Individual system water containers treated with a corrosion inhibitor are shipped with the system and after the initial system fill, the empty containers must be stored to be available for the FDT Tank Drain operation.

**The system water is treated and must not be poured down a sink or on the ground.**

***Reference Information:***

| | |
|---|---|
| **IBM Power 775** FDT P/N: | **45D6928** |
| **IBM** System Water Container P/N: | **45D2124** (U.S.), **45D2129** (non-U.S.) |
| Hose assemblies/adapters required: | **THA** (45D8563) |

Approximate FDT internal water volume: 32 L
Expected drainage time for one (1) system water container: 1 min, 40 s

***NOTE:*** *Some steps in this procedure may be redundant due to other service operations being completed prior to this procedure. If a step has already been completed, verify that the step has been completed properly and proceed to the next step.*

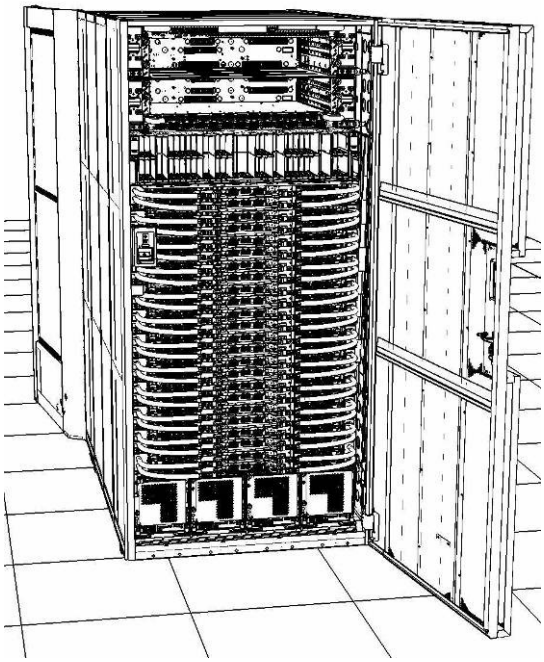
## 3.3 Procedure:

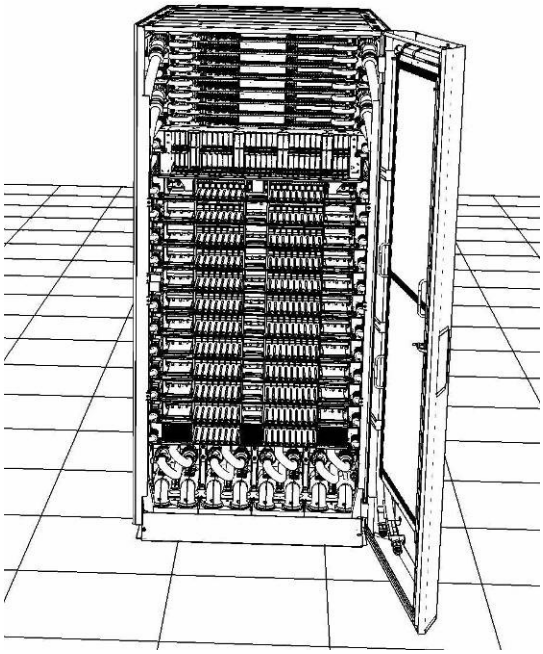
**NOTE:** If you already have the FDT powered on, proceed to **Step 14**. Otherwise, start procedure at **Step 1**.

1. Identify the **Power 775** frame that requires service.

   Verify that the system UEPO is set to **ON**, and the managing consoles (HMC and XCat) are powered on and communicating with the frame.

2. Open front and rear doors of the **Power 775** frame that requires service.

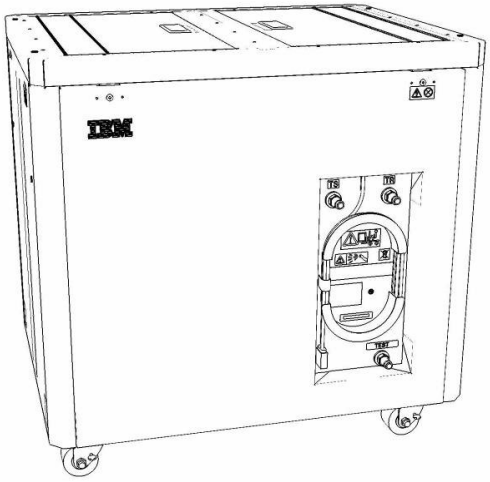


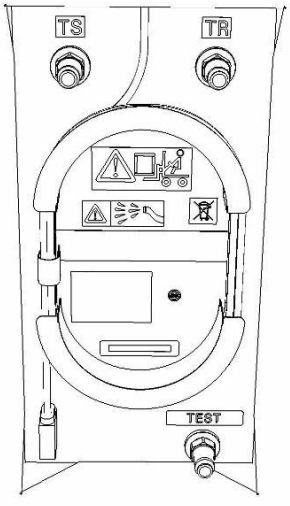


3. Bring the FDT to the front side of the **Power 775** frame that requires service.

4. Locate the panel of the FDT that contains the Universal Power and Information Cable (UPIC), as well as the **TS**, **TR**, and **TEST** water connections.

   This side of the tool should be facing the front of the frame.



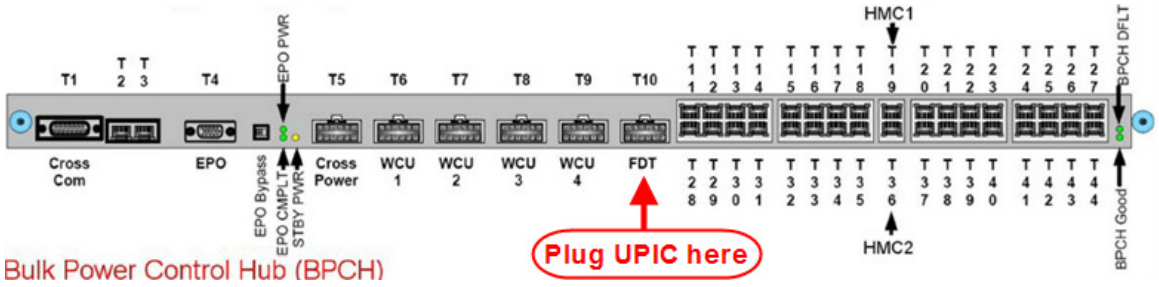




5. Unwrap the FDT UPIC cable from the storage loop on the FDT.

6. Select BPC port for FDT
   - If the lower BPA is not targeted for service, and is functional:

     Plug the FDT UPIC cable into **port T10 of the lower BPC**.
   - If the lower BPA is targeted for service, or is not functional:

     Plug the FDT UPIC cable into **port T10 of the upper BPC**.

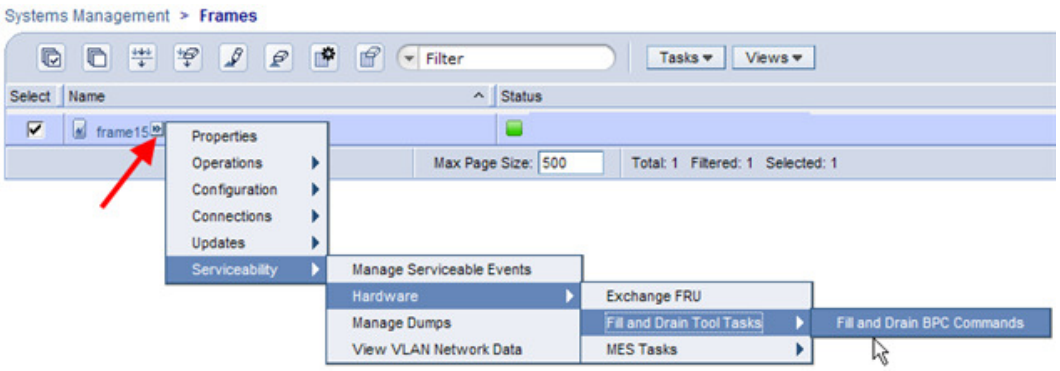



7. Login to the HMC with the User ID **`hscroot`**.

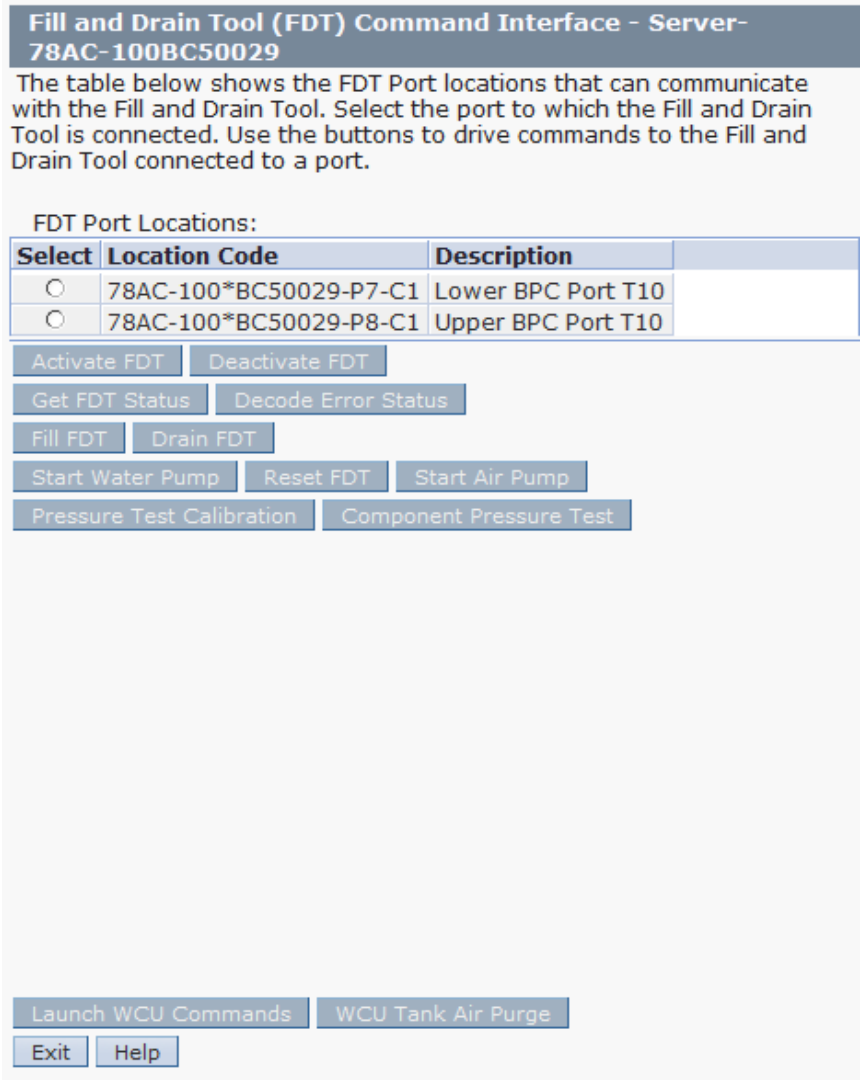
   Use the HMC that is connected to the BPA where the FDT is plugged.
8. From the HMC left Navigation menu, expand **Systems Management** then select **Frames**.

   Verify frame serial number for the frame to be serviced.
9. In the **Frames** view on the HMC, place a checkmark in the **Select** column for the frame to be serviced.
10. Verify that the frame **Status** is **Rack Standby/Rack Standby** or **Standby/Standby**.
    - If frame **Status** reads **Rack Standby/Rack Standby** or **Standby/Standby** – OK.

      Continue to next step.
    - If frame **Status** does not read **Rack Standby/Rack Standby** or **Standby/Standby** – action required. Contact your next level of support.
11. From the **Task** menu on the HMC, *select* **Serviceability** > **Hardware** > **Fill and Drain Tool Tasks** > **Fill and Drain Command Interface**




**Fill and Drain Tool Command Interface** will display. See below for a sample image of the interface (FDT deactivated).



12. Select the BPC port that the FDT was plugged into in **Step 6** from the **FDT Port Locations:** list.
13. *Click* the **Activate FDT** button.
    - If the Activate FDT command is successful – OK. Wait 30 seconds and continue to next step.
    - If the **Activate FDT** command fails – action required.

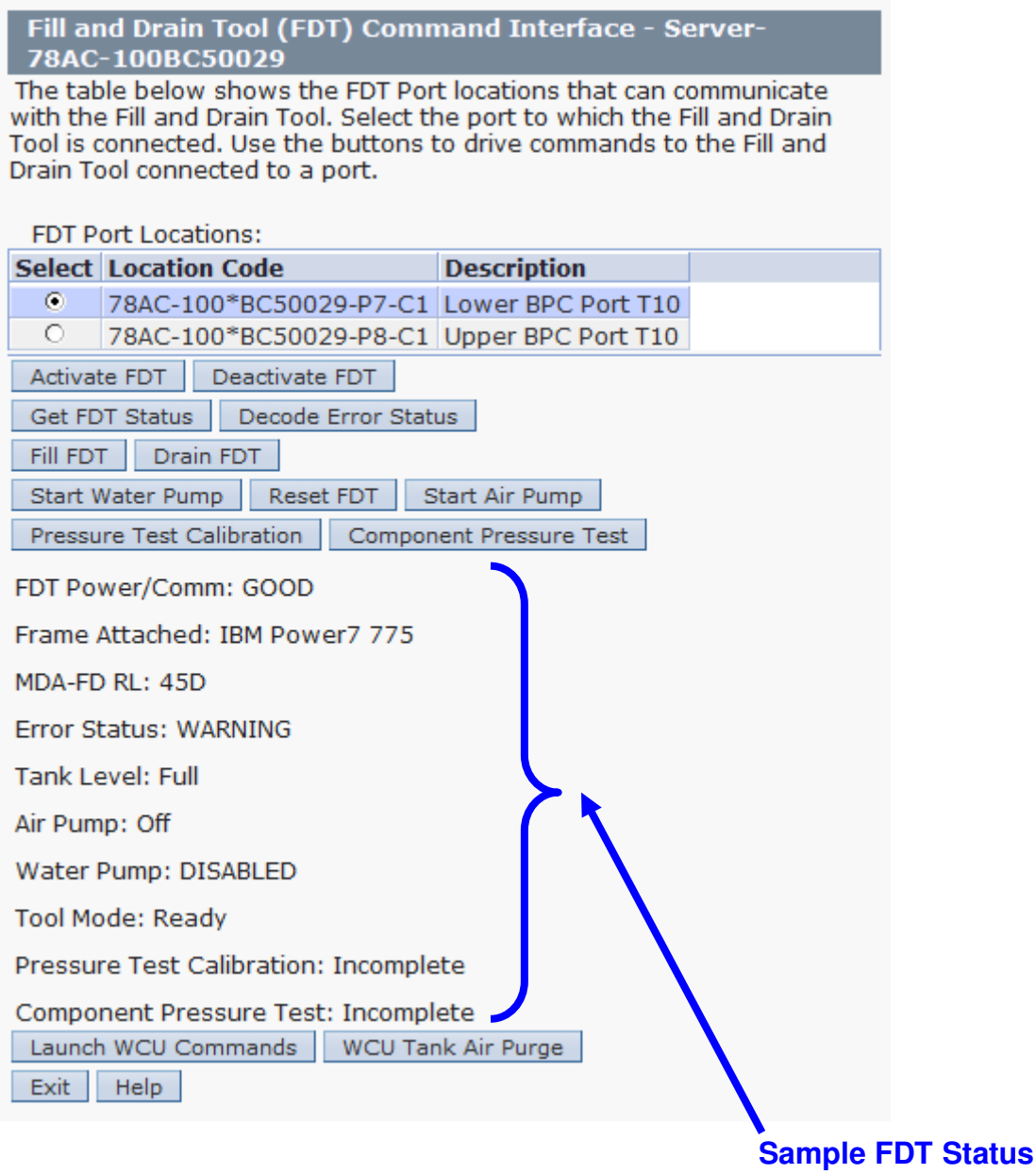
      *Click* the **Deactivate FDT** button.

      Wait 2 minutes and repeat **Step 13**. If the **Activate** command fails again, contact your next level of support.

14. *Click* the **Get FDT Status** button.
    - If the **Get FDT Status** command is successful – OK.

      See below for a sample status (does not reflect expected state)
    - If the **Get FDT Status** command fails – action required.

      Repeat **Step 14**. If the **Get FDT Status** command fails again, contact your next level of support.




15. Review the FDT status screen for the following:

- **Tool Mode:** **Ready** – OK. Check Error Status.
- **Error Status:** **NONE** – OK. Check Tank Level.

  **WARNING** – *click* the **Decode Error Status** button, record the information returned and check Tank Level.

  **CRITICAL** – *click* the **Decode Error Status** button, record the information returned and contact your next level of support.
- **Tank Level:** **Full**, **Upper Half**, or **Lower Half** – OK.

Note tank level, and proceed to next step.

**Empty** – FDT cannot be drained.

Exit procedure.

16. Locate an empty system water container.

    Transport the container to the location of the FDT.

    Do not place the container between the FDT and the open frame.

    ***NOTE:*** *Use an empty system water container **only**. If a non-empty system water container is used, water will overflow out of the container.*

    IBM PN **45D2124** (U.S.), **45D2129** (non-U.S.).

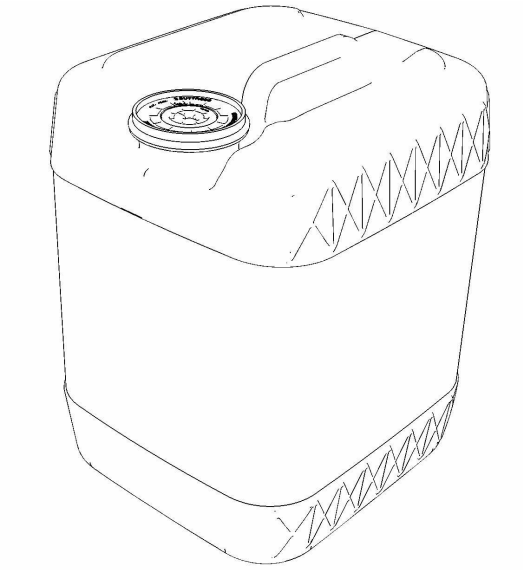
    **CAUTION: The water-based coolant solution may contain an additive intended to inhibit corrosion (or provide other functions). The solution may cause irritation to the skin or eyes. Avoid direct contact with the solution. Employ appropriate Personal Protective Equipment when performing operations involving the coolant or which may potentially expose you to the coolant. Refer to the MSDS for more information. (C037)**

    **CAUTION: Protective eyewear is needed for the procedure. (L011)**

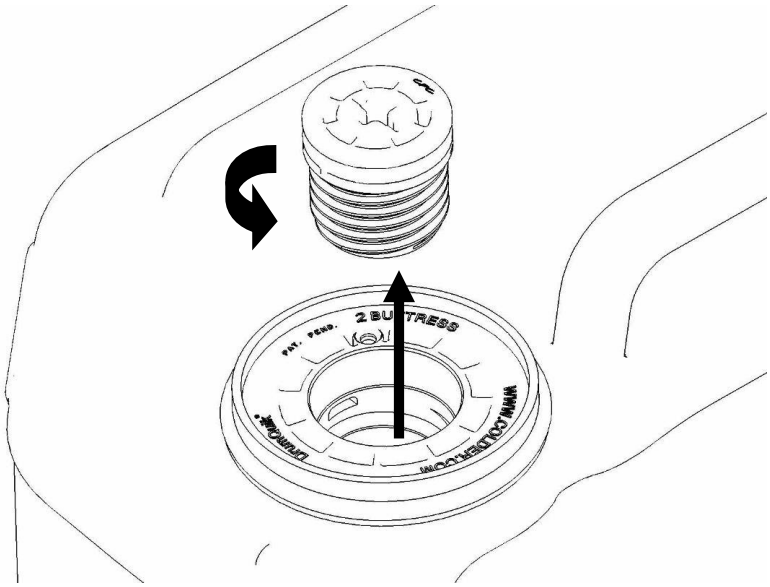
    **CAUTION: Chemical resistant gloves are needed for this procedure. (L014)**

    **DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)**

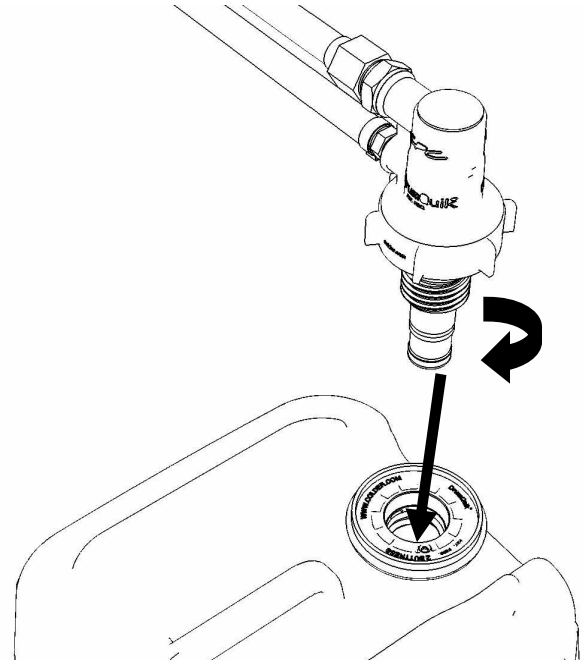
**The system water is treated and must not be poured down a sink or on the ground.**



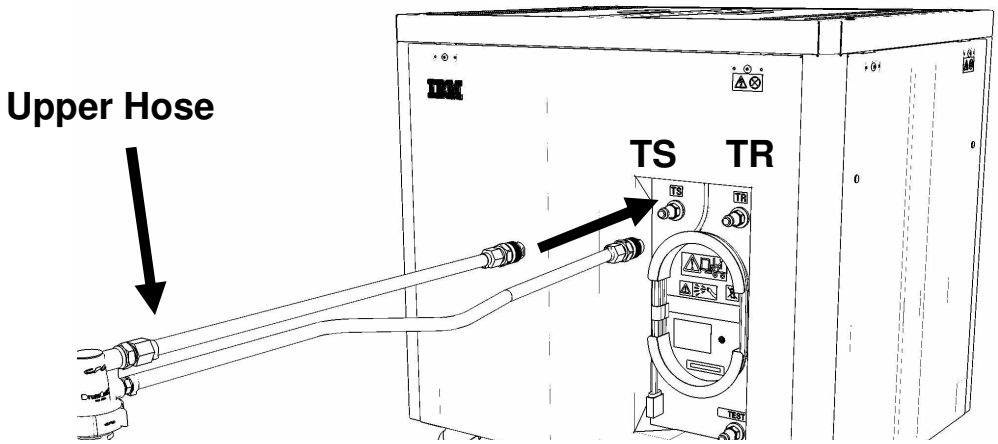
17. Remove the inner cap from the white system water container insert.
    Unthread inner cap counter-clockwise with a large screwdriver.



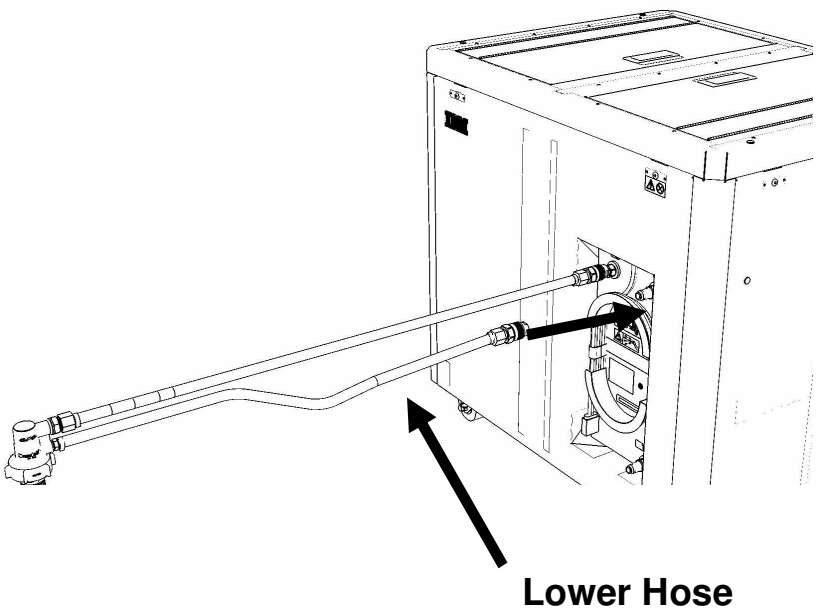
18. Remove transfer hose assembly **THA** from the upper tool storage compartment.
19. Insert large white threaded insert of **THA** into the system water container.
    Turn clockwise until hand tight.

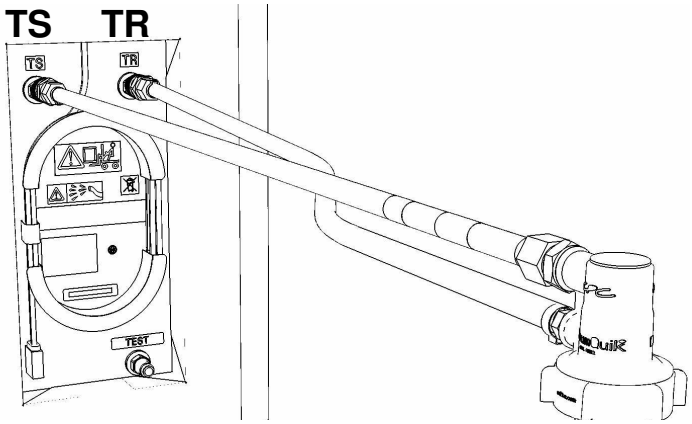


20. Connect the **Upper THA Hose** to the **TS** connection on the front panel of the FDT.

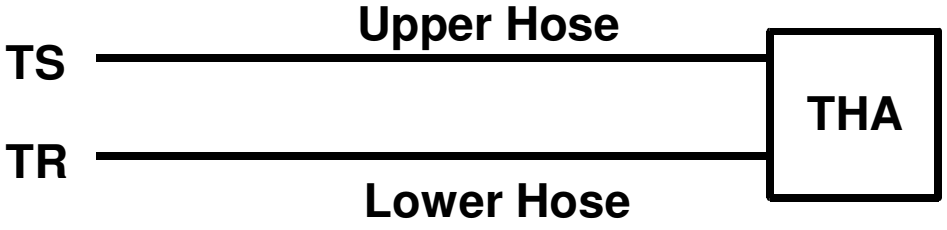



21. Connect the **Lower THA Hose** to the **TR** connection on the front panel of the FDT.




22. Ensure all water connections are made properly and securely.



23. On the FDT panel, *click* the **Drain FDT** button.

    The **Get FDT Status** button may be *click*ed to examine FDT status.

    ***NOTE:*** *The water pump will shut off after 1 minute, 40 seconds of run time.*

    **CAUTION: This unit must not be left running unattended, service personnel should always be overseeing the process. (C038)**

24. Verify that the container feels full of water after FDT drain.

    Container will weigh approximately 35 lbs. (16 kg) when full.

    - If container feels full, proceed to **Step 25**.
    - If container feels empty, repeat **Step 20** and continue with procedure.

      To prevent overflow, only repeat if the system water container is **still empty**.

25. *Click* the **Get FDT Status** button and review the following:

    - **Tool mode:** **Ready** – OK. Check Error Status.

      **FDT Drain Mode** – water pump still running.

      Wait 30 seconds and repeat **Step 25**.

    - **Error Status:** **NONE** – OK. Check Tank Level.

      **WARNING** – *click* the **Decode Error Status** button, record information returned and proceed to next step.

      **CRITICAL** – *click* the **Decode Error Status** button, record information returned and contact your next level of support.

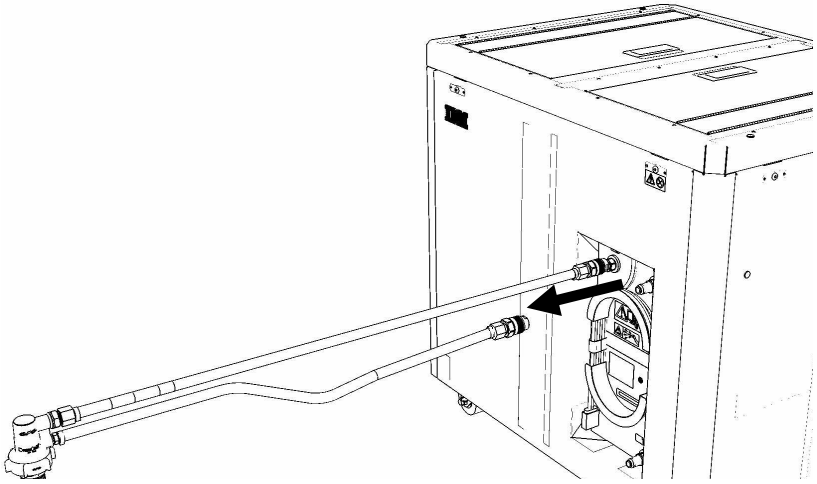
    - **Tank Level:** Repeat **Step 16** to **Step 25** (with additional empty container) until desired level is reached.

      If tank level does not fall, repeat **Step 16** through **Step 25**.

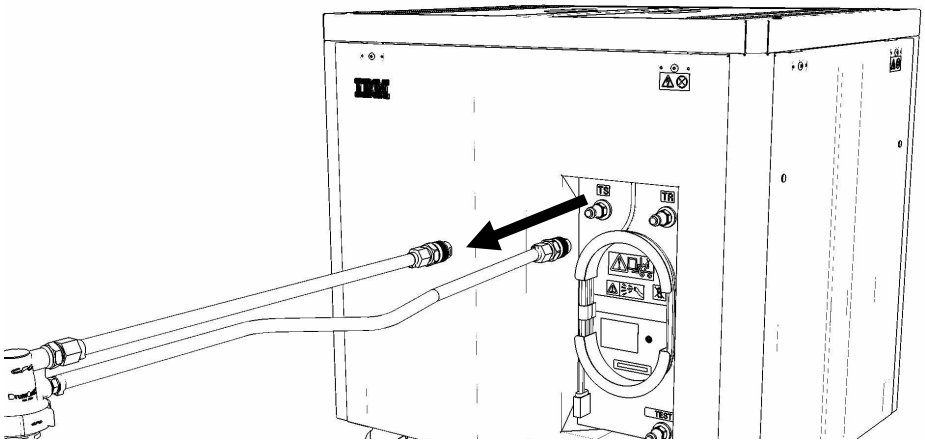
      If tank level does not decrease after repeat, contact your next level of support.

      To prevent overflow, only repeat if the system water container is **still empty**.

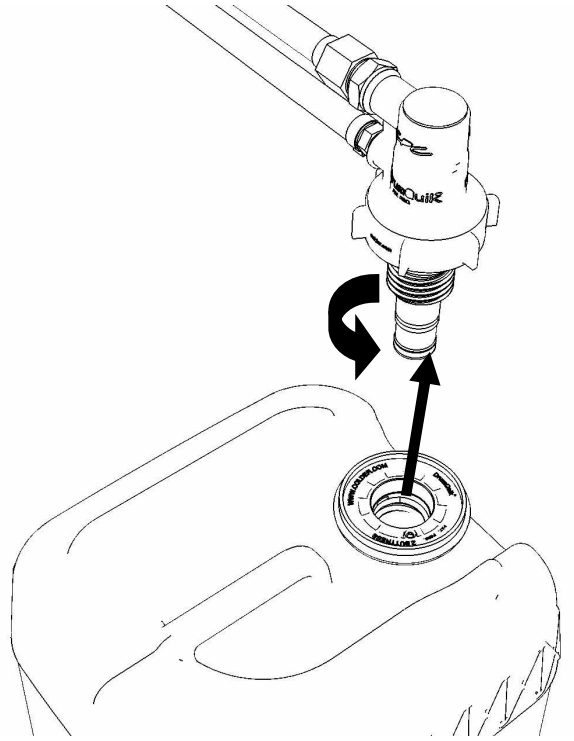
26. Disconnect the **Lower THA Hose** from the **TR** connection on the front panel of the FDT.



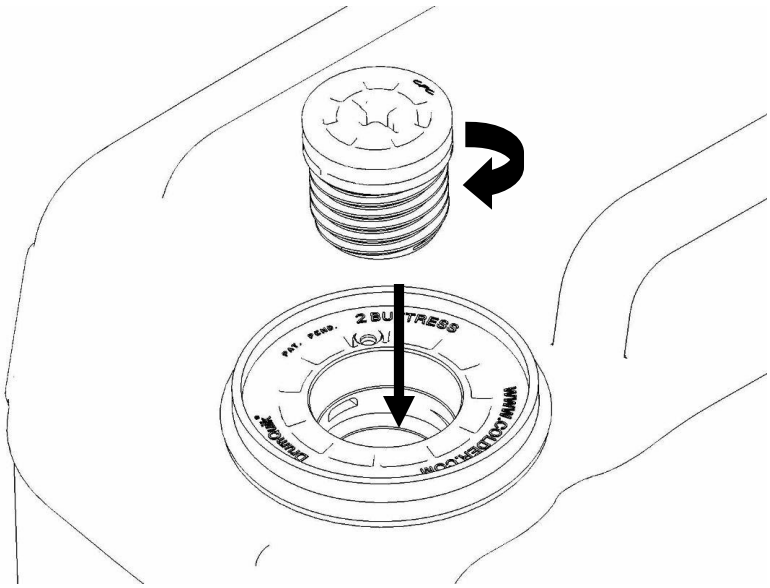
27. Disconnect the **Upper THA Hose** from the **TS** connection on the front panel of the FDT.



28. Remove large white threaded insert of **THA** from the system water container.
    Turn **slowly** counterclockwise until removed.
    Some residual pressure may remain on the system water container



29. Replace the inner cap into the white system water container insert.
    Turn inner cap clockwise with a large screwdriver.



30. Place all hose assemblies and adapters in their appropriate locations within the FDT storage enclosure.
31. Determine whether the FDT will be used for another procedure:
    - If the FDT will be used for another procedure, leave tool activated and go to that procedure now; skip the remaining steps of this procedure.
    - If the FDT requires no further use - proceed to the next step.
32. *Click* the **Deactivate FDT** button.
    - If the **Deactivate FDT** command is successful – OK. Proceed to next step.
    - If the **Deactivate FDT** command fails– action required.

      Repeat **Deactivate FDT**. If the **Deactivate FDT** command fails again, contact your next level of support.
33. Disconnect FDT UPIC power cable from port T10 of BPC used.

    Wrap the UPIC cable in appropriate cable storage location on FDT.
34. If this procedure was referenced from another procedure, return to parent procedure.

---

## 3.4 End of Power775 FDT Tank Drain Procedure

# 4 APPENDIX A: IBM POWER775 FDT VOLUME TABLES

## 4.1 IBM Power 775 Component Water Volumes

| | Liters | Gallons |
|---|---|---|
| WCU | 10.75 | 2.84 |
| Supply Manifold | 5.64 | 1.49 |
| Return Manifold | 5.64 | 1.49 |
| CEC | 1.74 | 0.46 |
| CEC DCCA | 0.07 | 0.02 |
| CEC + 2 DCCAs | 1.87 | 0.49 |
| BPE | 0.97 | 0.26 |
| BPR | 0.12 | 0.03 |
| BPD | 0.18 | 0.05 |
| Disk Enclosure | 0.90 | 0.24 |
| RDHX | 7.50 | 1.98 |
| | | |
| System Water Container | 15.00 | 3.96 |
| FDT Tank (Internal Reservoir) | 32.00 | 8.45 |

Table 4 IBM Power 775 Component Water Volumes

## 4.2 IBM Power 775 System Water Volumes

| | | Number of CEC Drawers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Number of Disk Enclosures | 0 | 46.8 | 48.6 | 50.5 | 63.6 | 65.4 | 67.3 | 69.2 | 82.3 | 84.1 | 86.0 | 87.9 |
| | 1 | 47.7 | 49.5 | 51.4 | 64.5 | 66.3 | 68.2 | 70.1 | 83.2 | 85.0 | 86.9 | 88.8 |
| | 2 | 48.6 | 50.4 | 52.3 | 65.4 | 67.2 | 69.1 | 71.0 | 84.1 | 85.9 | | |
| | 3 | 49.5 | 51.3 | 53.2 | 66.3 | 68.1 | 70.0 | 71.9 | | | | |
| | 4 | 50.4 | 52.2 | 54.1 | 67.2 | 69.0 | | | | | | |
| | 5 | 51.3 | 53.1 | 55.0 | | | | | (Volumes in Liters) | | | |
| | 6 | 52.2 | | | | | | | | | | |

Table 5 IBM Power 775 System Water Volume (Liters)

| | | Number of CEC Drawers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Number of Disk Enclosures | 0 | 12.4 | 12.8 | 13.3 | 16.8 | 17.3 | 17.8 | 18.3 | 21.7 | 22.2 | 22.7 | 23.2 |
| | 1 | 12.6 | 13.1 | 13.6 | 17.0 | 17.5 | 18.0 | 18.5 | 22.0 | 22.5 | 23.0 | 23.5 |
| | 2 | 12.8 | 13.3 | 13.8 | 17.3 | 17.8 | 18.3 | 18.8 | 22.2 | 22.7 | | |
| | 3 | 13.1 | 13.6 | 14.1 | 17.5 | 18.0 | 18.5 | 19.0 | | | | |
| | 4 | 13.3 | 13.8 | 14.3 | 17.7 | 18.2 | | | | | | |
| | 5 | 13.5 | 14.0 | 14.5 | | | | | (Volumes in Gallons) | | | |
| | 6 | 13.8 | | | | | | | | | | |

Table 6 IBM Power 775 System Water Volume (Gallons)

## 4.3 IBM Power 775 System Water Containers per Frame

| Number of Disk Enclosures | Number of CEC Drawers | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 0 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| 1 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| 2 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 | | |
| 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | | | | |
| 4 | 4 | 4 | 4 | 5 | 5 | | | | | | |
| 5 | 4 | 4 | 4 | | | | | | | | |
| 6 | 4 | | | | | | | | | | |

Table 7 IBM Power 775 Required Number of System Water Containers per Frame

## 4.4 End of Appendix A: Power775 FDT Volume Tables