| **Serial Number** | **Control Objective** | **Risk** | **Validation Procedure** | **Testing** | **Outcome** |
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|  | Data Centre should not have outside facing windows. In case there are windows facing east, west or south, they must be covered. | Thermal and solar gain through windows increases temperature in Data Centre | Inspection | Data Centre has no outside facing windows. | No observation noted |
|  | Data Centre should not be located near plumbing areas such as rest rooms/kitchens. | Water flooding can occur | Inspection | Data Centre is designed as an isolated unit. | No observation noted |
|  | The building should have a dedicated loading area to handle all deliveries and assembly of supplies and equipment. | Equipment assemble inside data center poses a risk to equipment already present.  Unnecessary access of 3rd party | Inspection | No separate loading area exists for any data center. | Weakness noted. |
|  | The building materials must be non-combustible.  Wooden or glass panels should be fire-rated Class 100 – 125.  Adjoining rooms or buildings to the main data center location should be protected with a sprinkler system. | Combustible material can cause spread of fire.  In case of fire outside the data center, lack of fire rated glass can cause inside temperature of data center to rise, causing damage to magnetic drives. | Inspection | No combustible items are used. However fire rating of glass panels has not been provided. | Fire rating of glass panels used in data center is not available. |
|  | Doors into computer rooms to be controlled by pin, swipe card or biometric access | Unauthorized entry | Inspection | Entry into Data center rooms is protection by swipe cards. | No observation noted. |
|  | Manned security counter with signing-in of 3rd party visitors. | In case of any incident, a record of all visitors should be available. | Inspection | Data Centre staff is present who logs in all third party personnel before allowing escorted entry into the room. | No observation noted. |
|  | Digital CCTV monitoring and recording of all external doors to the computer rooms | In case of incident, absence of security footage will hamper resolution process. | Inspection | Data center entry and exit points are under cctv monitoring. | No observation noted. |
|  | Server cabinets should be locked. CCTV cameras should monitor activity inside the data center as well. | In case of unlocked server cabinets, personnel with malicious intent can cause disruption to operations by fiddling with cables. These events may go unrecorded if CCTV cameras are not installed. | Inspection | Server cabinets are usually unlocked in the data centers. Further cctv monitoring does not cover the unlocked side of the server cabinets. | Weakness noted. |
|  | Data center should be cleaned regularly. | Presence of dust and contaminants can clog server inlets and outlets causing damage to machines. | Inspection | Sweeper comes daily to clean the data center however no logging is maintained. The data center incharged informed us that he escorts the sweeper in and out of the data center | As server cabinets are unlocked and CCTV monitoring does not cover the unlocked side of the data center, a sweeper may accidentally or intentionally unplug cables which may lead to disruption of operations. |
|  | Data Centre should be monitored by smoke detection system. | In case of fire and absence of smoke detection, early stage fire will not be detected. | Inspection | Smoke detectors are installed at different points in the data center. Testing and maintenance is regularly carried out. | No observation noted. |
|  | Data Centre should be protection by gaseous fire suppressant. | In case of fire and absence of fire suppressant, damage to equipment and loss of life can occur. | Inspection | FM-200 is installed in all data centers. Testing and maintenance is regularly carried out. | No observation noted |
|  | Fire extinguishers placed at doorways and other relevant points. | In case of fire and absence of fire suppressant, damage to equipment and loss of life can occur. | Inspection | Fire extinguishers are installed at entrances to data center as well as on different points on the floor. Testing and maintenance is regularly carried out. | No observation noted. |
|  | Standby generator dedicated to data center should be installed with backup fuel of 24 hours. | In case of power failure, operations would be stopped if no backup is present. | Inspection | 2 standby generators are installed each at CDC house and KSE site which will provide power to the entire building.  UPS take over the data center operation till generator comes online.  Time for generator to provide support is 42 seconds.  Adequate fuel is maintained in tanks for continuous operations.  Regular maintenance of generator and UPS is carried out. | No observation noted. |
|  | Emergency lights should be installed in the data center. | In case of power failure or incident, staff may have difficulty in getting out of data center. | Inspection | Emergency lights are installed in all data center sites. Backup power also comes on after 42 seconds. | No observation noted. |
|  | Data center temperature and humidity should be maintained at defined levels by ASHRAE.   Temperature: 18 – 27 degrees C  Relative humidity: 40 – 55 % | Not adhering to best practices can cause damage to equipment | Inspection and calculation | After analyzing 1 week temperature and humidity logs, relative humidity was recorded on average less than 30%  CDC is following IBM redbook temperature guidelines which allow the level of temperature and humidity measured in the data centers. | No observation noted. |
|  | Air conditioning units should function in N+1 format for backup purposes. | In case of failure of one unit. Backup units can take over. | Inspection | Except telecom room, all data center have backup air conditioners installed. In telecom room there are 3 split units which function 24/7. | Telecom room does not have a back-up air conditioning unit. However, as per discussion with admin staff, units are visually inspected daily and checked weekly by technicians to ensure they are free from faults. Further, an agreement exists which provides immediate support in case of failure of any unit. |
|  | Cables should be labeled at both ends. | In case wires are not labeled, identification of problematic wires is difficult. | Inspection. | Cables are adequately labeled. | No observation noted. |
|  | Temperature sensors should be installed at rack level and also near aircon units  General purpose temperature and humidity sensor should be installed in the data center. | If rack based monitoring is not done, overheating equipment may not be detected.  If monitoring of aircon units is not done, a failed unit may not be detected as other aircon units would try to compensate. | Inspection | Rack based monitoring is being done. General purpose temperature or humidity sensors not installed. However, daily monitoring of air conditioning units is carried out as a counter measure. | No observation noted. |
|  | There will be a water sensor under every raised floor, every CRAC unit and every water cooled rack and also in every plant room | In case of missing sensors, potential hazardous situation would remain undetected | Inspection | We observed water snake senors installed under raised floor. Smoke sensors were installed at multiple spots in data centre, on ceiling, above false ceiling and below raised flooring. | No observation noted. |
|  | Lighting should be a minimum of the following:   1. 500 lux in the horizontal plane 2. 200 lux in the vertical plane | In case of less lightning then specified in the occupied areas of the data center, precise maintenance operations may be difficult to carry out and may result in unintentional mistakes. | Lux meter inspection | We noted the following readings in the data centers. Horizontal plane: 888  Vertical plane 255  Lighting was overall sufficient where required. | No observation noted. |
|  | Spill containment and temperature control for UPS batteries in power room. | In absence of spill containment trays, chemical discharge can cause damage to equipment. | Inspection | CDC is using sealed lead acid batteries that are spill proof. Further, temperature of power room is also controlled via AC units. | No observation noted. |

**Follow-up of last year observation**

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| Primary DC | Passage leading to the FM200 (Fire Suppression System) room has a control panel which allows the user to switch off and test the smoke detectors placed inside the data centre. However, this control panel is not locked. In addition, no CCTV camera is installed in the passage to monitor the activities. |  | Inspection | FM200 cabinet was locked. CCTV cameras still not installed. However CDC admin gave response that they aren’t needed. | Resolved |
| Primary DC | An air-conditioning unit is installed above the UPS battery bank of 120 KVA UPS System without a water leakage safety tray.  Two other instances have been noted where water leakage safety tray is not fixed with an air conditioning unit.  Although water sensor has been laid, it does not cover the entire floor of the data centre. |  | Inspection | Water leakage trays have been installed on all split ac units.  During our review we have noted water sensor cables to be present at all points below the raised floor | Resolved |
| Secondary DC | Air-conditioning units are installed without a water leakage safety tray. We have noted that electrical cables were laid under the AC unit tagged as AC/KHI/03 and network cables under the AC unit located inside the Electrical / UPS room. |  |  | Water leakage trays have been installed on all split ac units in the power room. | Resolved |