Appendix K: Outside Management Control

Following this introduction of Outside Management Control (OMC) guidelines, we have listed those cause codes that GADS recognizes as being outside plant management control. At the end of this Appendix are guidelines for removing OMC events from standard calculations. Annex D of IEEE 762, quoted below, sets the standard for defining and handling OMC events. For more comments on OMC events, please refer to Section I-2 and III-13 of these GADS Data Reporting Instructions.

Annex D: Outside of Plant Management Control
The electric industry in Europe and other parts of the world has made a change to examine losses of generation caused by problems with and outside plant management control. After reviewing the work used by others, the following is provided as guidelines for determining what is and is not outside plant management control:

There are a number of outage causes that may prevent the energy coming from a power generating plant from reaching the customer. Some causes are due to the plant operation and equipment while others are outside plant management control.

The standard sets a boundary on the generator side of the power station (see Figure K-1, below) for the determination of equipment "outside management control".

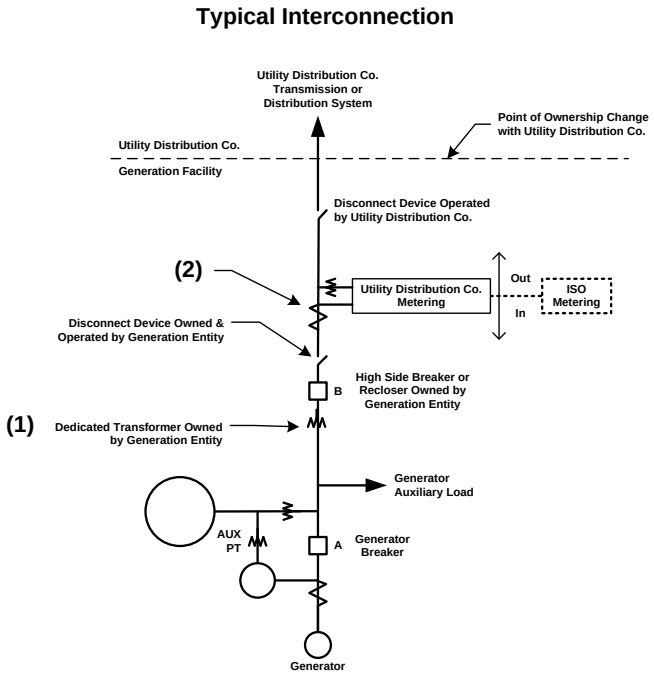


Figure K-1: The Physical Boundary of Outside Management Control

As shown in Figure K-1, a generating unit includes all equipment up to (in preferred order) (1) the high-voltage terminals of the generator step-up (GSU) transformer and the station service transformers; (2) the GSU transformer (load) side of the generator-voltage circuit breakers; or (3) at such equipment boundary as may be reasonable considering the design and configuration of the generating unit.

It may be assumed that all problems within the power station boundary are within plant management control; however that is not always the case. Therefore, there is a need for some additional clarification as to what is and what is not under plant management control.

It is easier to identify those actions outside plant management control than to identify the responsibilities of plant management. Therefore, the following are considered to be outside (external) of plant management control. All other items are considered within their jurisdiction and are the responsibility of the plant management for calculating power plant performance and statistics.

- Energy losses due to the following causes should not be considered when computing the unit controllable performance because these losses are not considered to be under the control of plant management:
- Grid connection or substation failure. This reason relates to problems with transmission lines and switchyard equipment outside the boundaries of the plant as specified by the "boundary of plant responsibility" shown in Figure K-1 on this Annex.
- Acts of nature such as ice storms, tornados, winds, lightning, etc are not under plant management control, whether inside or outside the plant boundary.
- Terrorist attacks on the generating/transmission facilities or transmission operating/repair errors are not under plant management control.
- Special environmental limitations such as low cooling pond level, or water intake restrictions that could not be prevented by operator action. These are acts of nature such as high ambient temperatures where the equipment is working within design specifications. However, if the equipment is not maintained by the plant such as opacity out of limits or NOx out of control, etc, then plant management should be penalized. These are equipment problems and are within plant management control.
- (9130) Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)

  This cause code is considered outside of management control. Examples of this would include:

  Firm pipeline gas transportation segment interrupted causing disruption or reduction in the flow of natural gas

  Physical damage to pipeline or cyber disruption

  Routine pipeline maintenance (e.g. pigging)

  Commodity supplier fails to deliver firm gas to primary pipeline receipt point

  (9131) Lack of fuel – due to contractual or tariff provisions that allow for service interruption or price fluctuations during peak demand periods.

  This cause code is not considered outside of management control. Examples of this would include:

  Company's fuel supply group allocates limited firm fuel to other fleet sites

  Interruptible pipeline transportation interrupted

  Pipeline issues Operational Flow Order

  Pipeline enforces ratable takes provision to tariff levels

  LDC confiscates or interrupts fuel scheduled for delivery to plant gate

  Plant fuel buyer rejects gas at implied delivered price (possibly including penalties)
- Labor strikes. Outages or load reductions caused by labor strikes are not normally under the direct control of plant management. These strikes may be company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.

However, direct plant management grievances that result in a walkout or strike are under plant management control and are included as penalties against the plant. If a labor strike is caused by plant management/worker problems during an outage, any outage extensions are included as energy losses as long as the unit is incapable of being restarted because of equipment failures, maintenance, overhauls, or other activities.

- Other weather related problems such as seasonal variations in gross dependable capacity due to cooling water temperature variations are not within plant management control.

GADS Cause Codes Outside Plant Management Control

(As of January 1, 2021)

3600	Switchyard transformers and associated cooling systems - external (OMC)
3611	Switchyard circuit breakers - external (OMC)
3612	Switchyard system protection devices - external (OMC)
3619	Other switchyard equipment - external (OMC)
3710	Transmission line (connected to powerhouse switchyard to 1st Substation)
3720	Transmission equipment at the 1st substation (see code 9300 if applicable)
3730	Transmission equipment beyond the 1st substation (see code 9300 if applicable)
9000	Flood
9001	Drought
9010	Fire including wildfires, not related to a specific component
9015	Pandemic
9020	Lightning
9025	Geomagnetic disturbance
9030	Earthquake
9031	Tornado
9035	Hurricane
9036	Storms (ice, snow, etc)
9040	Other catastrophe
9130	Failure of fuel supplier to fulfill contractual obligations or a pre-arranged deal due to physical fuel disruptions or operational impairments (e.g. force majeure on a pipeline or compressor down; making the pipeline incapable of making its firm deliveries.)
9132	Wet fuel – Biomass (OMC)
9135	Lack of water (hydro)
9138	High Water Level in Tailrace (too much water)
9139	Ground water or other water supply problems (OMC)
9150	Labor strikes company-wide problems or strikes outside the company's jurisdiction such as manufacturers (delaying repairs) or transportation (fuel supply) problems.
9200	High ash content (OMC)
9210	Low grindability (OMC)
9220	High sulfur content (OMC)
9230	High vanadium content (OMC)
9240	High sodium content (OMC)
9250	Low BTU coal (OMC)
9260	Low BTU oil (OMC)
9270	Wet coal (OMC)
9280	Frozen coal (OMC)
9290	Other fuel quality problems (OMC)

9300	Transmission system problems other than catastrophes (do not include switchyard problems in this category; see codes 3600 to 3629, 3720 to 3730)
9320	Other miscellaneous external problems
9500	Regulatory (nuclear) proceedings and hearings - regulatory agency initiated
9502	Regulatory (nuclear) proceedings and hearings - intervenor initiated
9504	Regulatory (environmental) proceedings and hearings - regulatory agency initiated
9506	Regulatory (environmental) proceedings and hearings - intervenor initiated
9510	Plant modifications strictly for compliance with new or changed regulatory requirements (scrubbers, cooling towers, etc.)
9520	Oil spill in Gulf of Mexico (OMC)
9590	Miscellaneous regulatory (this code is primarily intended for use with event contribution code 2 to indicate that a regulatory-related factor contributed to the primary cause of the event)

Policy on Handling Outside Management Control (OMC) Events and their Equations in GADS

(As of December 9, 2004)

Background

The IEEE 762 "Definitions for Reporting Electric Generating Unit Reliability, Availability and Productivity" (Annex D) is the basis for the OMC work. In part, Annex D states that:

> *"There are a number of outage causes that may prevent the energy coming from a power generating plant from reaching the customer. Some causes are due to the plant operation and equipment while others are outside plant management control."*

This Appendix K lists a number of cause codes that is universally accepted as those outside the control of management by the GADS program. It also identifies certain conditions under which those specific cause codes would be applied. The list may change with time and some additional clarifications may be added.

The list of cause codes shown hereafter should be reviewed from time to time to insure the latest cause codes are used in the OMC equations.

It is also VERY important that all cause codes (including all OMC cause codes) be reported to GADS. Some companies may wish to exclude a forced outage or change it to a non-curtailing event if it fits into the OMC category. THAT IS NOT RIGHT! The event should be reported as a forced outage and the OMC calculations will show the events without the FO.

Handling OMC Events

OMC events will come in two forms: outages or deratings. The OMC event types can be either forced, maintenance or planned but it is expected that the majority will be forced outage events.

For all existing GADS equation calculations, the OMC events will be treated as a standard event, i.e., a forced outage, forced derate, etc. The calculation will not change and will follow the calculations shown in Appendix F of the GADS DRI.

In calculating equations without OMC events, it is important to remember that the objective of the removal of OMC events is to affect the availability of the unit. To that end, we handle outages differently than derates. In removing a particular event from a unit's event records we are faced with the question of what to put in place of

the missing event. In the case of an outage, there is no sure way of knowing in what state a unit should be considered. The only sure thing is our objective of returning those hours to an available state. That is exactly what we do and that is all we do. Assuming that the unit is in reserve or in service during the time of the removed OMC outage event, and so, adding to either service or reserve hours presents a fictional summary of the unit's performance. In viewing the available hours we temporarily recalculate AH as (Service + Reserve + Synchronous Condensing + Pumping + OMC).

In the case of a derating event, however, we know for certain the state of the unit at the time of the removed event. Whenever an event is removed it is necessary to look for any derating events that may have been shadowed by or overlapping the removed event. Those overlapping hours must be accounted for by the software processing the OMC event. It isn't enough to simply recalculate Equivalent Availability by adding the sum of the removed OMC events because we need to now take into account the effect of the newly uncovered (un-overlapped) derating events.

Before we begin defining the methods there is an important assumption that needs to be made as to the processing of the data. Since the removal of the OMC outage event is seen as an adjustment, we'll assume that outage events have been processed as normal and that OMC removal is acting on clean data and that performance totals have already been summed for the unit. Also, in the case of derate events, that loss attributed to an event has been calculated particularly in the case of overlapping and shadowed events.

OMC Process Methods by Event Type

1. **Outage Events** – In simple terms, when an OMC outage event is encountered, the total associated hours would be reduced as well as the number of occurrences. In order to help keep our numbers in balance, we'll add these hours to an OMC Hours category. Notice that in each example below we are increasing available hours and not service hours even though we are reducing outage hours.

    a. **Forced Outage** – Regardless of whether it is a U1, U2, U3 or SF, removing an OMC_FO event would cause a decrease in Forced Outage hours and Forced Outage Occurrences and an increase in Available Hours.

    b. **Planned Outage** – Removing an OMC_PO event would cause a decrease in Planned Outage hours and Planned Outage Occurrences and an increase in Available Hours.

    c. **Maintenance Outage** – Removing an OMC_MO event would cause a decrease in Maintenance Outage hours and Maintenance Outage Occurrences and an increase in Available Hours.

    d. **Derate Event shadowed by an OMC outage** – If the removed OMC outage event shadows a derating event, the equivalent hours shadowed by the outage needs to be added into the equivalent outage hours so that it can be reflected in the equivalent availability.

2. **Derate Events** – In removing OMC derate events, it is important to keep in mind that the loss of capacity (a.k.a. reduction) originally calculated and attributed to an event is maintained when the OMC event is removed. The removal of the OMC event then properly affects the available capacity of the unit rather than increasing the losses attributed to the surrounding / overlapping derating events. Illustrations are included below in order to aid the explanations.

    a. **A simple OMC derate** – When there are no overlapping derating events, the equivalent hours of the OMC event can be removed from the total equivalent hours and the associated event occurrences can also be reduced by 1. The number of derate hours also is reduced by the duration of the event.

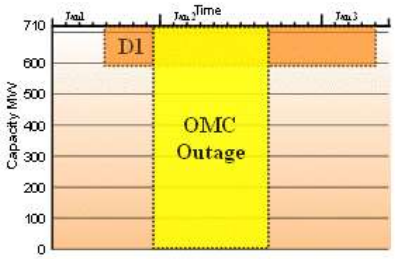
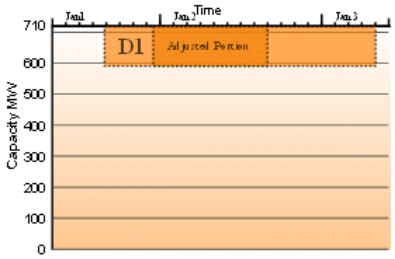
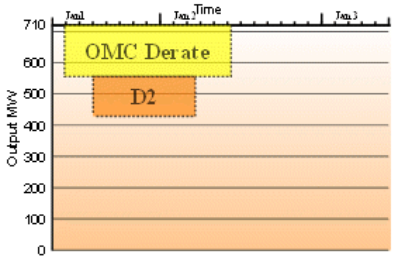
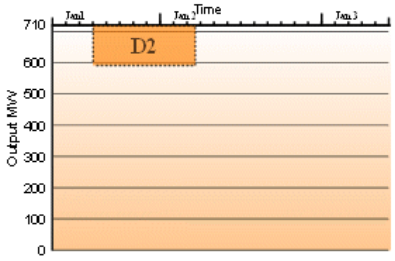
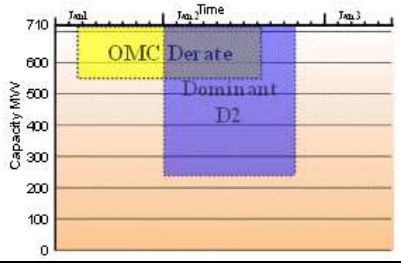
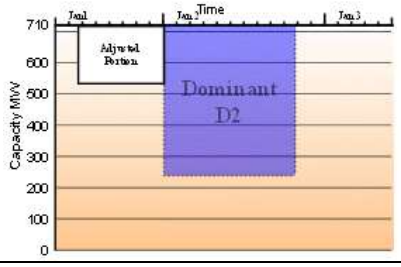
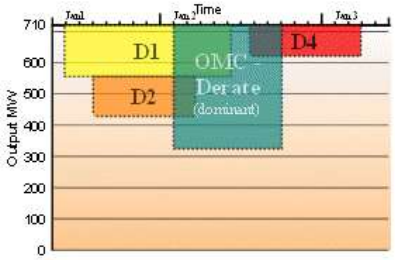
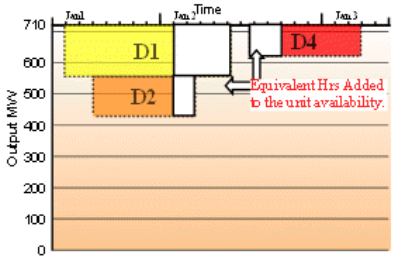
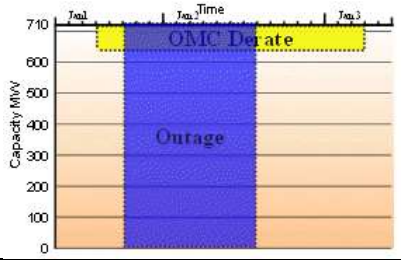
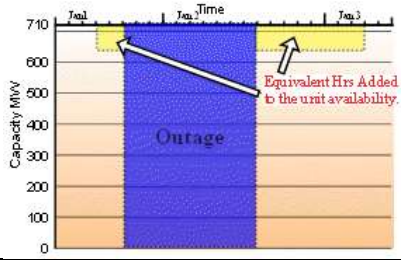
    b. **An OMC derate event overlapped by another derate** – If an OMC event is removed and there is another overlapping derate event, the OMC is removed and totals are adjusted just as in case 'a' above. The NAC of the unit at the start of the overlapping event is increased, but the loss attributed

to that event remains constant. (Normal derate events are considered loss-constant throughout their duration)

c. **OMC derate event which is shadowed by a dominant derate** – In this case, the overlapping derate is dominant and so, is considered to be capacity-constant. This means that removing the OMC event has no effect on the available capacity within the dominant overlapping derate. The adjustment to the unit performance stats would be limited to the duration and equivalent hours of that portion of the OMC event that exists outside the dominant derate.

d. **A dominant OMC derate overlaps another derate** – When the OMC derate event is marked as dominant, multiple adjustments may be necessary. The first adjustment is to take care of the total duration and equivalent hours of the OMC derate event. Once the OMC derate event affect is removed, the overlapped derate event(s) need to be accounted for by adding those portions of the event(s) that were overlapped by the OMC event to the equivalent hours total as well as any total durations. The number of derate event occurrences would not need to be adjusted.

e. **OMC derate event is shadowed by an outage** – Since an outage effectively truncates the derate event, only the portion of the OMC derate that extends outside the overlapping outage needs to be accounted for and removed.

Example#	Before OMC event removal	After OMC event removal
1-d - Derate Event shadowed by an OMC outage		
	OMC Outage (any type) is removed from shadowed derate.	Unit available hours increase by the outage duration. Equivalent hours are adjusted upward by the overlapped portion when derate D1 is now accounted for at its actual value.
2-b - An OMC derate event overlapped by another derate		
	OMC Derate is removed from above D2	Loss attributed to D2 remains unchanged. NAC of the unit increases
2-c - OMC derate event which is wholly or partially shadowed by a dominant derate		
	OMC Derate is removed from inside D2	The effect of removing the OMC event is to increase availability by the portions which extend beyond the dominant derate.
2-d – Dominant OMC derate overlaps other derates		
	Dominant OMC Derate is removed.	Events D1, D2 and D4 are extended and totalled at their original values.
2-e - OMC derate event is shadowed by an outage		
	OMC Derate is removed from being shadowed by an outage (any type)	The effect of removing the OMC event is to increase availability by the portions which extend beyond the outage.

New OMC Equations

Please note that all equations that include OMC events be calculated in the same methods and have the same names as that in IEEE 762 and Appendix F of the GADS DRI. In other words, those equations will not change at all but will be the benchmark as to what the unit was able to provide under all circumstances.

Please note also that any equation that excludes OMC events be calculated in the same methods as that in IEEE 762 and Appendix F of the GADS DRI but the names are modified to show they exclude OMC events. These equations will be used against the benchmark calculations to show what the unit *could* have done without OMC events. Both numbers will be provided by GADS and either number can be used based on the needs and the reports.

Equations 95-141 in Appendix F are for calculating the performance statistics without OMC events. Please note that they are the same as the equations for calculating the performance statistics with OMC events except that their names have an "X" in front of them.

Table K-1 below shows how the event based performance statistics can be affected by excluding OMC events. Two statistics, Starting Reliability (SR) and Seasonal Derating Factor (SEDF), do not have without OMC definitions. XSR is not defined because IEEE 762 does not adjust the actual/attempted starts when OMC events are removed, and although SEDF is based on available hours (AH), a without OMC version is not defined by NERC. Service Factor (SF) is not affected because it is only based on service hours (SH), which are not affected by removing OMC events. Because only AH is adjusted when excluding OMC events the performance statistics do, on rare occasions, exceed 100%. That is inherent with the concept of OMC events because the objective of their removal is to affect the availability of the unit and nothing else.

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F

DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Starting Reliability	62	SR	**	n/a	FALSE *	ACTSU	ATTSU
Forced Outage Factor	3	FOF	97	XFOF	TRUE	FOH	PH
Maintenance Outage Factor	4	MOF	98	XMOF	TRUE	MOH	PH
Planned Outage Factor	1	POF	95	XPOF	TRUE	POH	PH
Unplanned Outage Factor	2	UOF	96	XUOF	TRUE	FOH + MOH	PH
Scheduled Outage Factor	5	SOF	99	XSOF	TRUE	POH + MOH	PH
Unavailability Factor	6	UF	100	XUF	TRUE	FOH + MOH + POH	PH
Availability Factor	7	AF	101	XAF	TRUE	PH - FOH - MOH - POH	PH

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F							
DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Service Factor	8	SF	102	XSF	FALSE ***	SH	PH
Seasonal Derating Factor	9	SEDF	**	n/a	TRUE	ESEDH	PH
Unit Derating Factor	10	UDF	103	XUDF	TRUE	EFDH + EMDH + EPDH	PH
Equivalent Unavailability Factor	11	EUF	104	XEUF	TRUE	POH + MOH + FOH + EFDH + EMDH + EPDH	PH
Equivalent Availability Factor	12	EAF	105	XEAF	TRUE	PH - FOH - MOH - POH - EFDH - EMDH - EPDH - ESEDH	PH
Equivalent Maintenance Outage Factor	17	EMOF	106	XEMOF	TRUE	MOH + EMDH	PH
Equivalent Planned Outage Factor	18	EPOF	107	XEPOF	TRUE	POH + EPDH	PH
Equivalent Forced Outage Factor	19	EFOF	108	XEFOF	TRUE	FOH + EFDH	PH
Equivalent Scheduled Outage Factor	20	ESOF	109	XESOF	TRUE	MOH + POH + EMDH + EPDH	PH
Equivalent Unplanned Outage Factor	21	EUOF	110	XEUOF	TRUE	MOH + FOH + EFDH + EMDH	PH
Forced Outage Rate	22	FOR	111	XFOR	TRUE	FOH	FOH + SH + SYNCHRS + PUMPHRS
Forced Outage Rate demand	23	FORd	112	XFORd	TRUE	f*FOH	SH + SYNC + f*FOH
Equivalent Forced Outage Rate	24	EFOR	113	XEFOR	TRUE	FOH + EFDH	FOH + SH + SYNCHRS + PUMPHRS + EFDHRS
Equivalent Forced	25	EFORd	114	XEFORd	TRUE	f*FOH + p*EFDH	SH + SYNC + f*FOH

Table K-1: Comparison of OMC Affect on Performance Statistics in Appendix F							
DESCRIPTION	CALC No.	NAME w/ OMC	CALC No.	NAME w/o OMC	AFFECTED BY OMC?	NUMERATOR FORMULA	DENOMINATOR FORMULA
Outage Rate demand							
Equivalent Planned Outage Rate	26	EPOR	115	XEPOR	TRUE	POH + EPDH	POH + SH + SYNCHRS + PUMPHRS + EPDHRS
Equivalent Maintenance Outage Rate	27	EMOR	116	XEMOR	TRUE	MOH + EMDH	MOH + SH + SYNCHRS + PUMPHRS + EMDHRS
Equivalent Unplanned Outage Rate	28	EUOR	117	XEUOR	TRUE	MOH + FOH + EFDH + EMDH	FOH + MOH + SH + SYNCHRS + PUMPHRS + EFDHRS + EMDHRS
Notes: * IEEE 762 does not recommend adjusting actual/attempted starts when removing OMC events. ** Not defined by NERC. * SH is not affected by OMC events; only AH is affected.**							