Appendix G: Examples and Recommended Methods

Reporting Outages to the Generating Availability Data System (GADS)

Introduction

The examples in this appendix illustrate the reporting of outages and deratings to GADS. They are based on a fictional 600 MW coal-fired unit, Riverglenn #1, operated by the fictional "U.S. Power & Light Company." All the System/Component Cause Codes shown in these examples are real and found in *Appendix B08 – Fossil Steam Units.*

Each example includes a description of circumstances surrounding the event, the effect of the event on unit availability, and component repair time.

For the sake of space, the verbal description element (reported in Sections C and D of the event report (07)) is left out of the event description. Completing this information provides details about a failure's cause and appearance, identifies any contributing factors, and describes the corrective actions taken. Please refer to pages III-25 through III-26 for a discussion regarding the verbal description.

Index of Examples

Example 1: Simple Outage

Event Description

On January 3 at 4:30 a.m., Riverglenn #1 tripped off-line due to high turbine vibration. The cause was Low Pressure (LP) turbine bearings. Repairs began January 3 at 8:00 a.m. and were completed on January 8 at 9:30 a.m. The unit synchronized on January 8 at 5:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0001	
Event Type:	U1	
Start of Event:	January 3 at 04:30	
End of Event:	January 8 at 17:00	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	4240	
Time: Work Started:	January 3 at 08:00	
Time: Work Completed:	January 8 at 09:30	
Man Hours Worked:		Records 02/03

Effect on Unit Availability

The duration of this event was 132.50 hours (January 3, 4:30 a.m. to January 8, 5:00 p.m.).
Unit availability was affected for 132.50 hours.

Component Repair

The LP turbine bearings took 121.50 hours to repair (January 3, 8:00 a.m. to January 8 at 9:30 a.m.).

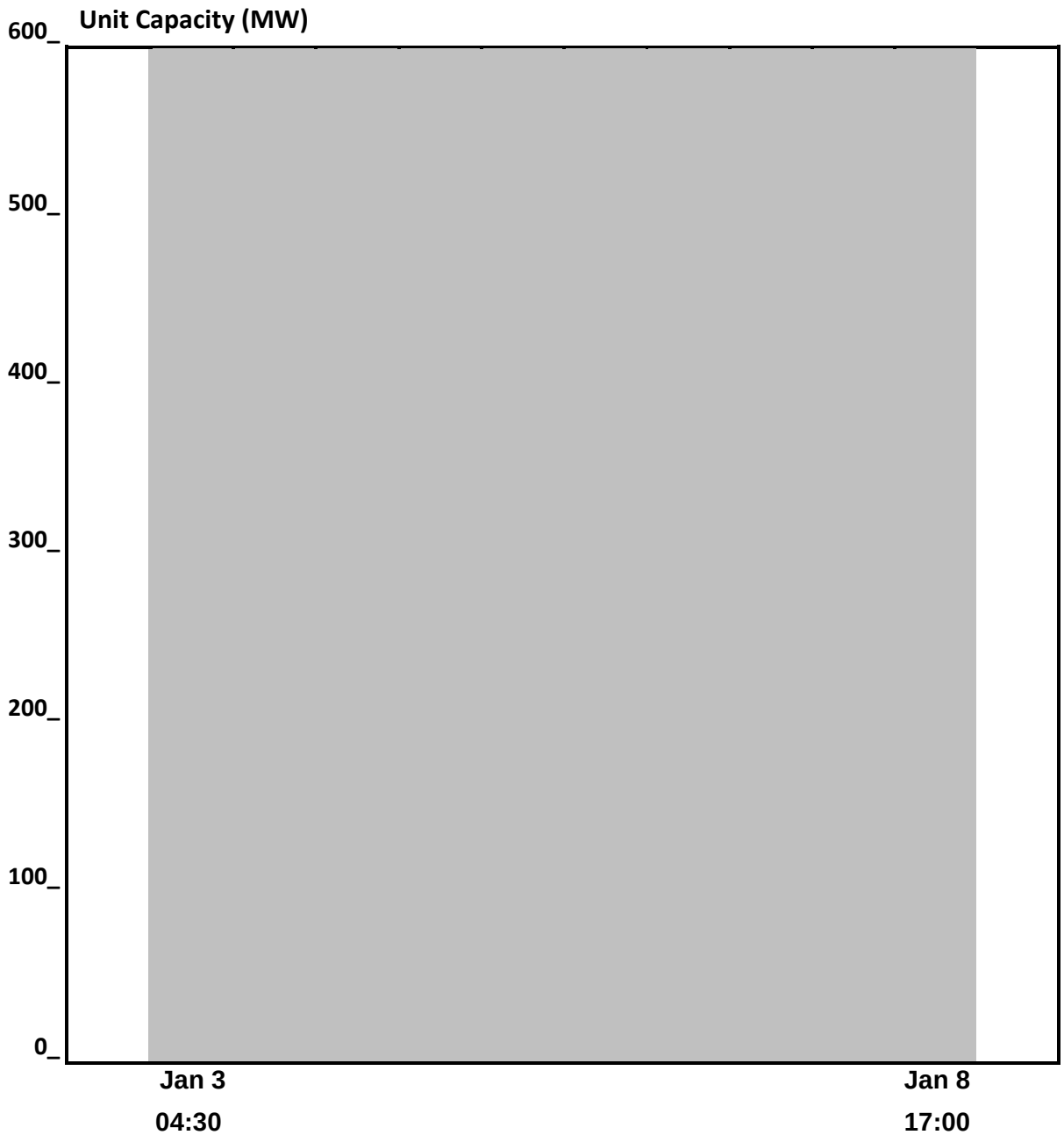

Figure G-1 - Simple Outage

Example 2: Simple Derating

Event Description

On January 10 at 8:00 a.m., Riverglenn #1 reduced capacity by 400 MW due to a fouled north air preheater. Fouling began a few weeks earlier, but the unit stayed on-line at full capacity to meet load demand. Repair crews completed their work and the unit came back to full load (600 MW) on January 11 at 4:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0002	
Event Type:	D4	
Start of Event:	January 10 at 08:00	
Event of Event:	January 11 at 16:00	
Gross Available Capacity as a Result of Event:	*	
Net Available Capacity as a Result of Event:	200	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	1492	
Time: Work Started:	January 10 at 08:00	
Time: Work Completed:	January 10 at 16:00	
Man Hours Worked:	100	Records 02/03

Effect on Unit Availability

To measure the impact of this event on unit availability, the duration of the derating is converted to Equivalent Derated Hours. This conversion enables availability losses caused by deratings to be assessed on the same basis as losses caused by outages. It is done by multiplying the event duration (hours) by the size of reduction and dividing by the unit's Net Maximum Capacity (NMC). Size of Reduction is calculated by subtracting the reported Net Available Capacity as a result of the derating (NAC) from Net Dependable Capacity (NDC) of the unit. Equivalent Derated Hours for this event are:

$$[(600\ \text{MW} - 200\ \text{MW}) * 32\ \text{hours}]/600\ \text{MW} = 21.33$$

Thus, the availability of Riverglenn #1 is impacted for 21.33 Equivalent Derated Hours.

Component Repair

The air preheater required 32 hours to repair. The hours are not equivalent.

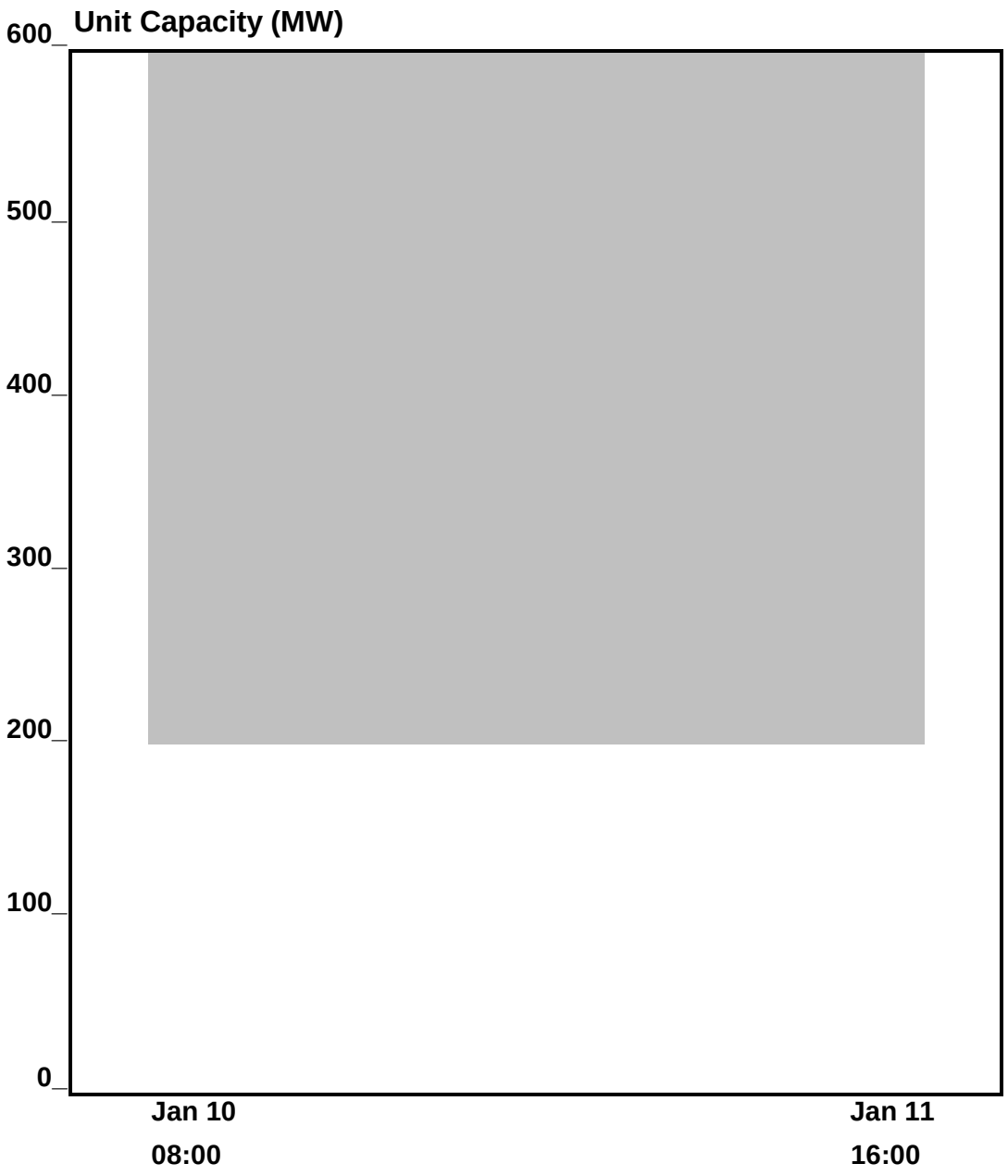

Figure G-2 — Simple Derating

Example 3A: Overlapping Deratings
Second Derating Begins and Ends During First Derating

Description of Events

Riverglenn #1 experienced an immediate 75 MW derating on March 9 at 8:45 a.m. The cause was an "A" pulverizer feeder motor failure (Derating "A"). Net Available Capacity (NAC) as a result was 525 MW.

At 10:00 a.m. the same day, the unit lost another 75 MW due to a trip of the "B" pulverizer feeder motor. The Net Available Capacity (NAC) as a result of the second derating (Derating "B") was 450 MW. The motor was restarted and Derating "B" ended an hour later. The capability of the unit increased by 75 MW at this time.

Derating "A" ended when the "A" pulverizer feeder motor was repaired and the unit brought back to full load at 6:00 p.m. on March 9.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0003	
Event Type:	D1	
Start of Event:	March 9 at 08:45	
End of Event:	March 9 at 18:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	525	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:		Records 02/03

Derating "B"

Event Number:	0004	
Event Type:	D1	
Start of Event:	March 9 at 10:00	
End of Event:	March 9 at 11:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	450	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:		Records 02/03

Effect on Unit Availability

In GADS, overlapping deratings are considered additive (unless the second derating occurs wholly within a derating of greater magnitude as in Example #4). When two deratings overlap, the size of reduction caused by

the second derating is determined by subtracting the Net Available Capacity as a result of the second derating from the Net Available Capacity of the unit as a result of the first derating.

The following shows the availability impact these two deratings had on the unit:

Derating "A": [(600 MW - 525 MW) * 9.25 hour]/600 MW = 1.16 Equivalent Derated Hours
Derating "B": [(525 MW - 450 MW) * 1.00 hour]/600 MW = 0.13 Equivalent Derated Hours

Component Repair

When "Time: Work Started" and "Time: Work Completed" are blank or asterisk-filled, the reported Start of Event and End of Event determine component repair time.

In this example, 10.25 hours are charged against the pulverizer feeder motor for repair (9.25 hours for Derating "A" and 1 hour for Derating "B.") These hours are not equivalent.

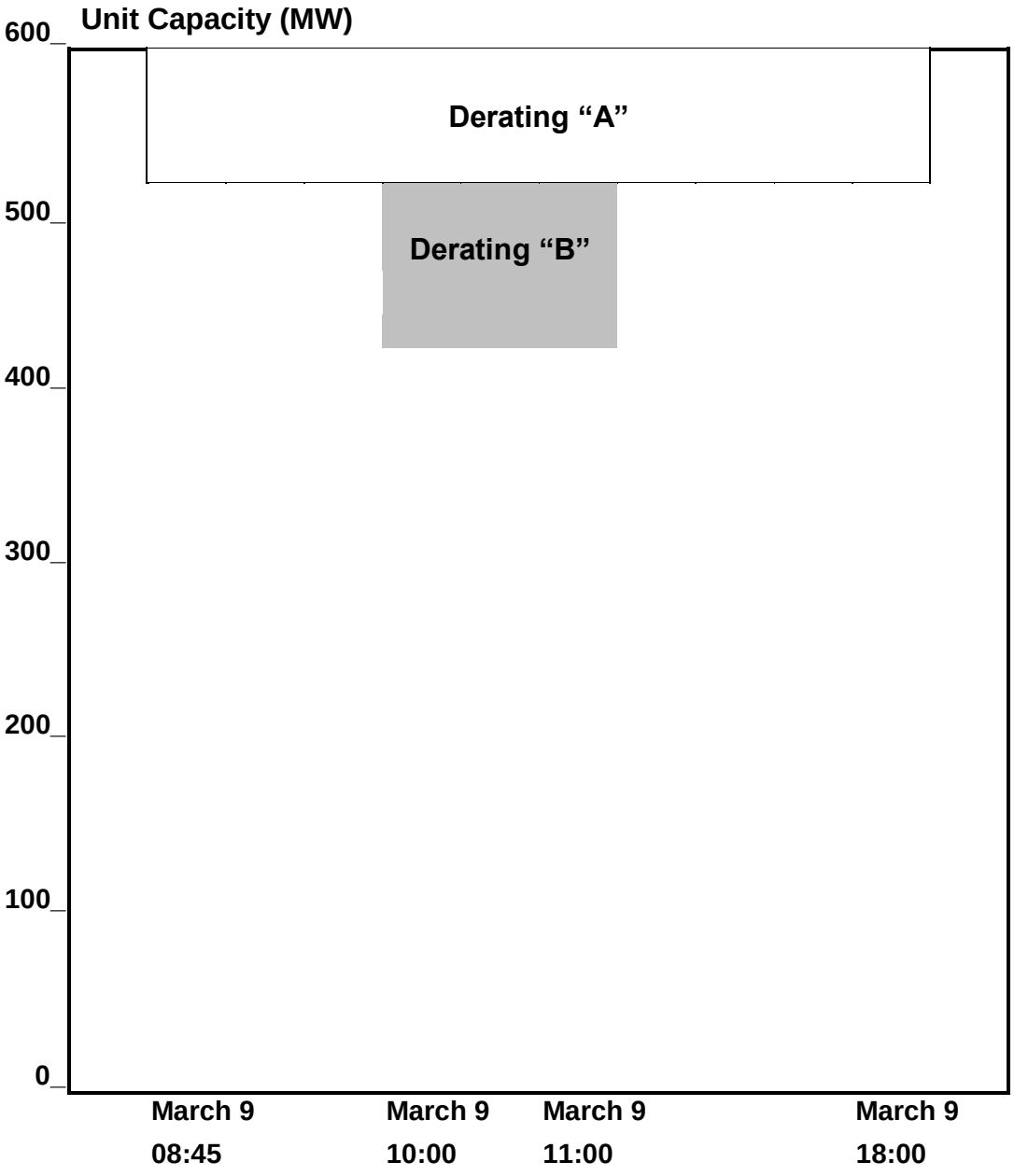

Figure G-3A — Overlapping Deratings

Second derating begins and ends during first derating

Example 3B: Overlapping Deratings
Second Derating Begins and Ends During First Derating
First is Partially Shadowed

Description of Events

A derating began on July 3 at 2:30 p.m., when capacity was reduced to 575 MW for condenser maintenance. The maintenance began July 13 at 8:00 a.m. The event ended on July 23 at 11:45 a.m.

On July 19 at 11:15 a.m., while the maintenance derating was in progress, a feedwater pump tripped. Load immediately fell to 360 MW. (This would have been the case, whether or not the unit was already derated.) The feedwater water pump was back in service at noon the same day.

Report the following on Records 01, 02, and 03 of Event Report (07):

Derating "A"

Event Number:	0005	
Event Type:	D4	
Start of Event:	July 3 at 14:30	
End of Event:	July 23 at 11:45	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	575	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3112	
Time: Work Started:	July 13 at 08:00	
Time: Work Completed:	July 23 at 11:45	
Man Hours Worked:	550	Records 02/03

Derating "B"

Event Number:	0006	
Event Type:	D1	
Start of Event:	July 19 at 11:15	
End of Event:	July 19 at 12:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	360	
Dominant Derating Column	D	Record 01
System/Component Cause Code:	3410	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

Dominant derates are not additive by definition. The reduction due to them always starts at NDC like an outage.

For the duration of the overlap of "A" by "B", or 0.75 hours, 25 MW, which would be attributed to derating "A" if it had occurred alone, are shadowed by derating "B" which acts on derating "A" like an outage. Because of shadowing, these equivalent hours are not double counted.

The unit's availability is affected as follows:

Derating "A": [(600 MW - 575 MW) * (477.25 hours – 0.75 hours)]/600 MW = 19.85 Equivalent Derated Hours
Derating "B": [(600 MW - 360 MW) * 0.75 hours]/600 MW = 0.30 Equivalent Derated Hours

Had derating "B" not been a dominant derate the two derates would have been additive (Figure G-3B would have to be redrawn with the top of Derate "B" starting at NAC_A) and the unit availability would have been affected as follows:

Derating "A": [(600 MW - 575 MW) * (477.25 hours)]/600 MW = 19.89 Equivalent Derated Hours
Derating "B": [(575 MW - 360 MW) * 0.75 hours]/600 MW = 0.27 Equivalent Derated Hours

Component Repair

Condenser maintenance took 243.75 hours. The feedwater pump was out of service for 0.75 hours. These hours are not equivalent.

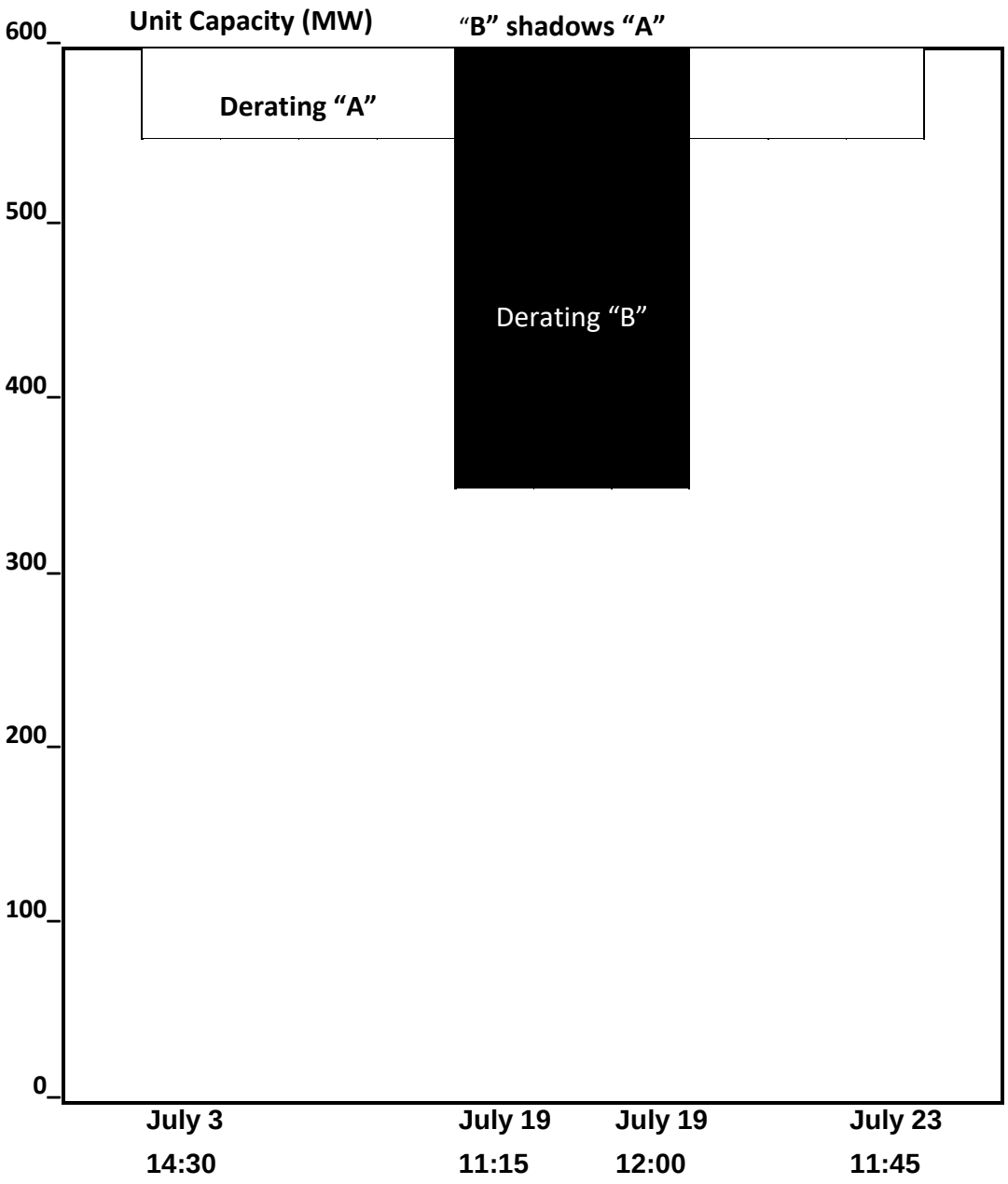

Figure G-3B — Overlapping Deratings

Second derating begins and ends during first derating
Second is partially shadowed

Example 3C: Overlapping Deratings
First Derating Ends before Second Derating Capability of Unit Changes

Description of Events

A 50 MW load reduction occurred on January 13 at 8:00 a.m. for a feedwater heater inspection (Derating "A"). The inspection had been planned several months earlier.

At 10:00 a.m., Riverglenn #1 experienced excessive pulverizer vibration. Available Capacity changed from 550 MW to 350 MW — a 200 MW reduction — as a result. A foreign object was the cause.

While the mill was under repair, the feedwater heater was put back in service, ending Derating "A" at 1:00 p.m. on January 13. This caused a 50 MW increase in the unit's Net Available Capacity.

Derating "B" ended on January 14 at 8:00 p.m. after completing pulverizer repairs.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0007	
Event Type:	PD	
Start of Event:	January 13 at 08:00	
End of Event:	January 13 at 13:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	550	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3340	
Time: Work Started:	January 13 at 08:30	
Time: Work Completed:	January 13 at 13:00	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0008	
Event Type:	D1	
Start of Event:	January 13 at 10:00	
End of Event:	January 14 at 20:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	350	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	0320	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	160	Records 02/03

Effect on Unit Availability

These two deratings are additive (See Example 3A). Availability is affected as follows:

Derating “A”: [(600 MW - 550 MW) * 5.00 hours)/600 MW = 0.42 Equivalent Derated Hours
Derating “B”: [(550 MW - 350 MW) * 34.00 hours)/600 MW = 11.33 Equivalent Derated Hours

Component Repair

The feedwater heater took 5 hours to repair and the pulverizer took 34 hours.

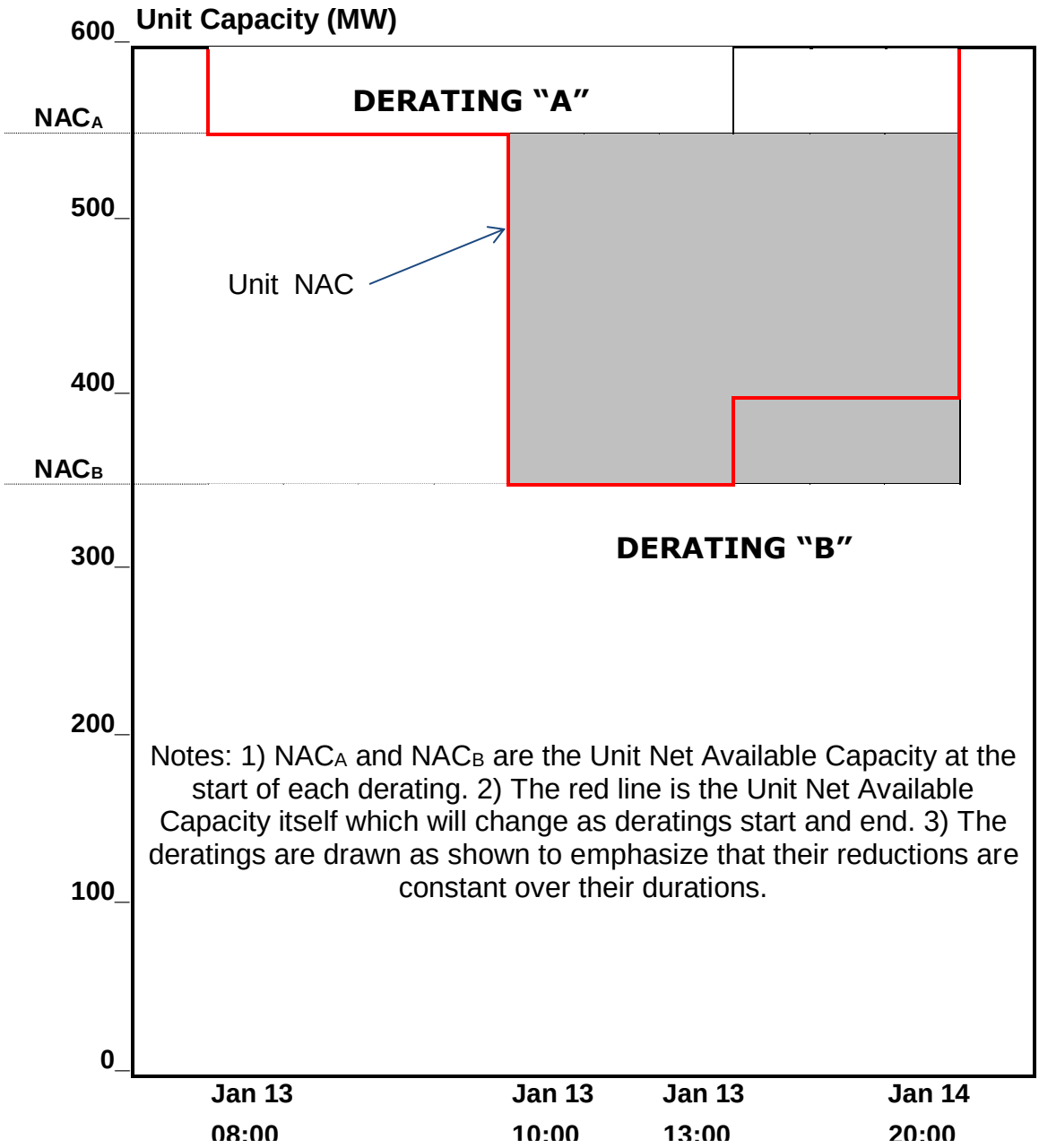

Figure G-3C - Overlapping deratings

First derating ends before second derating; capability changes

Example 3D: Overlapping Deratings First Derating Ends before Second Derating Capability of Unit Does Not Change

Description of Events

A circuit breaker tripped, causing an immediate 100 MW load reduction on March 10 at 6:30 a.m. (Derating "A.") At 7:45 a.m. the same day, a traveling screen jammed, causing one of the unit's circulating water pumps to shut down (Derating "B"). Net Available Capacity as a result of the event was 360 MW.

Derating "A" ended at 10:30 a.m. on March 10 when the circuit breaker repairs were completed. However, the traveling screen problem continued, forcing the unit to remain at 360 MW. The unit was available for full load on March 10 at 7:30 p.m. after completing repairs to the traveling screen.

Report the following on Records 01, 02 and 03 of Event Report (07):

Derating "A"

Event Number:	0009	
Event Type:	D1	
Start of Event:	March 10 at 06:30	
End of Event:	March 10 at 10:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	3661	
Time: Work Started:	March 10 at 08:00	
Time: Work Completed:	March 10 at 10:30	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0010	
Event Type:	D1	
Start of Event:	March 10 at 07:45	
End of Event:	March 10 at 19:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	360	
Dominant Derating Column	D	Record 01
System/Component Cause Code:	3260	
Time: Work Started:	March 10 at 08:15	
Time: Work Completed:	March 10 at 19:30	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

As shown in Example 3A GADS assumes that overlapping deratings are additive. In this example, however, Derating "A" and Derating "B" are not additive because the Net Available Capacity of the unit remains at 360 MW after the Derating "A" ends. The utility must report a dominant derating "turn off" of the additive assumption. To do this, end Derating "A" as normal and mark Derating "B" as a dominant derating (column 65 with a "D"). Net Available Capacity as a result of dominant derating is all that is necessary to retain the 360 MW available capacity.

The following losses are charged against unit availability:

Derating "A": [(600 MW - 500 MW) x 1.25 hours]/600 MW = 0.21 Equivalent Derated Hours
Derating "B": [(600 MW - 360 MW) x 11.75 hours]/600 MW = 4.70 Equivalent Derated Hours

Component Repair

The circuit breaker and the traveling screen are charged with 2.50 clock hours of repair and 11.25 clock hours of repair, respectively.

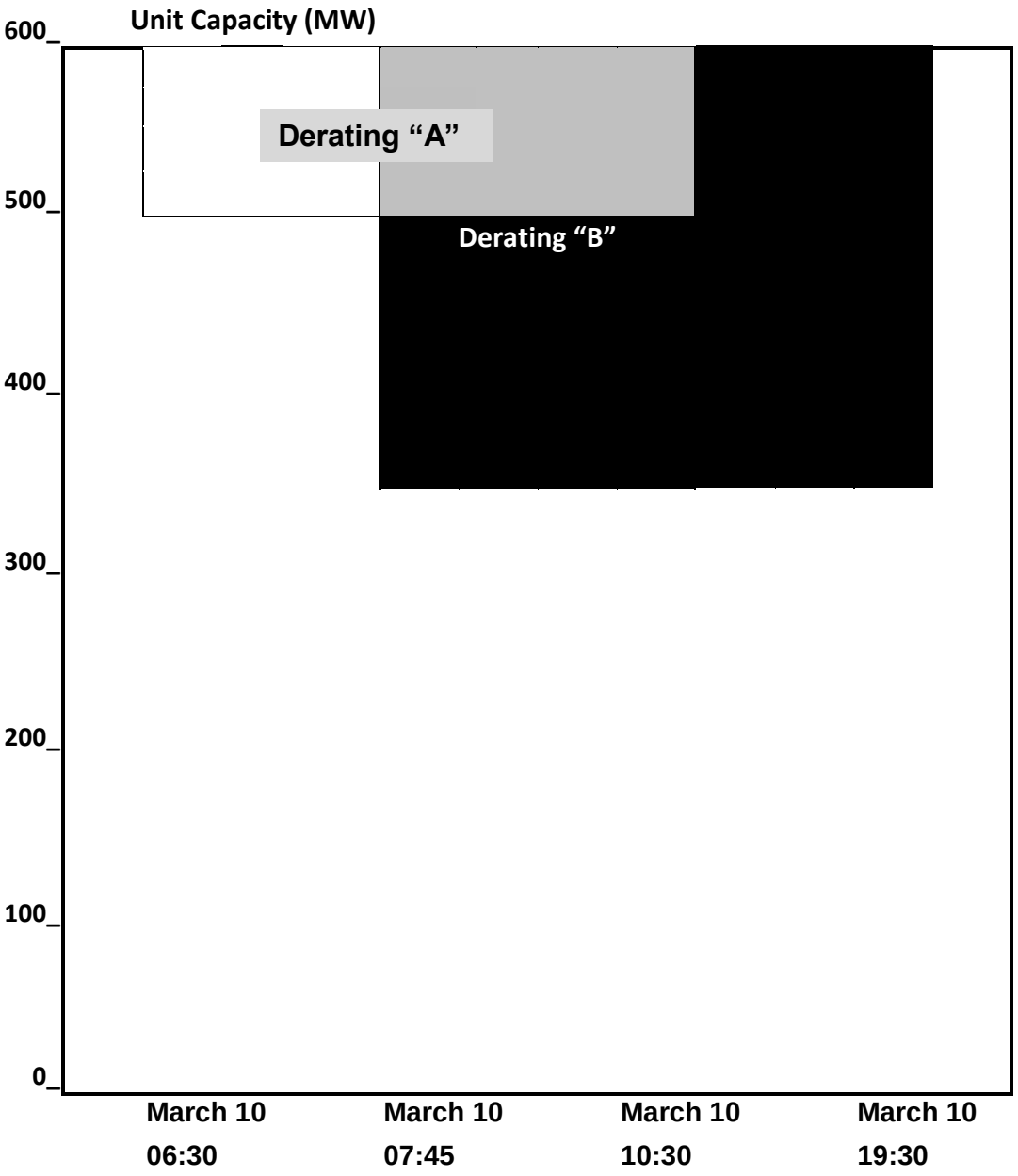

Figure G-3D - Overlapping Deratings

First derating ends before second derating
Capability of unit does not change

Example 4: Derating During a Dominant Derating

Event Description

A forced draft fan failed at 6:30 a.m. on April 10 causing a 300 MW reduction. Repairs began at 8:00 a.m. The unit returned to full capacity at 7:00 p.m. April 10.

During the force draft fan repair, a problem with the feedwater chemistry developed at 8:30 a.m. and it was corrected by 3:45 p.m. If it had occurred alone, a reduction of 100 MW would have resulted. In this example, it is completely shadowed by the dominant derating.

Report the following on Records 01, 02, and 03 of Event Report (07):

Derating "A"

Event Number:	0012	
Event Type:	D1	
Start of Event:	April 10 at 06:30	
End of Event:	April 10 at 19:00	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	300	
Dominant Derating Column:	D	Record 01
System/Component Cause Code:	1400	
Contribution Code:	1	
Time: Work Started:	April 10 at 08:00	
Time: Work Completed:	April 10 at 19:00	
Man Hours Worked:	*	Records 02/03

Derating "B"

Event Number:	0013	
Event Type:	D1	
Start of Event:	April 10 at 08:30	
End of Event:	April 10 at 15:45	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column:	(blank)	Record 01
System/Component Cause Code:	3352	
Contribution Code:	1	
Time: Work Started:	April 10 at 09:00	
Time: Work Completed:	April 10 at 15:45	
Man Hours Worked:	*	Records 02/03

Effect on Unit Availability

The forced draft fan caused the problem that affected Riverglenn's availability. The feedwater chemistry problem did not impact availability because it was completely shadowed by the dominant derating. The unit availability impact is:

[(600 MW - 300 MW) * 12.50 hours]/600 MW = 6.25 Equivalent Derated Hours

Component Repair

Although the feedwater chemistry problem does not affect unit availability, its occurrence should be reported. This information is important for analysis purposes. Never mentally manipulate shadowed events and report the results. Always report the actual events and let the math take care of the shadowing.

Repair of the forced draft fan took 12.5 hours. It took 7.25 hours to correct the feedwater chemistry problem.

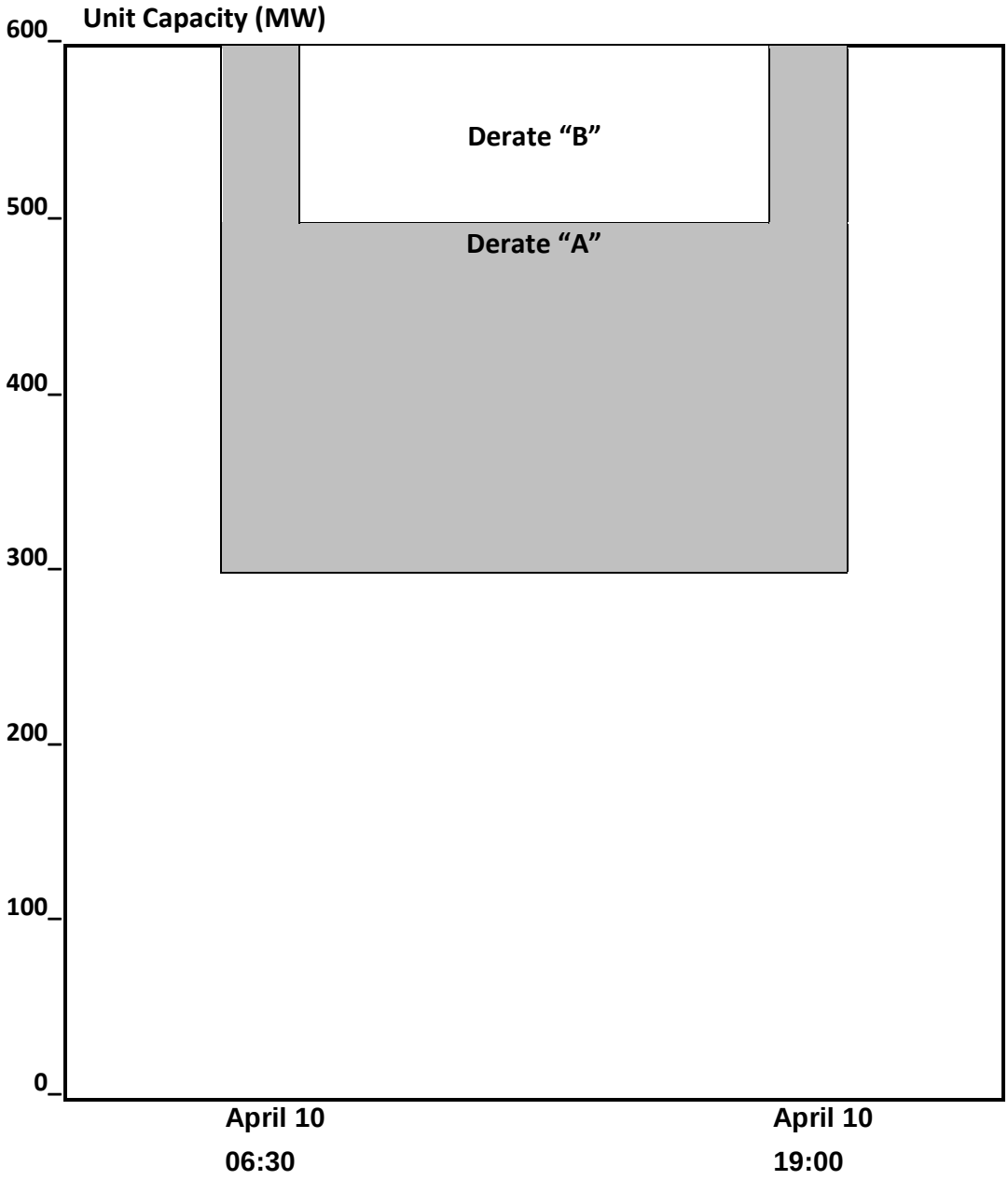

Figure G-4 – Derating During Dominant Derating

Example 5: Derating During a Reserve Shutdown

Description of Event

A reserve shutdown began on May 31 at 7:30 p.m. Maintenance crews took advantage of the off-line time and took one boiler feed pump (BFP) out of service (two other BFP were available) to repair the steam turbine. The work started at 8:00 a.m. on June 1 and ended on June 2 at 3:30 p.m. While the BFP valve maintenance was underway, the unit would have been able to synchronize, but would have been limited to 400 MW.

Riverglenn #1 was back in service on June 3 at 8:30 a.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0014	
Event Type:	RS	
Start of Event:	May 31 at 19:30	
End of Event:	June 3 at 08:30	
Dominant Derating Column	(blank)	Record 01

Event Number:	0015	
Event Type:	D4	
Start of Event:	June 1 at 08:00	
End of Event:	June 2 at 15:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	400	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	3412	
Time: Work Started:	June 1 at 08:00	
Time: Work Completed:	June 2 at 15:30	
Man Hours Worked:	80	Records 02/03

Effect on Unit Availability

Although it is off-line, a unit on reserve shutdown is available for full load. The "cause" of the event is economics, not equipment-related problems. However, if equipment is taken out of service that results in the unit's inability to come back on-line and achieve full load, the reserve shutdown status has changed. A new event that accurately reflects the available status of the unit is required.

In this example, Riverglenn was available for full load until the BFP valve work began. The status of the unit changed because it was no longer available for full load. A derating event must be reported. (An outage would be reported if the unit would have been unable to synchronize while the BFP work was in progress.) The unit availability impact resulting from the BFP valve maintenance is:

[(600 MW - 400 MW) * 31.50 hours]/600 MW = 10.50 Equivalent Derated Hours

Component Repair

The feedwater pump steam turbine required 31.50 hours to repair.

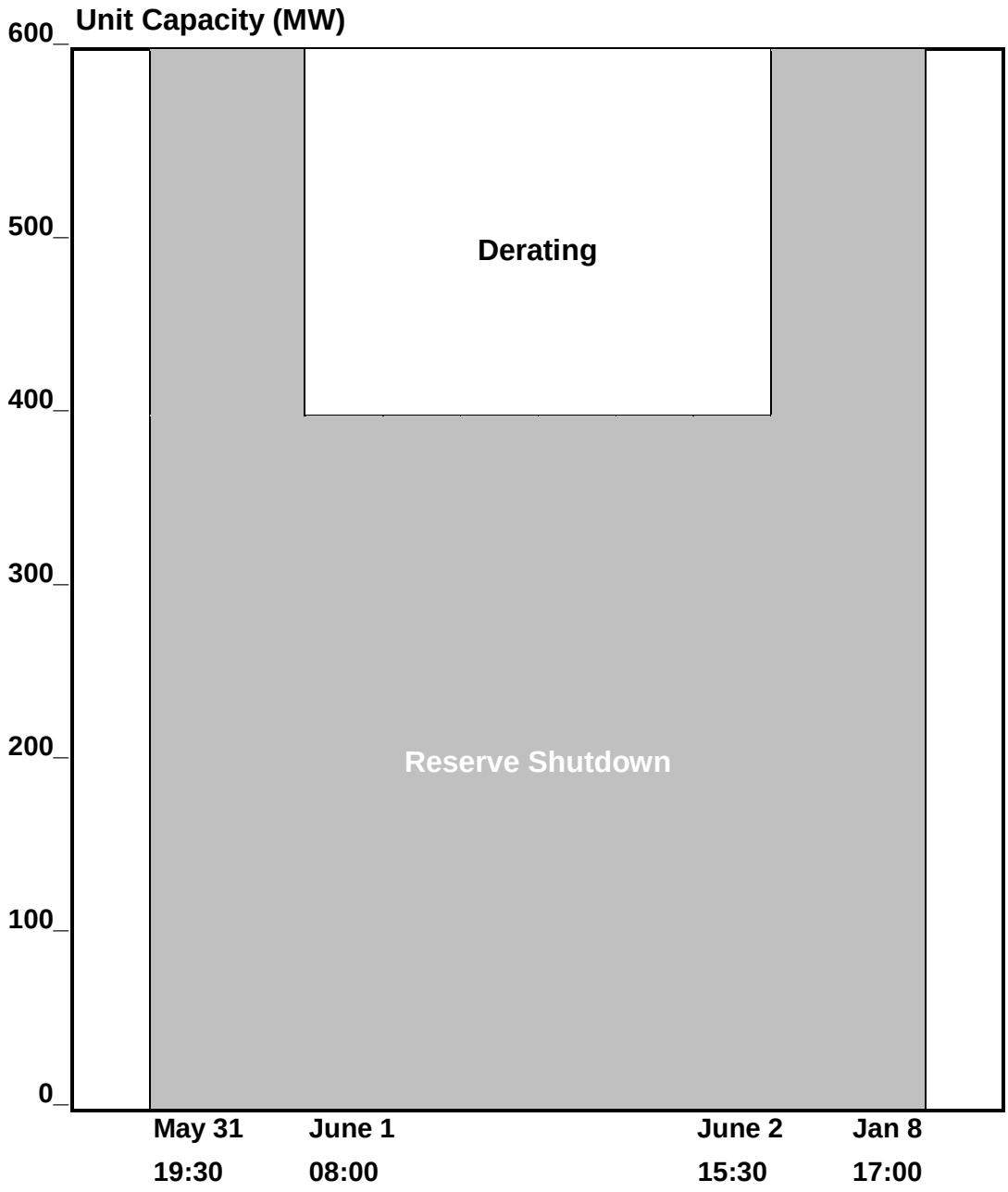

Figure G-5 — Derating During a Reserve Shutdown

Example 6a: Derating Overlapped by a Full Outage Derating Ends before Full Outage

Description of Events

Riverglenn #1 lost 100 MW due to a feedwater heater high-level trip at 9:45 a.m. on February 27. An L.P. heater tube leak was the cause. Repairs began March 2 at 8:00 a.m. A secondary superheater tube leak on March 2 at 1: 15 a.m. caused the unit to trip off-line.

The feedwater heater (cause of the derating) was repaired by March 4 at 6:30 p.m.

Repairs to the superheater (cause of the outage) were completed on March 4 at 10:00 p.m. The unit synchronized on March 5 at 9:22 a.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0016	
Event Type:	D1	
Start of Event:	February 27 at 09:45	
End of Event:	March 4 at 18:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	3340	
Time: Work Started:	March 2 at 08:00	
Time: Work Completed:	March 4 at 18:30	
Man Hours Worked:	234	Records 02/03

Event Number:	0017	
Event Type:	U1	
Start of Event:	March 2 at 01:15	
End of Event:	March 5 at 09:22	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	1050	
Time: Work Started:	March 2 at 12:00	
Time: Work Completed:	March 4 at 22:00	
Man Hours Worked:	600	Records 02/03

Effect on Unit Availability

The feedwater heater problem impacts availability until the outage begins:

[(600 MW - 500 MW) * 63.50 hours]/600 MW = 10.58 Equivalent Derated Hours

Once initiated, the outage assumes full responsibility for loss of availability. That is 80.12 hours in this example.

Component Repair

The feedwater heater was unavailable for 128.75 hours, the superheater for 80.12.

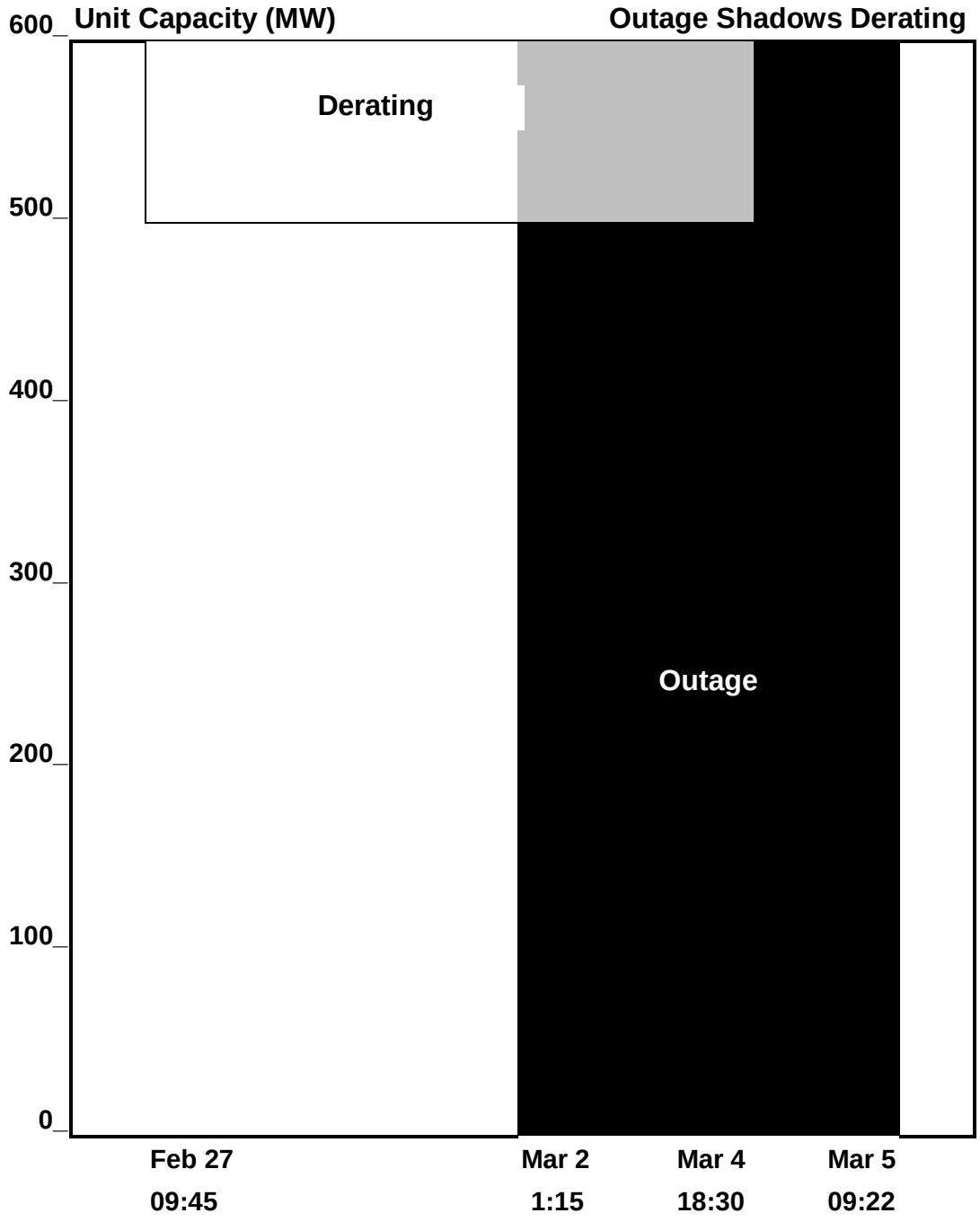

Figure G-6A — Derating Overlapped by an Outage
Derating Ends before Outage

Example 6B: Derating Overlapped by a Full Outage Full Outage Begins and Ends During Derating

Description of Events

A pulverizer motor failed on May 18 at 09:45 a.m. causing a 100 MW derating.

While the unit was derated, a maintenance crew discovered a severe water wall tube leak, forcing the unit off-line immediately. That occurred on May 20 at 6:45 p.m. The tube was welded, and the unit brought back into service at 2:42 a.m. on May 24. Pulverizer repairs were still in progress, so the unit was limited to 500 MW. The unit was available for full load on May 25 at 2:30 p.m. when pulverizer repairs were completed.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0018	
Event Type:	D1	
Start of Event:	May 18 at 09:45	
End of Event:	May 25 at 14:30	
Gross Available Capacity as a Result of the Event:	*	
Net Available Capacity as a Result of the Event:	500	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	0253	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	16	Records 02/03

Event Number:	0019	
Event Type:	U1	
Start of Event:	May 20 at 18:45	
End of Event:	May 24 at 02:42	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	1000	
Time: Work Started:	*	
Time: Work Completed:	*	
Man Hours Worked:	60	Records 02/03

Effect on Unit Availability

The outage interrupts the derating for 79.95 hours. The derating affects availability for 57 hours before the outage and 35.80 hours after the outage. Availability losses due to the derating are:

[(600 MW - 500 MW) * (57.00 Hours + 35.80 Hours)]/600 MW = 15.47 Equivalent Derated Hours

Component Repairs

Repair of the pulverizer motor, the cause of the derating, took 172.75 hours. The waterwall tube section repairs took 79.95 hours.

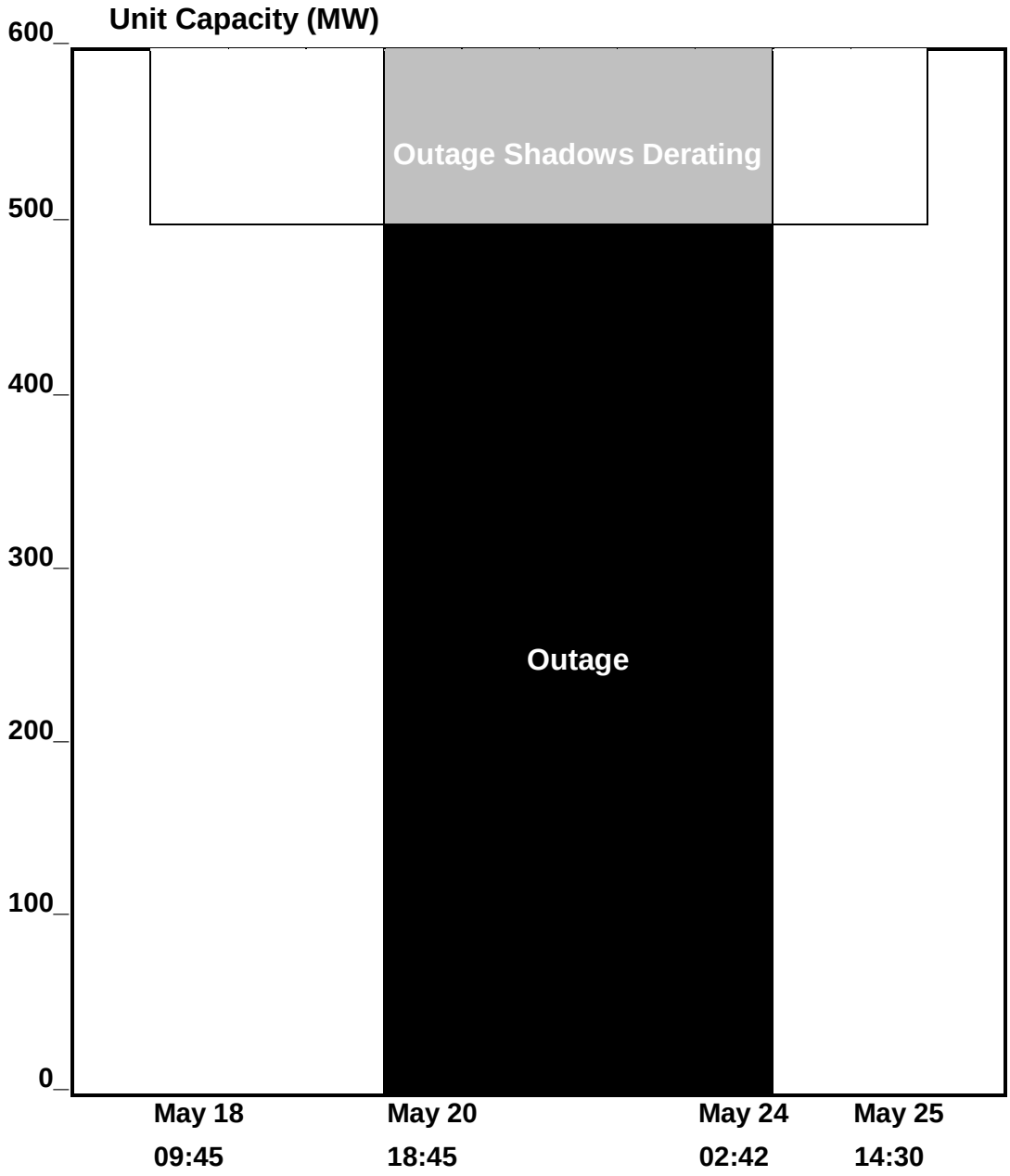

Figure G-6B — Derating Overlapped by an Outage
Outage Begins and Ends during Derating

Example 7: Startup Failure

Event Description

Riverglenn began its normal 15-hour startup cycle following a two-week planned outage on October 1, 7:00 a.m. At the end of the normal cycle; however, the unit was not ready to synchronize. The reason was excessive H.P. turbine rotor vibration. The problem was corrected and Riverglenn #1 synchronized at 3:00 a.m. on October 3.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0022	
Event Type:	SF	
Start of Event:	October 1 at 22:00*	
End of Event:	October 3 at 03:00	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	4030	
Time: Work Started:	October 1 at 23:00	
Time: Work Completed:	October 2 at 16:00	
Event Contribution Code:	1	
Man Hours Worked:	*	Records 02/03

Effect on Total Unit Availability

*The startup failure event began when the 15-hour startup cycle was exceeded. The unit is charged with a forced outage (SF) for the 29 hours it took to repair the H.P. turbine vibration problem and synchronize the unit.

Component Repair

The H.P. turbine rotor shaft took 17 hours to repair.

An outage or reserve shutdown must immediately precede a Startup Failure event. The end of the outage must be the same as the start of the SF event (see Page III-8).

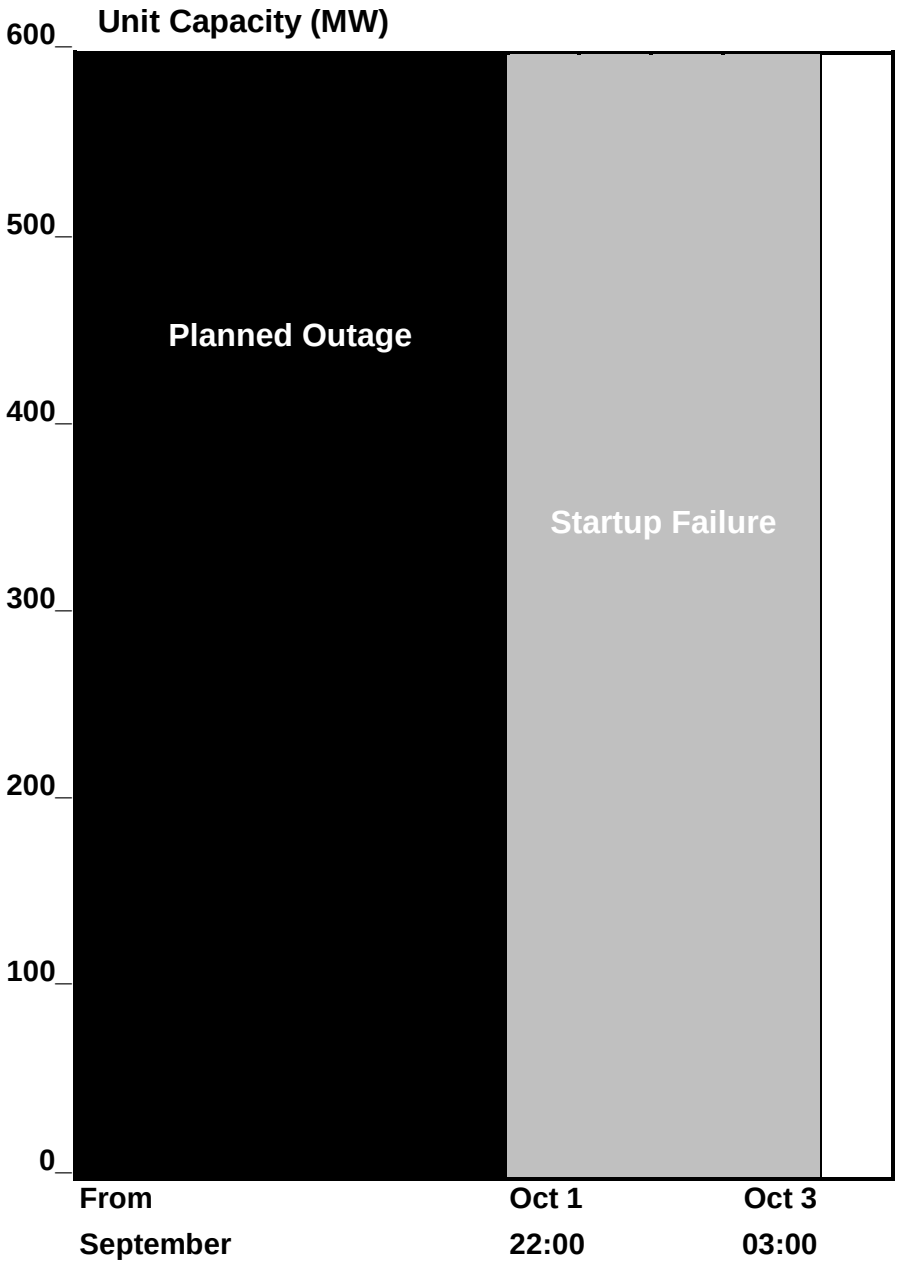

Figure G-7 — Startup Failure

Example 8: Fuel Conservation

Description of Events

On June 10 at 8:00 a.m., management decided to operate Riverglenn #1 at 50% capacity – 300 MW – in order to avoid a potential fuel shortage. If system demand increased, Riverglenn would be returned to full load. Because Riverglenn was not limited by equipment, the decision to operate at a reduced load was an economic issue.

On August 25 at 5:00 a.m., the station reported that fuel was in short supply and the unit could no longer reach full load as a result. An unplanned derating began when fuel became a limitation. The Net Available Capacity as a result of the derating was 300 MW.

Riverglenn's fuel supply was exhausted on September 3 at 9:00 p.m. and the unit was forced out of service. A new supply of fuel was delivered on September 4. The unit was restarted and synchronized at 4:00 p.m. on September 6.

Report the following on Records 01, 02, and, 03 of Event Report (07):

Event Number:	0020	
Event Type:	D1	
Start of Event:	August 25 at 05:00	
End of Event:	September 3 at 21:00	
Gross Available Capacity as a Result of Event:	*	
Net Available Capacity as a Result of Event:	300	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	9130	
Time: Work Started:	*	
Time: Work Ended	*	
Man Hours Worked:	*	Records 02/03

Event Number:	0021	
Event Type:	U1	
Start of Event:	September 3 at 21:00	
End of Event:	September 6 at 16:00	
Dominant Derating Column	(blank)	Record 01

System/Component Cause Code:	9130	
Time: Work Started:	*	
Time: Work Ended:	*	
Man Hours Worked:	*	Records 02/03

Effect of Unit Availability

Availability was unaffected until the fuel limitation prevented the unit from returning to full load. When that occurred, unit availability was affected. Equivalent Derated Hours for the derating are 116 ([(600 MW - 300 MW * 232.00 hours)/600] = 116). The outage was responsible for 67.00 unavailable hours.

The situation described typically affects fossil and hydro units. Nuclear units are sometimes operated at reduced levels to "stretch the core" in order to prolong the time to the next refueling. If the reactor core is capable of full load, the decision to operate at a lower level is an economic issue and therefore not reportable to GADS. When

the core can no longer support operation at full load, a planned derating (PD) is reported. This condition is sometimes referred to as “coasting down.” The magnitude of these deratings usually increase incrementally and should be reported as a series of PD events.

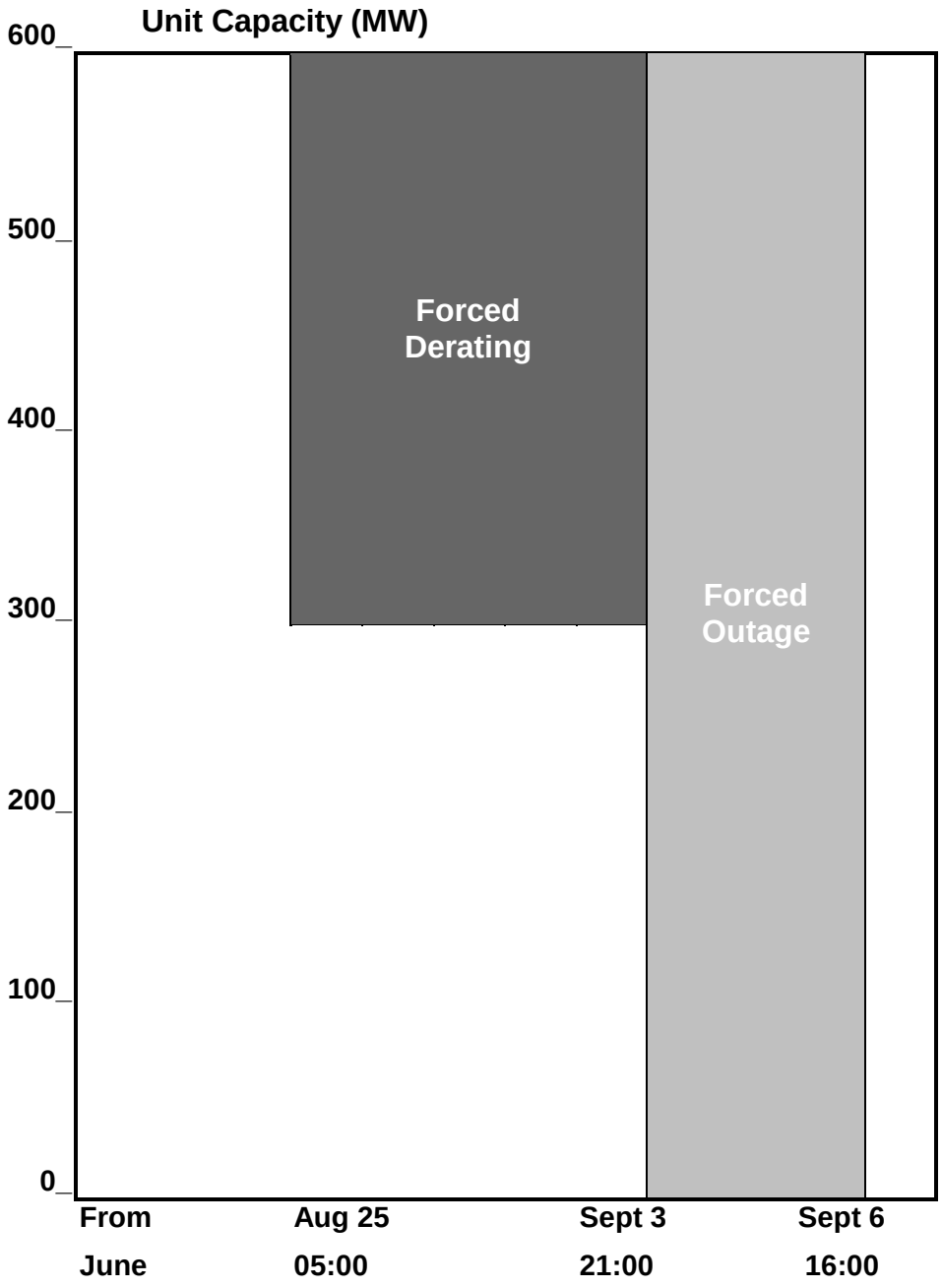

Figure G-8 — Fuel Conservation

Example 9: Transitions - U2 to RS to SF

Description of Events

After experiencing several hours of excessive scrubber ID fan vibration, Riverglenn was taken off line for repair on December 3 at 3:30 p.m. After pinpointing the problem, repairs were made. The unit was ready to begin its normal 15-hour startup cycle by 21:30 p.m. on December 5. However, due to low demand, Riverglenn entered the reserve shutdown state. Startup began at 2:30 a.m. the following morning. Several waterwall tubes burst during the startup, requiring immediate repair. The tube problem occurred at 9:00 a.m. on December 6. After repairing the tubes and a successful startup, Riverglenn synchronized on December 9 at 5:00 p.m.

Report the following on Records 01, 02 and 03 of Event Report (07):

Event Number:	0023	
Event Type:	U2	
Start of Event:	December 3 at 15:30	
End of Event:	December 5 at 21:30	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	8262	
Time: Work Started:	December 3 at 16:00	
Time: Work Completed:	December 5 at 06:30	
Man Hours Worked:	72	Records 02/03
Event Number:	0024	
Event Type:	RS **	
Start of Event:	December 5 at 21:30	
End of Event:	December 6 at 09:00	
Dominant Derating Column	(blank)	Record 01
Event Number:	0025	
Event Type:	SF	
Start of Event:	December 6 at 09:00	
End of Event:	December 9 at 17:00	
Dominant Derating Column	(blank)	Record 01
System/Component Cause Code:	1000	
Time: Work Started:	*	
Time: Work Completed:	*	
Event Contribution Code:	1	Records 02/03

Effect on Unit Availability

In this sequence of events — U2 to RS to SF — Riverglenn's availability is affected for 54.00 actual hours due to ID fan problems and 80.00 actual hours due to the water wall tube failure.

Component Repair

The scrubber ID fan is charged with 38.50 repair hours, and the water wall tubes with 80.00 repair hours.

*** Reporting a primary cause of event for Reserve Shutdowns is optional. In this example, Records 02/03 were omitted.*

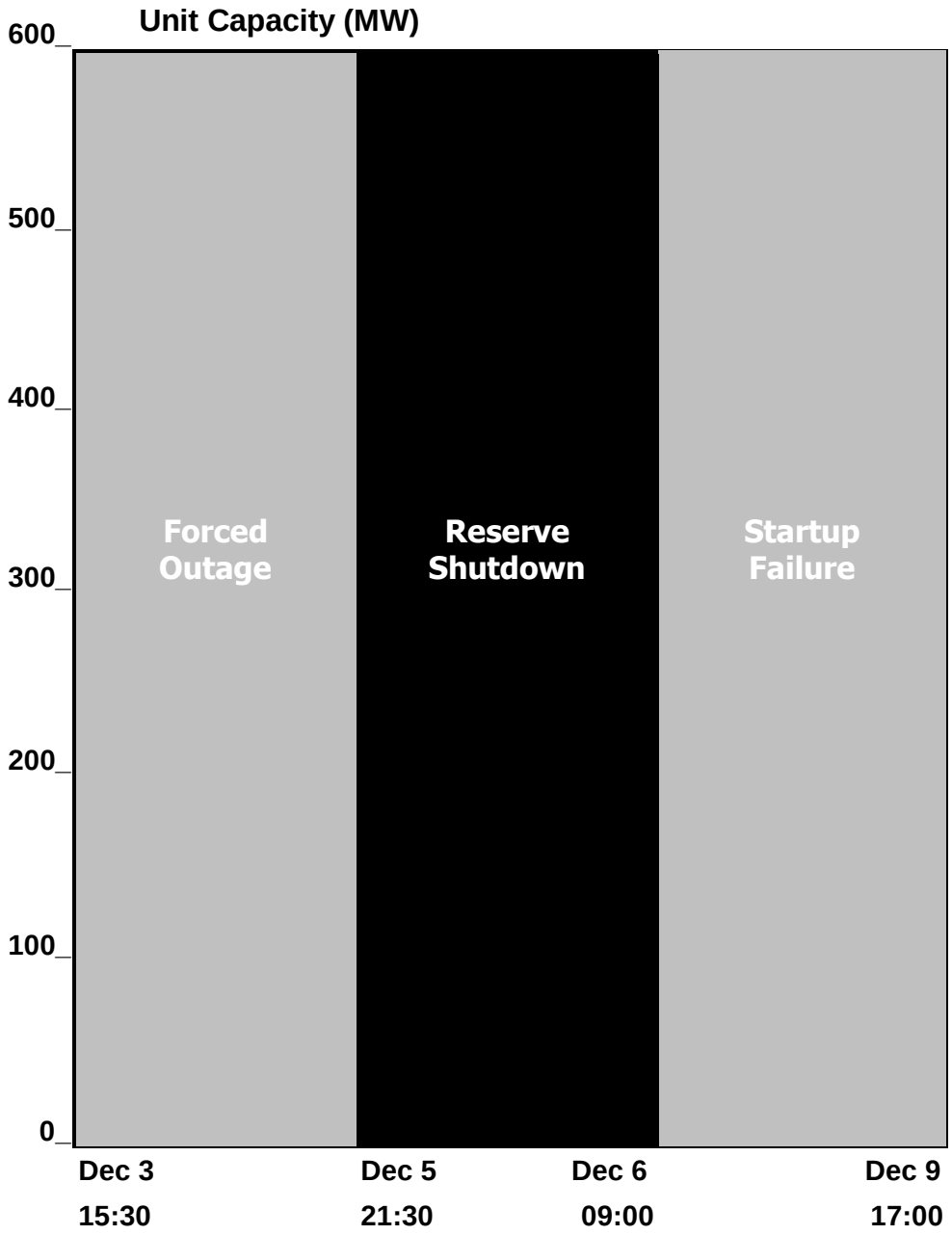

Figure G-9 — Event Transitions U2 to RS to SF