

Uptime Institute

Tier III Certification of constructed Facility

Overview/ 概況

The Tier Certification of Constructed Facility (TCCF) is intended to demonstrate the facility was constructed as indicated on the Tier Certified drawings and performs according to the Tier objective with the design load. Tier III - Concurrently Maintainable Infrastructure solutions include redundant critical power and cooling capacity components at a given design load. The solutions also include redundant distribution paths. The Tier Certification of the Constructed Facility (TCCF) for a Tier III data center involves demonstrating the critical infrastructure systems and distribution paths are capable of supporting the design IT load in a Concurrently Maintainable manner.

新建設施 Tier 認證 (TCCF) 用於展示新建設施根據 Tier 認證的設計圖並且執根據 Tier 目標與設計附載執行認證。 Tier III 並存可維護設施方案包含相關電力和冷卻能量在設計附載中有的餘裕。這個解決方案包含餘裕的分配路徑。新建設施 Tier 認證 (TCCF) 是給 Tier III 資料中心展示關鍵基礎系統和分配路徑能夠在維護的同時支持設計 IT 負載。

During a TCCF, Uptime Institute performs in an observational role. The client is responsible for creating all switching procedures to accomplish the demonstrations, providing all personnel to perform switching and/or system reconfiguration, and creating the schedule for the demonstrations.

在 TCCF 程序，Uptime 執行觀察的角色。客戶負責在展示過程中負責開關程序、提供人員執行開關和/或系統重新設定和製作展示的時程表。

TCCF Process / TCCF 程序

Following the successful completion of the Tier Certification of the Design Documents (TCDD), Uptime Institute will develop the List of Functionality Demonstrations. The list contains all demonstrations necessary to demonstrate the facility meets all the requirements of the given Tier objective.

成功完成 設計文件的 Tier 認證程序 (TCDD)，Uptime 將研議一個基本展示的清單。這個清單包含所有需要展現設施符合所有 Tier 要求的項目。

Once the facility construction and commissioning have been completed, the Uptime Institute will arrive on site to witness the demonstrations. The TCCF will

stay with an in brief meeting. The meeting purpose is to introduce all the people involved, the plan for the TCCF activities, and the actual demonstrations for that day. The in brief should also identify any significant changes to the facility from what was shown on the Tier Certified documents. Each additional day starts with a coordination meeting to plan the demonstrations for that day.

一旦設施新建和功能驗證完成，Uptime 會到案場觀看展示。TCCF 將會召開一個短暫的會議。會議的目的是介紹所有參與的人員、TCF 活動的計畫、和當天實際進行的展示內容。在會議中應該指出設施與先前認證文件中所有顯著的變更。每額外的協調會議會開始說明當天計畫的展示內容。

After the in brief meeting, a tour of the facility is conducted. The tour allows the consultants to familiarize themselves with the facility, check nameplates, and ensure the facility was essentially constructed according to the Tier Certified documents.

在短暫會議之後，設施參觀開始。參觀讓顧問熟悉設施、檢查銘板和確認設施根據 Tier 的認證文件施工建造。

After the load banks and mechanical systems have reached a stable state, the consultants will record the UPS load readings. This UPS load will become the capacity basis of the final certification letter. Once the UPS load readings are obtained, the demonstrations can be conducted.

在負載器和機械系統達到穩定的情況，顧問會計路 UPS 負載資讀數。這個 UPS 負載會變成最後認證信裡面的能量基準。一旦取得 UPS 附載讀數，展示能開始進行。

Once all demonstrations for the day or the full activity are completed, temperature, humidity, and electrical data is collected. The data is reviewed to ensure no anomalies were experienced. Finally, a final meeting is completed to review the TCCF activities and the results. The meeting will inform the client of the next steps and what to expect.

一旦所有的當天的展示或整個活動完成，溫度、濕度、電力資料會被收集。資料審查會確認沒有不正常的情況發生。最後，最後會議將審查 TCCF 工作和結果。會議將通知客戶下一步和預期的事情。

Following the TCCF activities a memorandum will be provided outlining the activities conducted and the outcome of those activities. Upon a successful completion of the TCCF, a certification letter and plaque will be provided indicating the facility certification achieved.

跟隨 TCCF 工作，執行的工作和這些工作的結果會列在備忘錄中。TCCF 完成的時候，會頒發認證信和獎牌給設施並且指出設施已獲得認證。

Generic Tier III Demonstration List/ 工作清單

The activities are intended to demonstrate the facility is constructed and performs according to the tier objective. It should be noted that each facility is a custom design and different than other facilities. The final demonstration list will be created for the actual facility being certified. The following generic demonstration list is provided as information to indicate the type of demonstrations that will be required and is not all inclusive. The official demonstration list may include any combination of the following generic list as well as additional demonstrations as required based on the actual facility design. 工作主要是展示設施已經建置並且達到目標的性能。請注意每一個設施都是個別設計而且與其他設施不同。最後檢查清單將以實際接受認證的設施列舉。以下的資訊是一般的必要檢查內容並且沒有包含所有的項目。正式檢查清單可能包含所有的以下一班清單的組合以及根據設施實際設計所制訂額外的內容。

The following demonstrations are conducted with the design load installed in the critical spaces. This is typically accomplished through the use of load banks. 以下的展示內容會在關鍵區域的設計附載中進行，這個是使用負載器完成以下工作：

Engine-Generator System/發電機

- With all engine generators available, interrupt the incoming utility power feeder to demonstrate the engine-generator system will automatically start and assume the critical load upon an interruption of the utility power.
所有的發電機可操作、中斷市電供應作為展示發電系統會自動啟動並且供應能量給被中斷的關鍵負載。
- Isolate one engine generator for maintenance then interrupt the incoming utility power feeder to demonstrate the engine-generator system will automatically start and assume the critical load upon an interruption of utility power while any single engine generator is isolated for maintenance. Repeat for all engine generators.
隔離一台發電機作為維修然後中斷市電供應，展示發電機系統將自動啟動並且在一台發電機被隔離維修時，供應能量給被中斷市電的關鍵負載。並且在所有發電機中重複執行。

- While the facility is supported by engine generators, demonstrate the engine-generator system will support the critical load with each capacity component removed from service individually. This demonstrates the Concurrent Maintainability of the capacity components. The capacity component is typically an engine generator.

當發電機供電給設施時，展示發電機耗能部件在個別工作中離線時能夠維持關鍵負載。這個展示耗能組件同時進行維護的能力。這個耗能組件通常是發電機。

- While the facility is supported by engine generators, demonstrate the engine-generator output switchgear and/or paralleling switchgear and controls will support the critical load with each switchgear and associated controls removed from service individually. This demonstrates the Concurrent Maintainability of the system.

當發電機供電給設施時，展示發電機輸出開關和/或平行開關和控制會在每個個別開關和關聯的控制從工作中離線時，仍能支援關鍵負載。這個展示耗能組件同時進行維護的能力。

Electrical Distribution System/配電系統

- While the facility is supported by engine generators, demonstrate the electrical system can support the critical loads with each electrical distribution system component removed from service individually.

當設施由發電機供電，展示發電機系統能夠在配電系統組件個別離線時仍能供應能量給關鍵負載。

Uninterruptable power Supply System/ UPS 系統

- While the facility is supported by engine generators, demonstrate the UPS system can support the critical loads with each UPS module, UPS system, and distribution system component removed from service individually.

當設施由發電機供電，展示 UPS 的每一個模組在 UPS 系統和配電系統組件個別離線時，仍能夠供應關鍵負載。

- While the facility is supported by engine generators, demonstrate the system can support the critical loads with each PDU, static switch, and distribution switchgear components removed from service individually.

當設施由發電機供電，展示系統的美一個 PDU 模組、靜態開關和配電開關模組個別離線時，仍能夠供應能量給關鍵負載。

Chilled Water System/冰水系統

- It should be noted that if absorption chillers are utilized, boilers may be considered capacity components.
須注意如果專案使用吸收式主機，鍋爐可以被認為是能量組件。
- Demonstrate the chilled water system will support the load with each capacity component removed from service individually. This is typically a chiller. Demonstrate the chilled water system will support the load with each primary chilled water pump removed from service individually.
展示冰水系統能夠在個別能量組件個別離線時，能支援負載。通常是冰水主機。展示在每一個一次側冰水泵浦個別離線時，冰水系統能支援負載。
- Demonstrate the chilled water system will support the load with each secondary chilled service individually. water pump removed from service individually.
展示在每一個二次側冰水泵浦個別離線時，冰水系統能支援負載。
- Demonstrate the chilled water system will support the load with any piping section or isolation valve isolated for replacement. This typically includes selecting a random selection of chilled water isolation valves to be isolated in preparation of removal.
展示任何管路部分或隔離閥隔離管路作更換時，冰水系統能支援負載。通常這包含隨機選擇冰水系統隔離閥準備移除的動作。

Removal is not required, isolation in preparation is required.

不必要進行移除，但要準備隔離。

Condenser Water System/冷卻水系統

- It should be noted that the Condenser Water System can also apply to water systems used to cool direct expansion (DX) systems.
須注意冷卻水系統能夠用於冷卻直膨系統。
- Demonstrate the condenser water system will support the load with each capacity component removed from service individually. This is typically a cooling tower cell or dry cooler.
展示冷卻水系統能夠在個別能量組件個別離線時，能支援負載。通常是冷卻水塔模組或乾式冷卻器。
- Demonstrate the condenser water system will support the load with each condenser water pump or glycol pump removed from service individually.
展示在每一個冷卻水泵或鹵水泵個別離線時，冷卻水系統能支援負載。

- Demonstrate the condenser water system will support the load with any piping section or isolation valve isolated for replacement. This typically includes selecting a random selection of condenser water isolation valves to be isolated in preparation of removal. Removal is not required, isolation in preparation is required.

展示任何管路部分或隔離閥隔離管路作更換時，冷卻水系統能支援負載。通常這包含隨機選擇冷卻水系統隔離閥作準備移除的動作。不必要進行移除，但要準備隔離。

- Demonstrate the onsite makeup water storage can deliver 12 hours of makeup water with the redundant storage tanks isolated and while the design load is being carried by N cooling towers.

展示補水儲存桶能在被隔離並且所有的冷卻水塔全部在設計負載的情況下，提供 12 小時的補充水。

Computer Room cooling/機房空調

- Demonstrate the computer room cooling system will support the load with each capacity component removed from service individually. This is typically a Computer Room Air Handler, computer Room Air Conditioner, Building Air Handler, and any associated condenser unit.

展示機房空調在能夠在個別能量組件個別離線時，能支援負載。通常是電腦機房空調箱、電腦機房冷氣、建築物空調箱和附屬的冷凝單元。

- If cooling is delivered via a duct work plenum, demonstrate the system can support the load with individual sections of duct work or dampers isolated for removal. Removal is not required, isolation in preparation is required.
- 如果冷卻由經過風管迴風層，展示系統在能夠在個別風管或風門個別離線時，能支援負載。不必要進行移除，但要準備隔離。

UPS Room cooling/ UPS 室空調

- Demonstrate the UPS room cooling system will support the load with each capacity component removed from service individually. This is typically a Computer Room Air Handler, Computer Room Air Conditioner, Building Air Handler, and any associated condenser unit.

展示 UPS 空調在能夠在個別能量組件個別離線時，能支援負載。通常是電腦機房空調箱、電腦機房冷氣、建築物空調箱和附屬的冷凝單元。

- If cooling is delivered via a duct work plenum, demonstrate the system can

support the load with individual sections of duct work or dampers isolated for removal. Removal is not required, isolation is preparation is required.

- 如果冷卻由經過風管迴風層，展示系統在能夠在個別風管或風門個別離線時，能支援負載。不必要進行移除，但要準備隔離。

Telecommunications POP Rom cooling 通訊室空調

- It should be noted the Telecommunications POP Room refers to the first point of demarcation for the telecommunications cabling. If the first point of demarcation includes no active equipment (fiber optic light panels only), Tier compliant cooling and power may not be required.

請注意通訊 POP 室是指通訊電纜檢查的第一個點。如果第一個檢查點沒有活動設備 (只有光纖面板)，Tier 允許不需要具備冷卻和電力。

- Demonstrate the POP room cooling system will support the load with each capacity component removed from service individually. This is typically a Computer Room Air Handler, Computer Room Air Conditioner, Building Air Handler, and any associated condenser unit.

展示 POP 空調在能夠在個別能量組件個別離線時，能支援負載。通常是電腦機房空調箱、電腦機房冷氣、建築物空調箱和附屬的冷凝單元。

- If cooling is delivered via a duct work plenum, demonstrate the system can support the load with individual sections of duct work or dampers isolated for removal. Removal is not required, isolation is preparation is required.
- 如果冷卻由經過風管迴風層，展示系統在能夠在個別風管或風門個別離線時，能支援負載。不必要進行移除，但要準備隔離

Fuel System/燃料系統

- It should be noted that if absorption chillers are utilized, the fuel system includes the items that deliver fuel to boilers serving absorption chillers.

須注意如果專案使用吸收式主機，燃料系統包含給吸收式主機使用的鍋爐。

- Demonstrate the fuel system can continue to provide fuel to the critical capacity components with each capacity component removed from service individually. This is typically a bulk storage tank and/or a day tank.

- 展示燃料系統在能夠在個別能量組件個別離線時，能提供燃料給關鍵負載組件。通常是大型燃料箱或日用燃料箱，

- Demonstrate the fuel system can deliver fuel to the critical capacity components when each fuel transfer pump is removed from service individually.

展示燃料系統在能夠在個別燃油輸送泵浦個別離線時，能提供燃料給關鍵負載組件。

- Demonstrate the fuel system will deliver fuel to the critical capacity components with any piping section or isolation valve isolated for replacement. This typically includes selecting a random selection of fuel isolation valves to be isolated in preparation of removal. Removal is not required, isolation in preparation is required.
- 展示任何燃油管路部分或隔離閥隔離管路作更換時，燃料系統能提供燃料給關鍵能量組件。通常這包含隨機選擇冷卻水系統隔離閥做準備移除的動作。不必要進行移除，但要準備隔離。
- Demonstrate the fuel system can deliver 12 hours of fuel with the redundant fuel tanks isolated and while the design load is being carried by N engine generators.
- 展示燃料儲存箱在被隔離並且所有的冷卻水塔全部在設計負載的情況下提供 12 小時的補充水。

Fire Detection System/火警系統

- Demonstrate the fire detection system can be removed from service without impacting the critical load. This typically involves shutting down the fire detection panel(s) and removing selected network addressable relay modules without shutting down more than the redundant number of capacity components.

展示火警系統能夠在不影響關鍵負載時離線。通常會包含關閉火災偵測面板和移除相關模組的網路而部會關閉超過餘裕的能量組件。

Building Control System/建築物控制系統

- Demonstrate the Building Control System (BMS, BAS, etc.) can be removed from service without impacting the critical load. This typically involves shutting down the building control system and controlling the operation of critical capacity components and systems in a local manual mode. In the event the system does not allow local manual control, the Building Control System will be demonstrated to being Concurrently Maintainable by shutting down specific control panels, communication paths, and end control devices.

展示建築物控制系統能夠在不影響關鍵負載下離線。通常包含在手動模式情況下關閉建築物控制系統和控制關鍵組件和系統。在系統不允許手動操作時，

建築物控制系統已關閉特定控制面板、通訊錄線和終端控制裝置展示同時維護能力。