I. Mechanical Systems Requirements

A. HVAC

Primary Data Centers, Automation

HVAC is to be provided on a 24 hours-per-day, 365 days-per-year basis. The HVAC system will maintain critical space temperature and relative humidity at design conditions. Alternative resources of water storage are to be provided when evaporative systems are in place.

Standby operation

The HVAC system shall be supported by the building standby generator system but not tied into the UPS.

Operational parameters

The mechanical system shall be capable of achieving the following Data Center environmental parameters: Temperature: 20°C (70°F) to 23°C (74°F)

- Normal set point 72°F
- Control ± 2°F

Relative Humidity: 45% to 55%

- Normal set point 50% RH
- Control ± 5%

Humidification and dehumidification equipment may be required depending upon local environmental conditions. Coordinate cooling system design and equipment floor plans so that airflow from cooling equipment travels in a direction perpendicular to the rows of cabinets/ racks. The preferred flow for air movement is supply from the floor and return in the ceiling. The ambient temperature and humidity shall be measured in the room at 4 points per 1000 sq. ft. at a distance of 1.5 m (5 ft) above the floor level, after the equipment is in operation, at any point along an equipment cold aisle centerline. Monitoring and reporting of temperature and humidity shall be consistent with the Siemens MCCC Building Management System, or provided as a stand-alone unit as part of this contract, to be accessible remotely via computer.

Positive pressure

A positive pressure differential with respect to surrounding areas shall be provided. A positive pressure level of .02 inches of water ± .01 shall be maintained.
**Air Filtration**

The HVAC system shall incorporate an air filtration system that will provide a minimum filtration factor of 85%.

**Contaminants**

The Data Center shall be protected from contaminants and pollutants that could affect operation and material integrity of the installed equipment. The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards. When contaminants are present in concentrations greater than indicated in table 1, vapor barriers, positive room pressure, or absolute filters shall be provided.

**Table 1: Contamination limits**

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine</td>
<td>0.01 ppm</td>
</tr>
<tr>
<td>Dust</td>
<td>100 μg/m^3/24 h</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>4 μg/m3/24 h</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>0.05 ppm</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>0.3 ppm</td>
</tr>
</tbody>
</table>

**Ventilation air**

The Data Center shall receive outside air ventilation for occupants. The ventilation air shall be introduced at the ceiling level, at a sufficient distance from the Data Center air conditioning units so as not to confuse the CRAC units into requiring heat. The Data Center shall receive supply air for ventilation and positive pressurization purposes.

**Leak detection system**

A leak detection system consisting of both distributed-type cable sensors and point sensors shall be provided in all Data Center spaces. A framed plan indicating cable routing and periodically indicating cable lengths calibrated to the system shall be provided adjacent to the system alarm panel.

**Building management system (Add/Alternate #1 for Bid Price)**

The existing Building Management System (BMS) shall monitor all mechanical, electrical, and other facilities equipment and systems. The system shall be capable of local and remote monitoring and operation. Individual systems shall remain in operation upon failure of the central BMS or head end. Consideration shall be given for the capability of controlling (not just monitoring) the room environmental systems as well as historical trending and logging. 24-hour monitoring of the BMS system shall be provided by facilities personnel, security personnel, paging systems, or a combination of these. Emergency plans shall be developed to enable quick response to alarm conditions. These plans will
include a listing of factory certified vendors who maintain a parts inventory, have 24 hour emergency service, and have a response time of >1 calendar day.

**Communications capabilities**

Environmental system shall have an internal communications module from the factory. Multidirectional communications shall be capable of monitoring, changing, and commanding user adjustable points for the unit. The proposed system shall incorporate the SNMP protocol to achieve this monitoring.

**Management and Monitoring System:**
- should support simultaneous Ethernet and serial communication
- should be SNMP v1, v2, and MIB-II compliant
- should support web/administration interface with username and password authentication
- should support email communication
- should support telnet communication

**Plumbing systems**

No water or drain piping shall be routed through or above the Data Center that is not associated with Data Center equipment. Water or drain piping that must be routed within the Data Center shall be either encased or provided with a leak protection jacket. A leak detection system shall be provided to notify building operators in the event of a water leak.

**Drainage piping**

No floor drain(s) within the Data Center shall be installed due to the possibility of backups and flooding. Instead, open drainage or troughs using gravitational piping into adjacent support rooms should designed into the flooring. Floor drains in the support spaces shall receive the condensate drain water and humidifier flush water from the Data Center air conditioning units. All drain piping terminations shall be set in the sink, below floor grade, and be provided with a splash-guard.
Equipment base specifications and installation

**Scope of Work: SH-168**

- Furnish and install one (1) **1 ½ Ton (+/-)**, data room environmental control system.
- Minimum operating voltage: 208 v
- Multi-directional diffuser.

**Scope of Work: SH-255**

- Furnish and install one (1) **6 Ton (+/-)**, data room environmental control system.
- Minimum operating voltage: 208 v
- Floor mount, updraft console unit. Multi-directional diffuser.
- System capacity should be staged or split to compensate for varying heat loads.

## II. Installation Requirements

### General installation requirements

- Design work to be performed by a licensed professional engineer in the state of Pennsylvania
- Floor penetrations will be professionally core drilled.
- If roof penetrations are required, work to be completed by Carlsile Factory Authorized Roofing Company. Certificate to be provided at completion of job to certify that existing warrantee is intact.
- First year parts and labor factory warranty, and a 5 year compressor warranty on the compressor only.
- Start up by factory authorized representatives for each unit.

### Mandatory site visit

Bidders must attend the mandatory site visit, to be held on ____________, at _______ pm/am, in room ____________.
III. Bid tabulations

Bid price for data room environmental control systems, South Hall Rooms 168 and 255:

$ ______________________

Add/Alternate #1 – Integration with Siemens Building Energy Management System

$ ______________________

Project contacts

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