



Columbia Falls DC Overview

May 5th, 2020



Site Map



Source:
maps.flathead.mt.gov



- **Datacenter Facility Overview**

- History

- Built in 2008
- 100% availability for the last 10 years

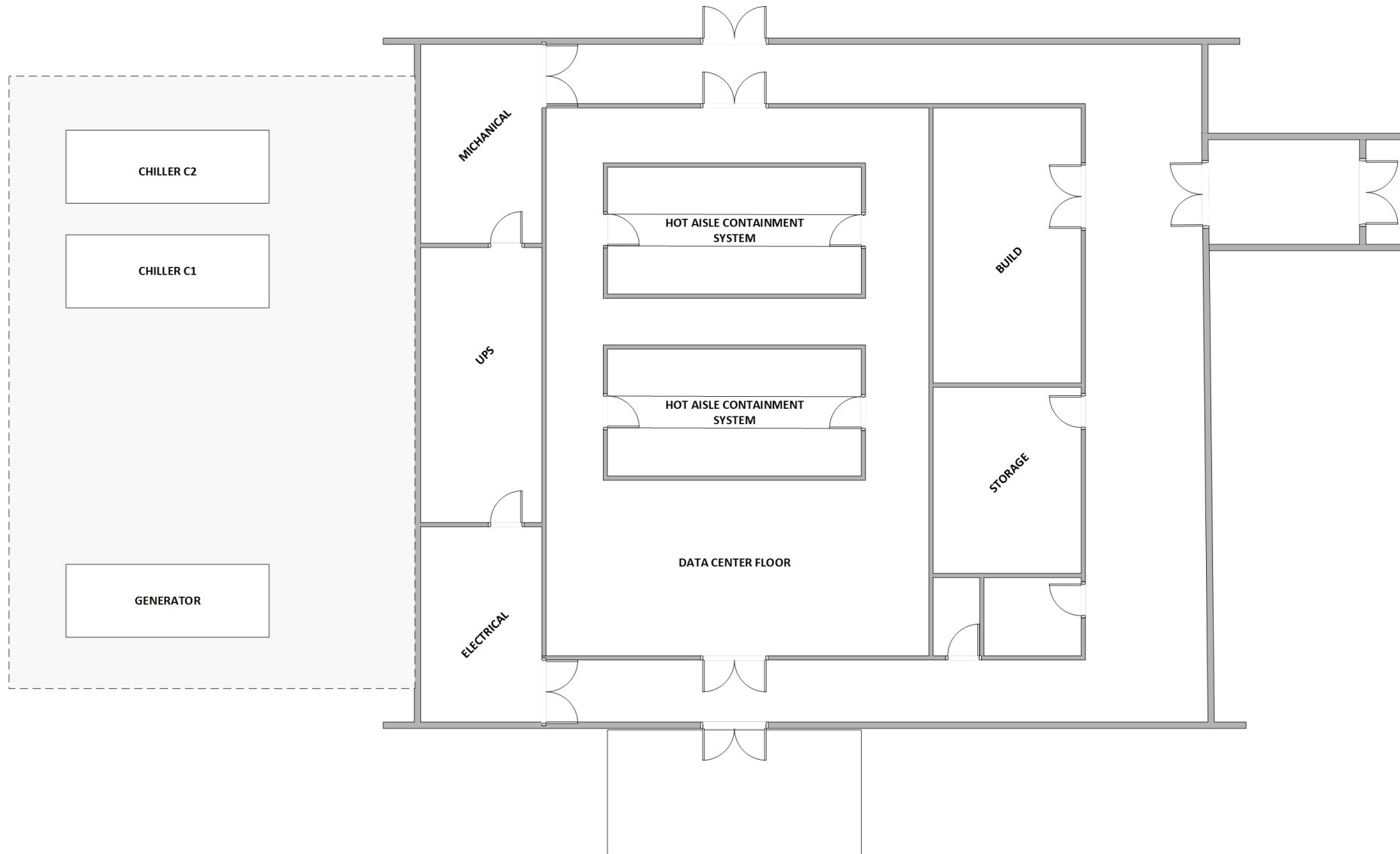
- Environmental Specs

- Tier III datacenter facility where all legacy WY applications are centrally hosted
- Fully redundant in terms of electrical circuits, cooling, UPS, and network
 - Single diesel KVA generator
- Free cooling most of the year
- Full building Automation through Electro Controls

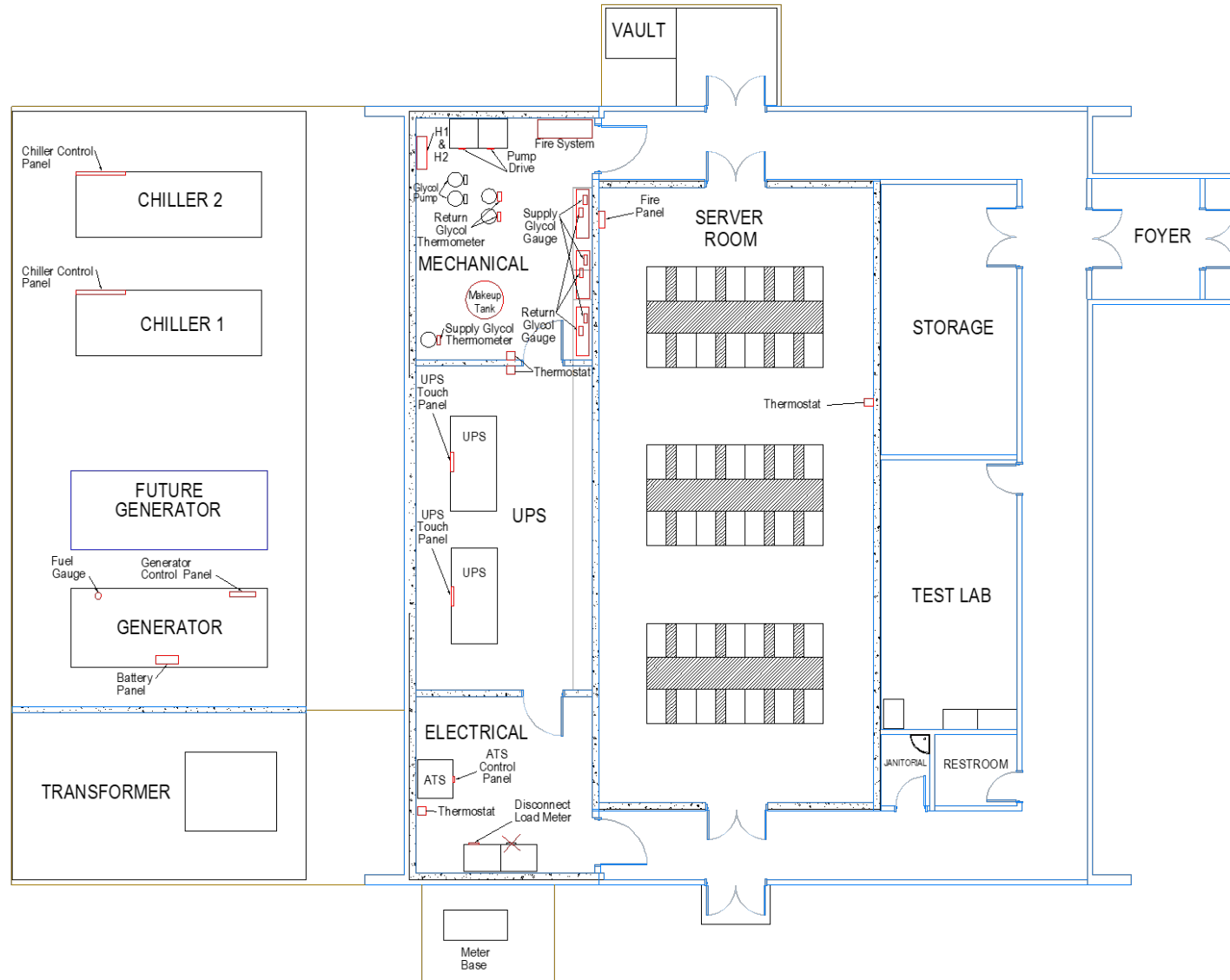
- Secure Building

- No regular occupancy or windows
- Security system, motion detection, key card access control
- Cameras, monitoring alerts via text and email

Data Center – Floor Plan



Data Center – Floor Plan Details





- **Datacenter Facility Overview Cont..**

- Capacity
 - 1736 square feet datacenter space
- Rack Space
 - Raised floor
 - 2 Hot Aisle Containment Systems
 - » Capacity for a 3rd
 - APC Rack Coolers
 - Overhead wire raceways



| Racks Installed | Rack Height Units Used | Rack Height Units Available | Expansion (Racks/U) |
|-----------------|------------------------|-----------------------------|---------------------|
| 28 | 429U | 747U | 14/560U |



Cooling for the Data Center consists of two main subsystems, one responsible for cooling the rooms outside of the “Server” room, and the other, which is responsible for cooling the Server room and the support equipment for the Server room.

- **CW SYSTEM (CHILLED WATER SYSTEM)**

This is a redundant chilled water system supplying chilled water to all of the cooling sub systems in the Data Center. The chilled water it supplies provides cooling to the Server room as well as the rest of the building’s cooling systems and it is essential to the proper operation of the Data Center.

- ***Overview of Operations:***

- The CW System (Chilled water system) consists primarily of the two main water pumps and their VFDs (variable frequency drives), the two chillers located outside, and the various pipes and gauges located in the mechanical room. The “water” used as a coolant throughout the entire Data Center is a propylene glycol and water mix that appears a bright pink color.
- The main pumps P1 and P2 provide the coolant flow for the entire system and one of them must be running at all times. From the pumps the water is pumped outside to the chillers. The water goes through an isolation valve located at the inlet of each chiller unit, through the free coolers in each unit, through the mechanical chillers in each unit, and back into the building. After reentering the building the coolant is mixed in two big tanks and flows into the three supply manifolds. The three manifolds supply chilled water to the rack coolers located in the Server room. After passing through the rack coolers the water comes back into the mechanical room through the three return manifolds and is passed back to the two main pumps.



- **FC1 & FC2 (FAN COOLER 1 & 2)**

This is a redundant cooling system supplying cooling to the UPS room located on the west wall of the mechanical room. It gets its chilled water from the CW System. This system only runs at capacity if the UPSs are supplying power to the servers, normally it is running at reduced capacity.

- ***Overview of Operations:***

- Chilled water is taken from the chilled water manifold above the UPS door and is supplied to FC1 and FC2 in two separate pipes. The chilled water is then pumped, thru FC1-P1 and FC2-P2 respectively, through the actual fan coils (radiators) and up thru two bypass valves. The bypass valves determine how much of the chilled water passes on to the return manifold and how much is recirculated back thru the pump. There are two squirrel cage blowers mounted in the ducting above the fan coils, the access doors to the blowers are labeled “FC1 belt access” and “FC2 belt access” respectively.

- **FC3 (FAN COOLER 3)**

This is a non-redundant system responsible for supplying makeup air to the Server Room. This is a non-critical system.

- ***Overview of Operations:***

- The supply air is drawn in from outside, filtered thru a HEPA filter, then heated or cooled depending on the outside air temperature. The air is then humidified and the treated air is blown into the Server room. The purpose of FC3 is to maintain positive air pressure in the Server room and regulate the humidity. This is a lower priority system. Faults in this system, which also include the humidifiers, can generally wait until the next regular business day to remedy.



- **DEHUMIDIFIER**

This is a non-redundant system responsible for supplying dry air to FC3 to prevent condensation both in the Mechanical room and the Server room. This is a non-critical system.

- ***Overview of Operations:***

- The supply air is drawn in from outside, filtered thru the same HEPA filter as FC3, dehumidified then pumped back into the supply side of FC3. Reactivation air is drawn in from the Mechanical room, moved through the desiccant cartridge then blown outside taking the humidity with it. This an automatic system controlled by the ElectroControls building automation system as per the settings in the FC3 screen. This is a lower priority system and faults in this system can wait until the next regular business day to remedy.

- **FC4 (FAN COOLER 4)**

This is a non-redundant system responsible for cooling the Electrical Room. This is a non-critical system.

- ***Overview of Operations:***

- This system recirculates the air in the Electrical room through a cooling coil. This is a lower priority system as the Electrical room stays relatively cool even when the outside air temperature is high. Faults in this system can generally wait until the next regular business day to remedy.

- **HP1 (HEAT PUMP 1)**

This is a non-redundant system responsible for heating or cooling the hallways and the other non-critical rooms in the data Center. This is a non-critical system.

- ***Overview of Operations:***

- The supply air is drawn in from outside, filtered thru the same HEPA filter as FC3, then is distributed to the Test Lab, Storage room, and the hallways. Faults in this system can generally wait until the next regular business day to remedy.



The electrical system for the Data Center consists of two primary systems, the utility feed and the ATS (Automatic Transfer Switch) and the generator. There is a framed engineering drawing on the south wall of the electrical room to help with understanding the various electrical systems. The following electrical systems are presented in the same order as they are listed in the ElectroControls building automation software.

- **MAIN UTILITY FEED**

The main utility feed consists of the large transformer located outside on the west side of the building in the south end of the fenced enclosure, the meterbase located in the fenced enclosure on the south side of the building west of the south exterior door. This is a critical system, but there are no “user serviceable” parts associated with the utility transformer or meterbase. Main power is Three phase power from Flathead Electric.

- **MAIN SWITCH GEAR (POWER METERS)**

The main switch gear is located on the south wall of the Electrical room and is fed by the meterbase outside. This is a critical system; faults need to be addressed immediately. There are two separate cabinets, MDPA and MDPB. MDPB is turned off, and has a lockout tag on it, as we only need it if we have a second generator. Under no circumstances should you ever remove the tag and turn MDPB on. If it needs to be turned on a Weyerhaeuser electrician will do it. There is a panel, on each cabinet, showing information about the voltage and power going through it; that information is also available on the ElectroControls software. The output power from MDPA is fed to the ATS.



- **ATS AND GENERATOR**

The ATS is an automatic switch that senses when the utility power has failed, starts the generator, and switches over to generator power as soon as the generator is up to speed and the generated power is stable. Once the utility power is restored, the ATS will switch back to utility power, and shut down the generator. This is a critical system; faults need to be addressed immediately.

- ***Overview of Operations:***

- It takes an outage that lasts more than 3 seconds to initiate the starting sequence for the generator so very short outages will not start the generator. Power from MDPA (utility power) comes in to the ATS as S1 and generator power is S2. You can check the status of the two power feeds either on the ATS panel or the ElectroControls software.
- The generator will run until the utility power is again available and once it has been stable for a while the ATS will switch back to utility power. The generator will run an additional 15 minutes or so to cool down and then will shut down. Both the ATS and generator are monitored in the ElectroControls software.
- The generator is a diesel powered 700KW genset with a 1200 gallon fuel tank. At full load the generator will run 24 hours on a tank of fuel. There is a “time to empty” field on the generator page in the ElectroControls software. I would suggest not allowing the “time to empty” fall below 8 hrs. We fuel the generator with #1 diesel which is delivered by CityServiceValcon. If you need fuel delivered call CityServiceValcon.



- **UPS**

The UPS system is fully redundant and consists of the switch gear located on the north wall of the Electrical room, the two actual UPSs located in the UPS Room, the four transformers located in the UPS Room and the breaker panels located on the west wall inside the server room.

 - APC Symmetra PX250-500 | UPS Power Rating 500kW | Phase Type 3:3 | Installed Nov, 26 2008
 - The UPS system is a critical system and faults should be addressed immediately.
- ***Overview of Operations:***
 - Power from either the main switchgear or the generator is fed from the ATS thru the redundant switchgear mounted on the north wall of the Electrical Room and from there to each of the two UPSs. The switchgear should only be operated by a Weyerhaeuser electrician. Each UPS supplies two transformers and each transformer supplies two breaker panels. These panels then supply power to the PDUs (Power Distribution Units (plug strips)) mounted in the server racks. Each of the two PDUs gets its power from a different UPS. In the event of a failure of one of the UPSs power will still be supplied to the servers thru the other PDU/server power supply. The UPSs and PDUs are monitored by the APC software available on the Management server.
- **RACK MOUNTED PDUS**

The rack mounted PDUs are responsible for supplying power to the redundant power supplies in each server. There are two PDUs in each rack and each of them receives power from a different UPS. These are critical devices, monitored by the APC software, and faults should be investigated immediately.

Fire Detection and Suppression



The fire system detects and suppresses a fire using sprinkler heads and water for a suppression agent. The fire system consists of two separate systems supplied by a single water source and monitored by a single monitoring system. There are labels on the gauges associated with both fire systems indicating normal readings. The piping and valves are located in the mechanical room, on the north wall, and the monitoring panels are located in the server room, on the west wall. There are two panels in the foyer on the north wall. The panels in the foyer are password protected and are meant to be read for informational purposes only. This is a critical system and faults in this system need to be addressed immediately.

- **DRY SYSTEM**

The dry system protects the non-critical areas of the Data center including the attic, hallways, Storage room and Test Lab. The pipes are filled with compressed air, supplied by a small air compressor in the Mechanical room, to prevent freezing and burst pipes. When a sprinkler head is broken, either by accident or by fire, the compressed air escapes through the sprinkler head and the main water valve opens. Water then issues from the sprinkler head. Water DOES NOT come out of any unbroken heads. When the monitoring panel detects the air pressure loss it automatically calls the Fire department.

- **PRE-ACTION SYSTEM**

The pre-action system protects critical areas of the Data Center including the Server Room, Mechanical Room, UPS Room, and Electrical Room. The pre-action pipes are also filled with compressed air, supplied by a small air compressor located in the Mechanical Room, and when a sprinkler head is broken, either by accident or by fire, the compressed air escapes through the sprinkler head. The difference with this system is that the main water valve is NOT opened when pressure is lost, a smoke detector or heat sensing head must also be activated before the panel will activate the main water valve and let water spray from the sprinkler head. Water DOES NOT come out of any unbroken heads. When the monitoring panel detects the air pressure loss it sends a trouble alert. If the panel detects smoke or heat it automatically calls the Fire department.

Intruder Detection and Door Access System



The intruder detection and door access system (security system) is responsible for operating the doors via access cards and detecting unauthorized access to the data center; including the fenced areas outside of the actual building. This is a critical system and faults should be addressed immediately.

- **SECURITY SYSTEM**

The security system main panels are located in the Server room, the arming/disarming access panel is located in the foyer, and various sensors are located throughout the Data Center building and outside in the fenced areas. More information will be provided upon request.

- **DOOR ACCESS SYSTEM**

The door access system is out of date, It's recommended that new ownership replace with modern door access system.

