Appendix L1: Calculating Combined Cycle and Co-Generation Block Data Using the Synthesis Event and Performance Method

Overview

This document will explain the synthesis method for collecting combined-cycle data on a unit-level basis and creating combined-cycle block statistics from the unit-level event and performance information.

This document applies only to reporters who wish to report event and performance data for each generating unit individually. This document does not apply to reporters wishing to continue reporting combined-cycle data to GADS as a 'single unit' (or traditional method). GADS will still accept the traditional method but it is not favored over the reporting of each generating unit within the block.

***Please Note**: The majority of this document is the same as the fleet-type roll up method. The basic data gathering process on a unit-level basis is **identical** in all respects. The differences are in creating block statistics from the unit level data.*

IEEE 762 does not address reporting separate units and bringing the components together to create combined-cycle block statistics. Therefore, this document establishes a NERC methodology for creating new combined-cycle block event and performance records based on reported unit level event and performance records.

Terms

To insure proper documentation, some terms must be agreed on to eliminate some of the ambiguity concerning combined-cycle blocks in general.

Combined-Cycle Block (also known in the industry as a "Block") – By definition, a combined cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Brayton Cycle (expand hot gas to turn a gas turbine) with a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine). A combined-cycle block employs electric generating technology in which electricity and process steam is produced from otherwise lost waste heat exiting from one or more combustion turbines. In most situations, the exiting waste heat is routed to a conventional boiler or to a heat recovery steam generator (HRSG) for use by a steam turbine in the production of electricity. Therefore, the combined-cycle block consists of one or more gas turbines/jet engines, one or more steam turbines, and balance-of-plant equipment supporting the production of electricity or steam energy.

There may be more than one combined-cycle block at a plant site. Our discussion relates to each individual combined-cycle block reporting, not the process of reporting several combined-cycle blocks as one plant site.

Units – Each generator set is considered a "unit." Typically in combined cycle, each gas turbine or jet engine and each steam turbine are considered a "unit." Each unit contributes to the total electric generation of the combined-cycle block.

Heat Recovery Steam Generator (HRSG) – There may be one or more HRSG or waste heat boilers in a combined-cycle block. Some units may have a single HRSG per GT/jet engine; others may have several GT/jet engines feeding a single HRSG. The HRSG does not contribute electricity to the output of the combined-cycle block and so, is considered a component rather than a unit.

Other Balance of Plant Equipment – These are the other pieces of equipment in the combined-cycle block used to support the production of electricity. They are not related to any specific part of the block and are also considered as components.

Combined-Cycle Block/Unit Numbering

The combined-cycle block and unit numbering system is straightforward and follows the usual guidelines. The combined-cycle block is identified by the range 800-899 and will be used to relate the individual units to the block level. The gas turbine/jet engine units will be numbered from 300-399 or 700-799. The steam turbine units will be numbered as Fossil Steam Turbines in the range of 100-199.

Impact on Design Data

It will be necessary for each generating company to provide new and/or additional design data for the combined-cycle blocks that it is submitting GADS data on to NERC. This new design data will allow NERC to identify the specific units that make up each combined-cycle block for the purposes of creating synthesized calculations of the unit level data that is submitted to NERC.

Units - The design data is reported as though each unit were a separate generator, this meaning that each unit would have its own unit number and design data as described in the NERC guidelines for each unit type. In addition to this, the unit would be marked as being part of a combined-cycle block by a field that would hold the Identifying 800 series unit code of the combined-cycle block.

Combined-Cycle Block – Balance of plant and other equipment not directly related to each unit is coded as described for the combined-cycle block.

Cause Codes

Since each unit of the combined-cycle block can affect the generation of the other units, it is possible to have a situation where a derate in a gas turbine or jet engine may have a steam turbine cause code. (See Example 2 below.) In other words, the cause codes for all units will be open to all task-force-approved cause codes for all units within the combined-cycle blocks.

Reporting Event Records

Report events on the unit level only. DO NOT REPORT COMBINED-CYCLE BLOCK EVENTS TO NERC! Since the design data links the units together with the combined-cycle block, the event records of the unit's data will be used to create event records of the combined-cycle block. The unit-level event data will be used by NERC to synthesize block-level data for use in calculating traditional industry statistics. All the normal methods/rules would apply with the exception of cause codes crossing over between dissimilar unit types.

Reporting Performance Records

Report performance records on a unit basis only. DO NOT REPORT COMBINED-CYCLE BLOCK PERFORMANCE RECORDS TO NERC! Since the design data links the units together to the combined-cycle block, the performance records of the individual units will be used by NERC to calculate traditional industry statistics using the synthesis method. The general procedure for combining unit performance records to form a combined-cycle block record will be explained later in this document.

Therefore, if you operate a combined-cycle block with two gas turbines and one steam turbine, you will report 36 performance records annually – one set of 12 performance records for each gas turbine unit and one set of 12 performance records for the steam turbine unit.

Effects on pc-GAR Peer Groups

Reporting the data on the units of a combined-cycle block allows those units to become part of other peer groups. In pc-GAR, the following options could be given when the peer group is created.

- Include units – ex: Create a gas turbine peer group that includes gas turbines in simple-cycle operation with those in combined-cycle blocks.
- Include units only – ex: view gas turbine units in combined-cycle blocks operation only.
- Combined-cycle blocks will be available for each of the three groups shown below or groups 1 and 2 **or** 1 and 3:
  - **Group 1**: Not rolled-up (neither syntheses nor fleet) but used only reported block data as supplied by the reporter (traditional data reporting).
  - **Group 2**: Creating block data using the synthesis event and performance method shown in this document.
  - **Group 3**: Creating block data using the fleet-type roll up method described in a separate document "Calculating Combined-Cycle Block Data Using a Fleet-type Roll up Method When Reporting Each Gas Turbine/Steam Turbine Unit."

Not everyone will wish to use some of these options. However, GADS is committed to providing options to all since the individual needs of GADS data users vary.

Special Rules Used in Calculating Synthesized Combined-Cycle Block Data from Unit-level Data

Some rules for calculating synthesized combined-cycle block data are necessary. The rules will insure uniformity in creating synthesized statistics from the unit-level data.

RULE #1: the outage for the combined-cycle block starts when the breaker of the last of the units is opened and ends when the breaker of the first unit is closed.

RULE #2: the number of attempted and actual starts for the combined-cycle block is determined when the first unit's breaker is closed. If the unit starts without a problem, then there is one attempted and one actual start for the combined-cycle block. If the first unit has a startup failure and a second unit is then started, then the combined-cycle block will have two attempted starts and one actual start.

RULE #3: A unit is on reserve shutdown when it is removed from service for economic reasons or the electricity is not needed on the system (standard RS definition).

The reserve shutdown may affect other units (for example a GT out on reserve shutdown will reduce the steam to the steam turbine). In cases where the steam turbine is still in operation, there would be no event reported because of the reduction in steam flow because the steam turbine is operating as if in load following and can return to full capacity as soon as the GT unit is returned to service.

RULE #4: A combined-cycle block is on reserve shutdown if one or more of the gas turbine/jet engine units are also on reserve shutdown and the combined-cycle block is not in operation. That means other units of the combined-cycle block may be on forced, maintenance, or planned outage, but the combined-cycle block still has the capability to produce electricity with the one or more units on reserve shutdown.

RULE #5: As reported for other unit types, coast down to outages is not reported to GADS. Therefore, the orderly removing of units towards an outage (standard outage procedure) is considered a coast down and is not reported as a penalty against the combined-cycle block (See Example #7).

Examples in Synthesizing Block Outages and Deratings from Reported Unit-level Data

In each example, the status of each unit is discussed. Some units are not impacted at all by an outage or derate. The only reason they are listed is to show they are not impacted and have no impact on available electricity production. In actual reporting, the unaffected units would not be reported or even mentioned.

Please Note: These examples are created to simply illustrate specific cause-and-effect relationships for discussion purposes only and may or may not be real world equipment designs, installations, configurations, or actual outage occurrences. The purpose of these examples is to illustrate how the outage of one unit affects other units and the entire combined-cycle block.

Our Example Combined-Cycle Block – Big Jumbo, the combined-cycle block, consists of two gas turbines, each with its own generator. Each GT has its own HRSG. The two GT/HRSG trains are connected through a manifold to a single steam turbine that also has its own generator. The total electrical combined capacity of this fictitious combination is 710 MW.

- Units – The units which make up the example combined-cycle block are as follows –
  - Two 225 MW Gas Turbines numbered 301 & 302
  - One 260 MW Steam Turbine numbered 101
- Combined-cycle block – The combined-cycle block is a 710 MW combined cycle numbered 801

Example 1 - Three Reserve Shutdowns (RS) on different units.

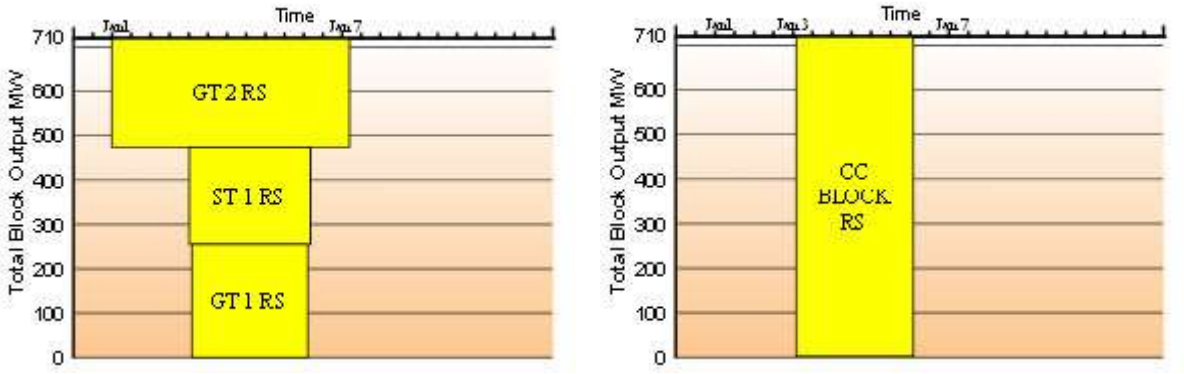
Unit Event Report

- GT #2 placed on RS from January 1 at 0000 until January 7 at 0315. GT #2 was capable of providing 225 MW during this period.
- ST #1 placed on RS from January 3 at 0010 to January 6 at 0230. The steam turbine was capable of providing 260 MW during this period.
- GT #1 placed on RS from January 3 at 0015 to January 6 at 0215. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- Big Jumbo Block placed on RS from January 3 at 0015 to January 6 at 0215. The combined-cycle block had the capability to provide 710 MW during this period.
- Please note that only three events were reported: one for each unit. During the RS outages, the combined-cycle block was not showing any derates because the block was still capable of generating the full 710 MW but was not required to do so. There were no equipment restrictions; there were only load requirements causing the reduced loading.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-1.



Combined Unit Event Single Block Event

Figure L1-1: Concurrent RS

Summary of Example #1:

- GT #1 on Reserve Shutdown for 74.00 hours.
- GT #2 on Reserve Shutdown for 147.25 hours.
- ST #1 on Reserve Shutdown for 74.33 hours.
- Combined-cycle block on Reserve Shutdown for 74.00 hours.

Example 2 – Single cause of derates on all units.

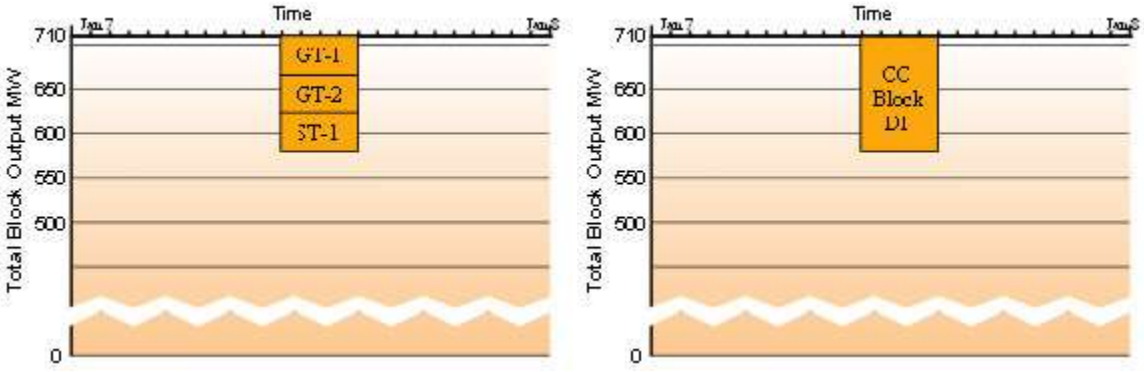
Unit Event Report

- GT #1 on D1 derate from January 7 at 1000 until January 7 at 1400. GT #1 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- GT #2 on D1 derate from January 7 at 1000 to January 7 at 1400. GT #2 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- ST #1 on D1 derate from January 7 at 1000 to January 7 at 1400. ST #1 was capable of providing 208 MW during this period. Cause code 3620 – Main Transformer.

Combined-Cycle Block Impact

- Big Jumbo Block was on D1 derate from January 7 at 1000 to January 7 at 1400. Cause code 3620 – Main Transformer. The combined-cycle block was capable of generating 568 MW.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-2.



Combined Unit Event Single Block Event

Figure L1-2: Single Cause of Derates

Summary of Example #2:

- GT #1 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- GT #2 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- ST #1 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- Combined-cycle block on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)

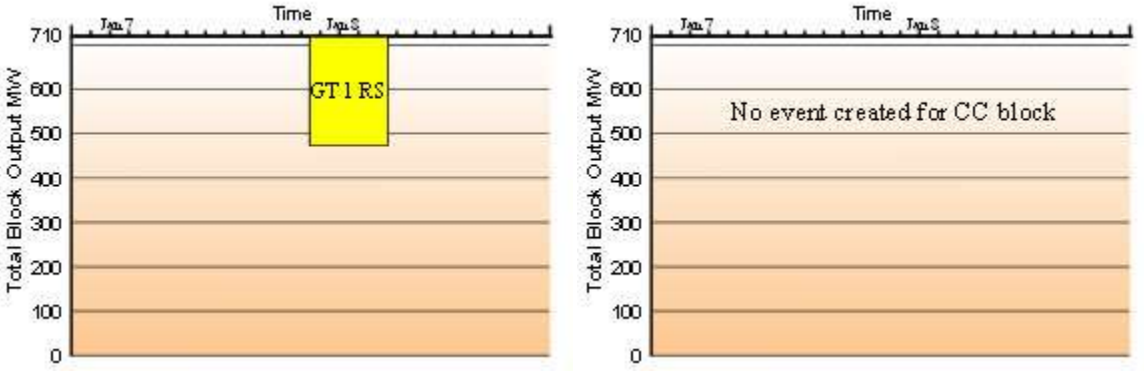
Example 3 – Single unit on Reserve Shutdown.

Unit Event Report

- GT #1 placed on RS from January 7 at 2115 to January 8 at 0500. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- No impact on Big Jumbo Block. The combined-cycle block was capable of generating 710 MW during the full period.
- Diagrams of the units and combined-cycle block during this period are shown in Figure L1-3:



Combined Unit Events CC Block Events

Figure L1-3: Single Unit on RS

Summary of Example #3:

- GT #1 on Reserve Shutdown 7.75 hours
- Combined-cycle block – no impact

Example 4 – Single unit on outage, affecting other units and then changing event types.

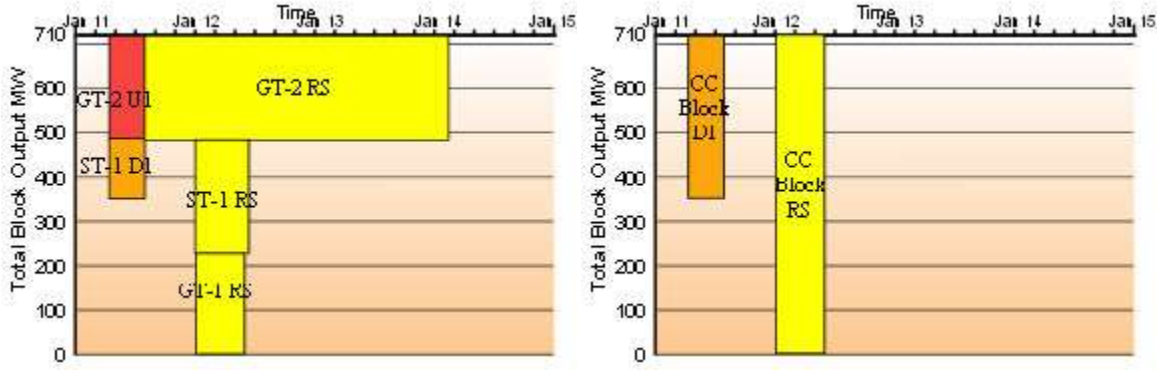
Unit Event Report

- GT #2 on Forced Outage (U1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #2 was capable of providing no MW during this period.
- As a result, ST #1 on forced derate (D1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). The steam turbine unit was capable of providing 130 MW during this period.
- GT #2 was placed on RS from January 11 at 1445 to January 14 at 0330. GT #2 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 12 at 0000 to January 12 at 11:20. ST #1 was capable of providing 260 MW during this period.
- GT #1 was placed on RS from January 12 at 0015 to January 12 at 0930. GT #1 was capable of providing 225 MW during this period.

Combined-Cycle Block Impact

- The combined-cycle block was on derate from January 11 at 0700 to January 11 at 14:45. The combined-cycle block was capable of generating 355 MW during the full period.
- The combined-cycle block was on RS from January 12 at 0015 until January 12 at 0930. The combined-cycle block was capable of generating 710 MW during the full period.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-4:



Combined Unit Events CC Block Events

Figure L1-4: Single Unit Outage, Other Events

Summary of Example #4:

- GT #1 on Reserve Shutdown for 9.25 hours.

- GT #2 on forced outage for 7.75 hours and on Reserve Shutdown for 60.75 hours.
- ST #1 on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 11.33 hours.
- Combined-cycle block on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 9.25 hours.

Example 5 – Reserve Shutdowns of unit followed by a startup failure of one unit.

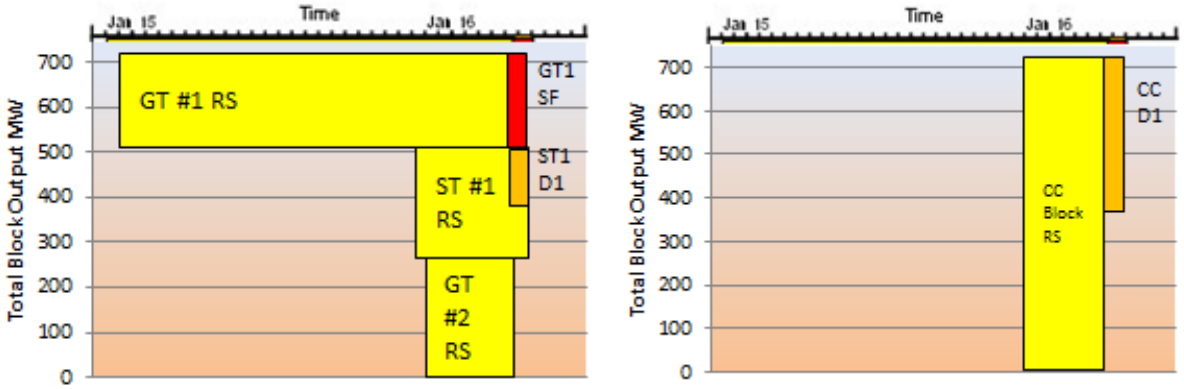
Unit Event Report

- GT #1 was placed on RS from January 14 at 2215 to January 16 at 0445. GT #1 was capable of providing 225 MW during this period.
- ST #1 was placed on reserve shutdown from January 15 at 2300 to January 16 at 0600. ST #1 was capable of providing 260 MW during this period.
- GT #2 was placed on RS from January 15 at 2310 to January 16 at 0545. GT #2 was capable of providing 225 MW during this period.
- GT #1 on Startup Failure outage (SF) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #1 was capable of providing no MW during this period.
- As a result of the GT #1 SF, ST #1 on forced derate (D1) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). ST #1 was capable of providing 130 MW during this period. (Note: ST #1 was on RS but it is treated as if it were in service.)

Combined-Cycle Block Impact

- The combined-cycle block was on RS from January 15 at 2310 until January 16 at 0445 (when GT #1 went on SF). The combined-cycle block was capable of generating 710 MW during the full period.
- The combined-cycle block was on derate from January 16 at 0445 to January 16 at 0600 caused by the SF of GT #1 and no potential steam flow to ST #1 (cause code 5030). The combined-cycle block was capable of generating 355 MW during the full period.

Diagrams of the units and combined-cycle block during this period are shown in Figure L1-5:



Combined Unit Events CC Block Events

Figure L1-5: RS Followed by SF

Summary of Example #5:

- GT #1 on Reserve Shutdown for 30.50 hours and on Forced Outage for 1.25 hours.
- GT #2 on Reserve Shutdown for 6.58 hours.
- ST #1 on Reserve Shutdown for 7.00 hours and on forced derate for 1.25 hours with a loss of capacity of 130MW (or 0.63 Equivalent Forced Derated Hours)
- Combined-cycle block on forced derate for 1.25 hours with a loss of capacity of 355MW (or 0.63 Equivalent Forced Derated Hours) and on Reserve Shutdown for 5.58 hours.

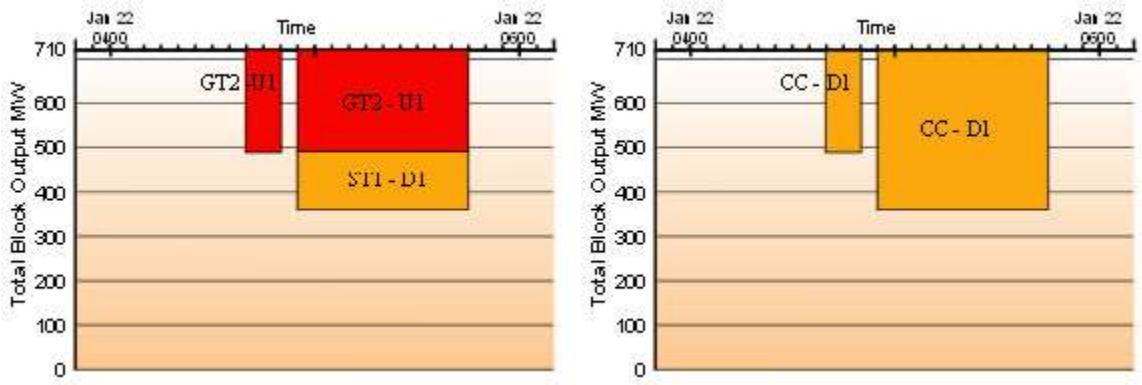
Example 6 – Unit outage to unit outage affecting other units.

Unit Event Report

- GT #2 on Forced Outage (U1) from January 22 at 0440 to January 22 at 0450 (cause code 5250 – Other Controls and instrumentation Problems).
- NOTE: Because the FO on GT#2 was so short, there was no loss of steam flow to ST #1. Therefore, ST #1 was capable of providing 260 MW during this period.
- GT #2 on Forced Outage (U1) from January 22 at 0455 to January 22 at 0545 (cause code 5250)
- As a result of GT #2 not providing steam service, ST #1 on forced derate (D1) from January 22 at 0455 to January 22 at 0545 (cause code 5250 – Other Controls and instrumentation Problems). ST #1 was capable of providing 130 MW during this period.

Combined-Cycle Block Impact

- The combined-cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0440 until January 22 at 0450 (when GT #2 came on line). The combined-cycle block was capable of generating 485 MW during the full period.
- The combined-cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0455 to January 22 at 0545 caused by the U1 of GT #2 and no steam for ST #1. The combined-cycle block was capable of generating 355 MW during the full period.



Combined Unit Events CC Block Events

Figure L1-6: Multiple Unit Outages

Summary of Example #6:

- GT #2 on forced outage for 1.00 hours (0.17 + 0.83 hours)
- ST #1 on forced derate for 0.83 hours (or 0.42 Equivalent Forced Derated Hours).
- Combined-cycle block on forced derate for 1.00 hour (0.17 + 0.83 hours or 0.47 [0.05 + 0.42] Equivalent Forced Derated Hours).

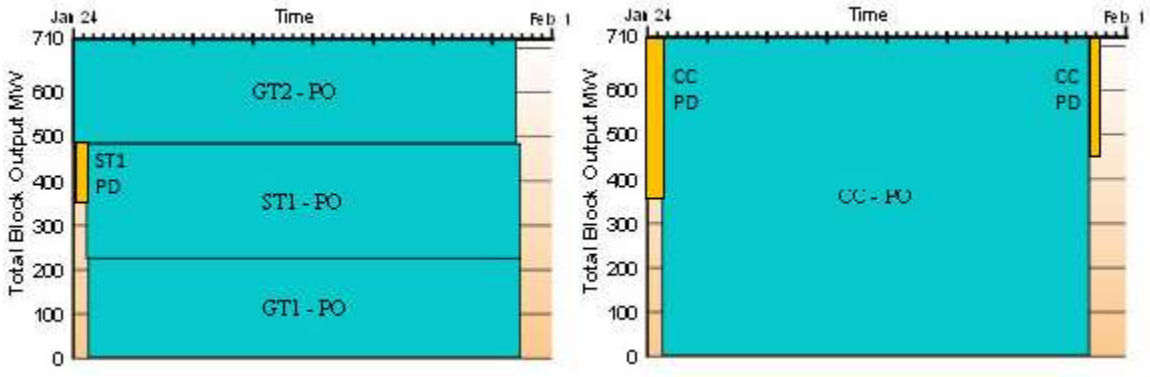
Example 7 – Combined-Cycle Block annual planned outage.

Unit Event Report

- GT #2 placed on Planned Outage from January 24 at 0000 until January 31 at 1000 (cause code 5260 – Major Gas Turbine Overhaul). GT #2 was not capable of providing power during this period.
- As a result of GT #2 not providing steam service, ST #1 on Planned Derate (PD) from January 24 at 0000 to January 24 at 0515 (cause code 5260). The steam turbine was capable of providing 130 MW during this period.
- ST #1 unit placed on Planned Overhaul from January 24 at 0515 to January 31 at 1130 (cause code 4240 – Low-pressure steam turbine bearings). The steam turbine was not capable of providing power during this period.
- GT #1 placed on Planned Outage January 24 at 0530 to January 31 at 1015 (cause code 5272 - Borescope inspection). GT #1 was not capable of providing power during this period.

Combined-Cycle Block Impact

- The combined-cycle block was placed on Planned Derate from January 24 at 0000 (when GT #2 came off-line) to January 24 at 0515 (cause code 5260). The combined-cycle block was capable of generating 355 MW during this period.
- The combined-cycle block was placed on Planned Derate from January 24 at 0515 to January 24 at 0530, when ST #1 was placed on Planned Outage (cause codes 5260 and 4240). The combined-cycle block was capable of generating 225 MW during this period.
- The combined-cycle block was placed on Planned Outage from January 24 at 0530 (when GT #1 came off-line) to January 31 at 1000 (when GT #2 came on line) (cause codes 5260, 4240, and 5272). The combined-cycle block has the capability to provide no power during this period.
- The combined-cycle block was placed on Planned Derate from January 31 at 1000 to January 31 at 1015, when GT #2 came on-line. The combined-cycle block was capable of generating 225 MW during this period.
- The combined-cycle block was placed on Planned Derate from January 31 at 1015 to January 31 at 1130, when GT #1 came on-line. The combined-cycle block was capable of generating 450 MW during this period.



Combined Unit Events CC Block Events

Figure L1-7: CC Block Annual Outage

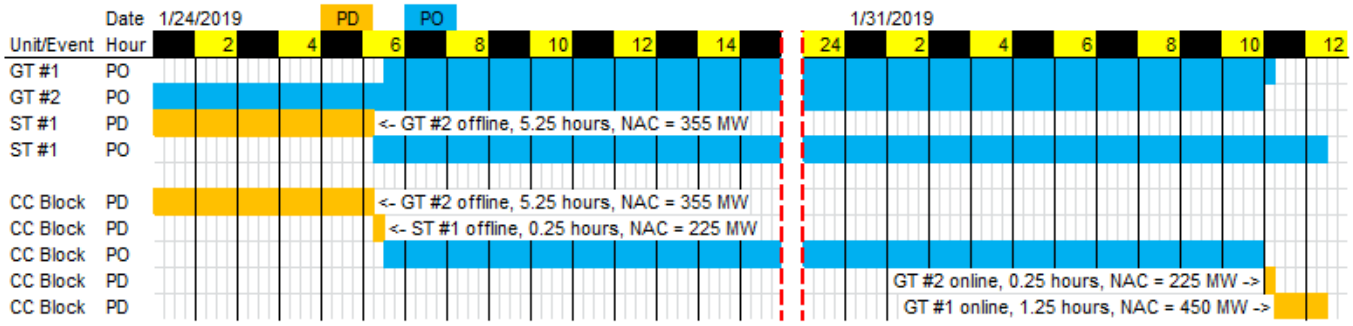


Figure L1-8: CC Block Annual Outage – Start/End Details
(0.25 hour PD too small to see in Figure L1-7: CC Block Events but shown here)

Summary of Example #7:

- GT #1 on Planned Outage for 172.75 hours.
- GT #2 on Planned Outage for 178.00 hours.
- ST #1 on Planned Derate for 5.25 hours.
- ST #1 on Planned Outage for 174.25 hours.
- Combined-cycle block on Planned Outage for 172.50 hours.
- Combined-cycle block on Planned Derating for 7.00 hours.

Statistics from Unit Event and Performance Reports

There will be other outages, deratings and reserve shutdown periods at a real combined-cycle block. We could list more but they would just be a repeat of what is shown in the seven examples shown above. So to test the data collection methodology, we will calculate statistics for each unit and the combined-cycle block using the data from the seven examples.

The time period with be January 1 at 0000 to January 31 at 2400. This is a total of 744 hours during the month of January.

Table 1: Statistics from Unit Event and Performance Reports				
Statistic	**GT #1**	**GT #2**	**ST #1**	**CC Block**
Net Maximum Capacity	225	225	260	710
Period Hrs	744	744	744	744
Forced Outage Hrs	1.25	8.75	0.00	0.00
Planned Outage Hrs	172.75	178.00	174.25	172.50
Maintenance Outage Hrs	0.00	0.00	0.00	0.00
Reserve Shutdown Hrs	121.50	214.58	92.67	88.83
Service Hrs	448.50	342.67	477.08	482.67
Equiv. Forced Derated Hrs	0.80	0.80	5.72	5.77
EFDH During RS Hrs	0.00	0.00	0.63	0.00
Equiv. Planned Derated Hrs	0.00	0.00	2.63	3.42
Net Actual Generation	100,000	77,000	124,000	301,000.00
Attempted Starts	6.00	7.00	4.00	4.00
Actual Starts	5.00	7.00	4.00	4.00
Equiv. Availability Factor	76.51%	74.79%	75.46%	75.58%
Equiv. Forced Outage Rate	0.46%	2.72%	1.20%	1.20%
Forced Outage Factor	0.17%	1.18%	0.00%	0.00%
Forced Outage Rate	0.28%	2.49%	0.00%	0.00%
Scheduled Outage Factor	23.22%	23.92%	23.42%	23.19%
Net Capacity Factor	59.74%	46.00%	64.10%	56.98%
Starting Reliability	83.33%	100.00%	100.00%	100.00%

Table 2: Sample Data Summary								
Event #	**Unit**	**Event Type**	**Start Date**	**End Date**	**Duration**	**Loss MW**	**EDH**	**Example**
1	GT #2	RS	01/01/0000	01/07/0315	147.25	225		1
2	ST #1	RS	01/03/0010	01/06/0230	74.33	260		
3	GT #1	RS	01/03/0015	01/06/0215	74	225		
Syn. 1	CC	RS	01/03/0015	01/06/0215	74	710		
4	GT #1	D1	01/07/1000	01/07/1400	4	45	0.8	2
5	GT #2	D1	01/07/1000	01/07/1400	4	45	0.8	
6	ST #1	D1	01/07/1000	01/07/1400	4	52	0.8	
Syn. 2	CC	D1	01/07/1000	01/07/1400	4	142	0.8	
7	GT #1	RS	01/07/2115	01/08/0500	7.75	225		3
Syn. 3	CC	NC						
8	GT #2	U1	01/11/0700	01/11/1445	7.75	225		4
9	ST #1	D1	01/11/0700	01/11/1445	7.75	130	3.88	
10	GT #2	RS	01/11/1445	01/14/0330	60.75	225		
11	ST #1	RS	01/12/0000	01/12/1120	11.33	260		
12	GT #1	RS	01/12/0015	01/12/0930	9.25	225		
Syn. 4	CC	D1	01/11/0700	01/11/1445	7.75	355	3.88	
Syn. 5	CC	RS	01/12/0015	01/12/0930	9.25	710		
13	GT #1	RS	01/14/2215	01/16/0445	30.5	225		5
14	ST #1	RS	01/15/2300	01/16/0600	7	260		
15	GT #2	RS	01/15/2310	01/16/0545	6.58	225		

Table 2: Sample Data Summary								
Event #	**Unit**	**Event Type**	**Start Date**	**End Date**	**Duration**	**Loss MW**	**EDH**	**Example**
16	GT #1	SF	01/16/0445	01/16/0600	1.25	225		
17	ST #1	D1	01/16/0445	01/16/0600	1.25	130	0.63	
Syn. 6	CC	RS	01/15/2310	01/16/0445	5.58	710		
Syn. 7	CC	D1	01/16/0445	01/16/0600	1.25	355	0.63	
18	GT #2	U1	01/22/0440	01/22/0450	0.17	225		6
19	GT #2	U1	01/22/0455	01/22/0545	0.83	225		
20	ST #1	D1	01/22/0455	01/22/0545	0.83	130	0.42	
Syn. 8	CC	D1	01/22/0440	01/22/0450	0.17	225	0.05	
Syn. 9	CC	D1	01/22/0455	01/22/0545	0.83	355	0.42	
21	GT #2	PO	01/24/0000	01/31/1000	178	225		7
22	ST #1	PD	01/24/0000	01/24/0515	5.25	130	2.63	
23	ST #1	PO	01/24/0515	01/31/1130	174.25	260		
24	GT #1	PO	01/24/0530	01/31/1015	172.75	225		
Syn. 10	CC	PD	01/24/0000	01/24/0515	5.25	355	2.63	
Syn. 11	CC	PD	01/24/0515	01/24/0530	0.25	485	0.17	
Syn. 12	CC	PO	01/24/0530	01/31/1000	172.5	710		
Syn. 13	CC	PD	01/31/1000	01/31/1015	0.25	485	0.17	
Syn. 14	CC	PD	01/31/1015	01/31/1130	1.25	260	0.46	