

Albany County Sewer District North Plant

The Albany County Sewer District North Plant CHP system consists of a waste heat oil heater (WHOH) and Organic Rankine Cycle generator that works in a similar manner to a steam turbine using a thermal oil instead of water. Waste heat from an existing incinerator is used to generate up to 835 kW. Thermal output from the system will be used to supplement the existing hot-water heating system in the facility. A dump radiator will reject any unneeded thermal energy.

Data Point Details

The existing plant SCADA system logs data on 15-minute intervals and sends the data as a .CSV report to the NYSERDA CHP web site sub-contractor. The data is checked for errors, aggregated into hourly data, and uploaded to the NYSERDA CHP website.

The timestamp in the raw data files is in Eastern Standard Time. All data on the website is presented in Eastern Standard Time.

DG/CHP Generator Output (total kWh)

The Generator Output comes from the column labeled “JI-325A” in the data files from the SCADA system. This rate (kW) is divided by the number of data intervals per hour to determine the energy output for each interval (kWh). This 15-minute interval energy data is summed into hourly data.

DG/CHP Generator Output Demand (peak kW)

The Generator Output Demand comes from the column labeled “JI-325A” in the data files from the SCADA system. The maximum demand for each hourly period is used as the demand for the generator.

DG/CHP Generator Gas Input (cubic feet)

The ORC system uses waste heat from the incinerator flue to generate power. There is no gas input to the generator.

Total Facility Purchased Energy (total kWh)

No data

Total Facility Purchased Demand (peak kW)

No data

Other Facility Gas Use (cubic feet)

Other facility gas use is derived from daily data from the Niagara Mohawk web site. The total daily gas use reading is distributed across the day as hourly data.

Unused Heat Recovery (total MBtu/h)

Unused Heat Recovery comes from the columns labeled “TET-125-1”, “TET-125-2”, and “FIT-130” in the data files from the SCADA system. These points are used to calculate the heat recovery for each interval. The 15-minute interval data is summed into hourly data.

Useful Heat Recovery (total MBtu/h)

The Useful heat Recovery is obtained from the columns labeled “TI-155-1”, “TI-155-2”, and “FI-160-1” in the data files from the SCADA system. These points are used to calculate the heat recovery for each interval. This 15-minute data is summed into hourly data.

Status/Runtime of DG/CHP Generator (hrs)

The Status/Runtime of DG/CHP Generator comes from the column labeled “JI-325A” in the data files from the SCADA system. This 15-minute interval energy data is summed into hourly data.

Ambient Temperature (avg °F)

The data for Ambient Temperature is obtained from Weather Underground. The data point obtained represents the average temperature for each day. The temperature reading is distributed across the day as hourly data.

Electrical Efficiency (%)

No data

Total CHP Efficiency (%)

No data

Data Quality Checks

The Data Quality Checks consist of three levels of verification:

- the data exist (flag=1),
- the data pass range checks (flag=2)
- the data pass relational checks (flag=3).

The methodology for applying the data quality begins by creating a contiguous database. We initially assume all data are good (flag=3) and then work backwards to identify data that does not meet Relational and/or Range Checking.

The next step is to apply the relational checks. Relational checks attempt to identify data values which conflict with other data in the data set. For instance, data received indicating a DG/CHP Generator output when the gas use is zero is suspect. For data failing a relational check, the data quality level is set to 2 for “Data Passes Range Checks”.

The last step is evaluating the range checks. The range checks consist of reasonable high and low values based on facility and DG/CHP Generator information. Data that falls outside the defined range for the database value has its data quality level set to 1 for “Data Exists.”

It is necessary to work backwards when applying data quality checks to insure that data gets set to the lowest applicable data quality level. It is possible for data to pass the relational check and fail the range check and such data will be set to a data quality level of 1 for “Data Exists.”

Table 1. Data Quality Definitions

| Data Quality Levels | Description | Definition |
|----------------------------|----------------------------|---|
| 3 | Passes Relational Checking | This data passes Range Checks and Relational Checks. This is the highest quality data in the data set. |
| 2 | Passes Range Checks | This data passes the Range Checks but is uncorroborated by Relational Checks with other values. |
| 1 | Data Exists | This data does not pass Range Checks. This data is found to be suspect based on the facility and/or CHP equipment sizing. |
| 0 | Data Does Not Exist | This data is a placeholder for maintaining a contiguous database only. |

Details on the Range and Relational Checks are found below.

Relational Checks

These checks are applied to the interval data before it is converted to hourly data. If any of the interval data points fails the relational check, the data for the entire hour is marked as failed.

Table 2. Relational Checks

| Evaluated Point | Criteria | Result |
|------------------------|-----------------|---------------|
| | | |

Range Checks

These checks are applied to the 15-minute data before it is converted to hourly data. If any of the 15-minute data points fails the range check, the data for the entire hour is marked as failed.

Table 3. Range Checks

| Data Point | Hourly Data Method | Upper Range Check | Lower Range Check |
|------------------------------------|---------------------------|--------------------------|--------------------------|
| DG/CHP Generator Output | Sum | 300 kWh | 0 kWh |
| DG/CHP Generator Output Demand | Maximum | 1,000 kW | 0 kW |
| DG/CHP Generator Gas Use | Sum | -- | -- |
| Total Facility Purchased Energy | Sum | 500 kWh | 0 kWh |
| Total Facility Purchased Demand | Maximum | 2,000 kW | 0 kW |
| Other Facility Gas Use | Sum | 2,000 cf | 0 cf |
| Unused Heat Recovery | Sum | 3,500 MBtu | 0 MBtu |
| Useful Heat Recovery | Sum | 3,500 MBtu | 0 MBtu |
| Status/Runtime of DG/CHP Generator | Sum | 1 | 0 |
| Ambient Temperature | Average | 130°F | -30°F |

Notes: Data failing the Range Check has the data quality level set to 1 for “Data Exists”

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Site Notes:

6/27/2013:

Data is being transferred regularly.