# Princeton – Database Notes

**Table 1 Database Notes**

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|---|---|---|
| **Data Collection** | Data Logger:<br>Data Collection Interval:<br>Collection Method:<br>Timestamp Reference: | Obvius Aquisuite (CDH)<br>1-minute<br>Obvius Upload with sensor polled from ALC Control System<br>Eastern Standard Time |
| **Site Information** | Cogeneration Units:<br>Nameplate Capacity:<br>Heat Recovery Medium:<br>Heat Recovery Uses:<br><br>Excess Heat: | 3 - Tecogen InVerde 100<br>300kW<br>Hot Water<br>Space Heating/Cooling<br>Domestic Hot Water<br>Rejected from the hot water loop to heat exchanger connected to building cooling tower loop |
| **DG/CHP Generator Electrical Output** | Engineering Units:<br>Energy Measurement (net/gross):<br>Measurement Type:<br>Generator Power Measurements:<br>Parasitic Power Measurements: | kWh<br>Net<br>Pulse<br>One for three engines<br>Determined with one-time reading |
| **DG/CHP Generator Electrical Output Demand** | Engineering Units:<br>Measurement Type: | kW<br>From energy measurement, based on peak 1-minute power |
| **DG/CHP Generator Fuel Input** | Engineering Units:<br>Measurement type: | CF<br>Pulse/modbus - one for each engine<br>Data is summed for three engines |
| **DG/CHP Useful Heat Recovery** | Engineering Units:<br>Heat Measurement Type: | MBtu (calculated value)<br>One thermal loop - Common flowmeter and multiple temperature measurements (across all useful loads) |

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|---|---|---|
| **DG/CHP Unused Heat Recovery** | Engineering Units:<br>Heat Measurement Type: | MBtu (calculated value)<br>Flowmeter – common flowmeter, multiple temperature measurements (across dump HX) |
| **DG/CHP Status/Runtime** | Engineering Units: | Not collected |
| **Facility Purchased Energy** | Engineering Units: | Not collected |
| **Facility Purchased Demand** | Engineering Units: | Not collected |
| **Other Facility Gas Use** | Engineering Units: | Not collected |

**Note: See addendum for further details**

**Table 2 Event Timeline**

| **Date** | **Event** |
|---|---|
| February 17, 2011 | CDH on site to install logger. Data collection begins |
| April 12, 2011 | Cogen units begin running |
| April 18,2012 | CDH on site for sensor verification |
| May 4, 2012 | ALC added T-50 and T-51 temperature sensors |
| October 6, 2012 - January 22, 2013 | Parameter channels stopped working or were intermittent because ALC board failed. Fixed January 22, 2013. |
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**Table 3 Data Point Tag Name and CDH Point Name**

| No. | Actual Tag Name (see pics) | Manufacturer / Model # | Description | CDH Point Name | Eng Units | CDH Name |
|---|---|---|---|---|---|---|
| 1 | WG | Veris H8053-0800-4 (pulse) | Gross Generator Power (all 3) | WG | kW | WG |
| 2 | - | InVerde 100 | Gross Generator #1 Power | WG1 | kW | |
| 3 | - | InVerde 100 | Gross Generator #2 Power | WG2 | kW | |
| 4 | - | InVerde 100 | Gross Generator #3 Power | WG3 | kW | |
| 5 | FG-1 | Sage SIP-150 | Engine 1 Gas Input | FG1 | cf/h | FG1 |
| 6 | FG-2 | Sage SIP-150 | Engine 2 Gas Input | FG2 | cf/h | FG2 |
| 7 | FG-3 | Sage SIP-150 | Engine 3 Gas Input | FG3 | cf/h | FG3 |
| 8 | FM-8 | Flexim / FSM-NNNTS-000 | Heat Recovery Loop Flowrate | FM8 | gpm | FW1 |
| 9 | T-45 | BAPI / ALC M304 | HR Loop High Supply Temp | T45 | ºF | T1 |
| 10 | T-44 | BAPI / ALC M304 | HR Loop High Return Temp | T44 | ºF | T2 |
| 11 | T-50 | BAPI / ALC M304 | HR Loop Temp - After Abs. Chiller | T50 | ºF | |
| 12 | T-51 | BAPI / ALC M304 | HR Loop Temp - After HX-1 | T51 | ºF | |
| 13 | FM-5 | Flexim / FSM-NNNTS-000 | Dump/HX2 Flowrate | FM5 | gpm | FW2 |
| 14 | T-16 | BAPI / ALC M304 | Dump/HX2 Supply Temp | T16 | ºF | T3 |
| 15 | T-17 | BAPI / ALC M304 | Dump/HX2 Return Temp | T17 | ºF | T4 |
| 16 | - | Calculated | Total Heat Recovery | QT | MBTU/hr | |
| 17 | - | Calculated | Rejected Heat Recovery | QR | MBTU/hr | |
| 18 | - | Calculated | Useful Heat Recovery | QU | MBTU/hr | |

**Note:** All data collected via modbus by connection to Obvius to PCS

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## *Range Checks*

**Table 4. Range Checks**

| Data Point | Hourly Data Method | Units | Sensor Lower Range | Sensor Upper Range | Database Lower Range | Database Upper Range | Notes |
|---|---|---|---|---|---|---|---|
| DG/CHP Generator Output | Sum | kWh/int | 0 | 300/int | 0 | 15 | |
| DG/CHP Generator Output Demand | Max | kW | 0 | 250 | 0 | 250 | |
| DG/CHP Generator Gas Use | Sum | cf/int | 0 | 3000 | 0 | 100 | |
| Total Facility Purchased Energy | Sum | kWh/int | - | - | - | - | Not installed |
| Total Facility Purchased Demand | Max | kW | - | - | - | - | Not installed |
| Other Facility Gas Use | Sum | cf/int | - | - | - | - | Not installed |
| Useful Heat Recovery | Sum | MBtu/int | - | - | 0 | 6000 | Calculated Value |
| Unused Heat Recovery | Sum | MBtu/int | - | - | 0 | 6000 | Calculated Value |
| Status/Runtime of DG/CHP Generator | Sum | hr | - | - | - | - | Not installed |
| Ambient Temperature | Avg | °F | -30 | 130 | -30 | 130 | WUG Airport Code - HFD |

Notes:

1. This table contains values from *princeton.csv*

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## *Relational Checks*

**Table 5. Relational Checks**

| Evaluated Point | Criteria | Result |
|---|---|---|
| FG | WG > 25 and FG <= 0 | DQ flag for FG set to 2 |
| | | |

Notes: FG – DG/CHP Generator Gas Use