



Unplanned outage

Purpose: This performance commitment is designed to incentivise the company to appropriately maintain and improve the asset health of the non-infrastructure or above-ground water assets and demonstrate its commitment to its asset stewardship responsibility.

Benefits: This performance commitment helps to ensure that the overall asset health of the above-ground water assets is maintained and improved for the benefit of current and future generations.

Version control

Version	Date of issue	Performance commitment changes
0.1	22 December 2022	Published at final methodology, changes to definition from draft methodology identified in red text.
0.2	09 May 2023	Removal of red text. Exclusions for WQ removed from flowchart. Replacement of text in bullet point in section 1.4, to clarify treatment of adjustments for over-running planned outages.
1.0		
2.0		

Performance commitment definition and parameters

1.1 Detailed definition of performance measure

It measures the unplanned loss of peak week production capacity and reports this loss as a percentage of the overall company peak week production capacity. It provides an appropriate incentive for the company to ensure that treatment works are maintained to reduce the risk that unplanned outage occurs when capacity is required.

The actual unplanned outage should be reported as the temporary loss of peak week production capacity (PWPC) in the reporting year weighted by the duration of the loss (in days). Outages arising from planned works should be recorded separately to outages arising from unplanned causes, such as asset failure.

The calculation for both figures is:

$$\frac{\textit{Reduction in peak week production capacity} \times \textit{Duration in days}}{365}$$

Unplanned outage for each water production site is calculated separately and then summed over the reporting year to give a total actual unplanned outage for the water resource zone.

The company water resource zone weighted outage can then be summed (Ml/d) and normalised based on overall company PWPC to be reported as a percentage.

A calculation example is as follows:

For a single source works:

A source works has a PWPC of 30 MI/d

For 15 days the maximum production capacity is reduced to 15MI/d due to a temporary unplanned outage (pump failure). This is a loss of PWPC of 15 MI/d for 15 days.

The weighted unplanned outage for this source works = $15 \times (15 / 365) = 0.62$ MI/d

Each weighted unplanned outage is then summed over the reporting year to give a total unplanned outage for the water resource zone.

For a water resource zone:

First source works in zone – weighted unplanned outage = 0.62 MI/d

Second source works in zone – weighted unplanned outage = 2.58 MI/d

Third source works in zone – weighted unplanned outage = 3.67 MI/d

Zonal weighted outage = 6.87 MI/d

The company water resource zone weighted unplanned outage can then be summed and normalised based on overall company PWPC.

Company normalising:

Zone 1 weighted unplanned outage = 6.87 MI/d

Zone 2 weighted unplanned outage = 7.95 MI/d

Company weighted unplanned outage = 14.82 MI/d

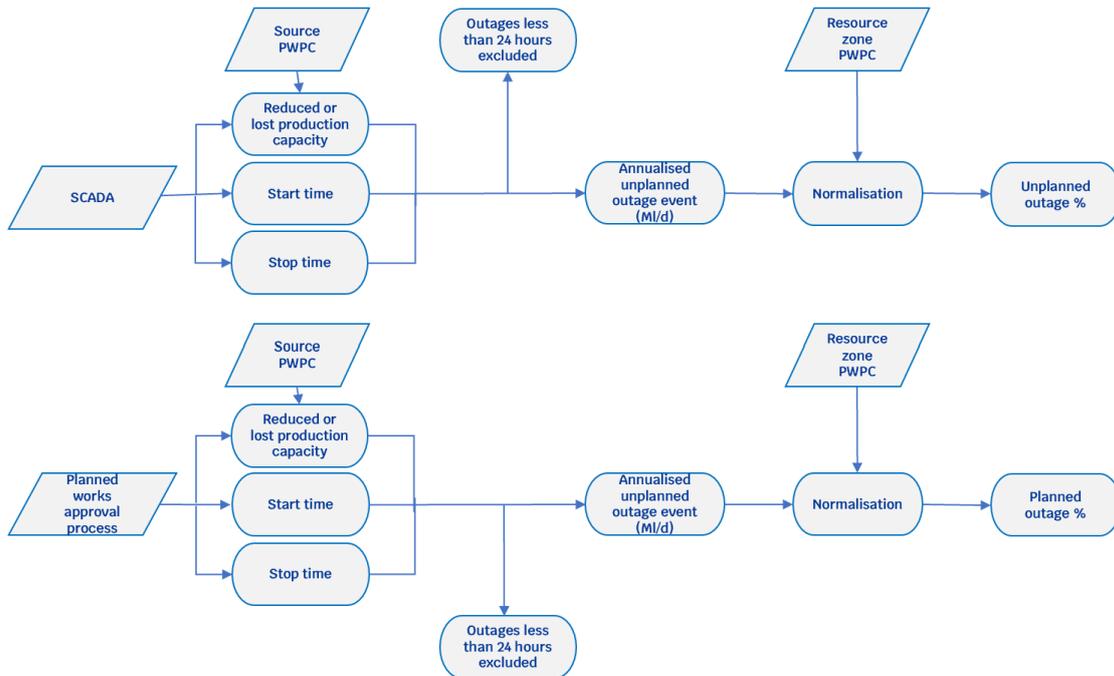
Company PWPC = 120 MI/d

Unplanned outage proportion = 12.4%

1.2 Additional detail on measurement units

The process for deriving planned and unplanned outage is shown in the following diagram.

Figure 1 Flow diagram for unplanned outage



Components of unplanned outage calculation

Peak Week Production Capacity

The company shall define its PWPC for each water production site or source works included as an input to its latest water resources management plan (WRMP). PWPC for this measure is not expected to be the same number as reported for dry year availability or deployable output (although it is possible that it may be the same).

For this measure, PWPC is equivalent to the maximum volume of water which can be put into supply and sustained over a period of one week measured in MI/d. This should be at least as great as the highest historic performance that has been sustained for any seven-day period in the last five years (unless a change to assets or process can be evidenced) but could be higher. This should be supported by physical tests to demonstrate capability undertaken at least once every five years.

The value should be reviewed annually and as modifications to assets and processes are completed which impact capacity. PWPC is a fixed value for each production site each year unless a change to assets or process can be evidenced.

PWPC does not account for seasonal changes in yield (most commonly observed at groundwater sources) and allowed abstraction volumes (most commonly observed at river sources) which are weather dependent and not an indicator of asset health.

The company shall:

- define PWPC for each water production site;
- review PWPC annually;
- support PWPC with evidence of actual output or of capacity tests undertaken on a rolling programme each five years. This should be based on a risk-based approach for each works and the duration of testing does not need to extend to seven days; and
- support revisions to PWPC with evidence of changes to assets or processes.

Asset failure / unplanned outage

The failure or deterioration of any asset which impacts on the ability to deliver the PWPC should be recorded as an unplanned outage. This may be a failure which impacts part or all of the production plant which contributes to PWPC.

This can include:

- source abstraction assets (e.g. abstraction pumps, screens, boreholes);
- raw water transport assets (e.g. pumping plant and mains);
- raw water storage assets (e.g. balancing reservoirs);
- water treatment assets;
- treated water storage assets (e.g. contact tanks, pre-distribution storage); and
- treated water distribution assets before distribution input meter (e.g. treated water pumping).

In some circumstances the failure of assets upstream of the treated water distribution assets may not impact on the PWPC.

For example, where a river abstraction is pumped to bankside storage and then stored water is pumped onto treatment works, the failure of an abstraction pump may not impact PWPC as water onto the treatment works can be maintained from the raw water storage. The length of time that this asset is unavailable will determine whether the PWPC is reduced and therefore contributes to unplanned outage.

Where asset failures occur at water production sites with standby assets this may also not impact PWPC.

For example, a groundwater site with a PWPC of 10MI/d may have three boreholes on site, all with capacity of 5MI/d. Under normal circumstances boreholes 1 and 2 may be operated to provide the site output of 10MI/d. If the pump in borehole 1 fails, then borehole 3 is switched on to replace the lost capacity. Providing borehole 3 is switched on within 24 hours to replace the failed asset in borehole 1 there would be no unplanned outage recorded.

There may need to be an outage at a later stage to repair or replace the failed pump. Whilst this can be scheduled and planned for a convenient time the reason for the need to make the repair is an unforeseen failure of an asset and therefore the outage for the scheduled repair or replacement should also be classified as unplanned.

Where planned work is undertaken as a result of an asset failure the resultant reduction in PWPC should be recorded as unplanned.

Planned outages

Where assets are taken out of supply or made unavailable for supply to enable planned maintenance or capital works to be completed then these should be recorded as planned outages. The same principles for work on standby assets apply here as for unplanned outages.

It is expected that the company will have a process whereby planned works on production assets are approved and scheduled. This may be the basis of evidence to demonstrate that the outage is planned.

If planned maintenance or capital works overruns meaning that PWPC is reduced, the overrunning period and subsequent impact on PWPC should be recorded as unplanned outage.

Duration

Only outage events which exceed 24 hours in duration should be included in this measure. Outage duration should be recorded to the nearest whole day with normal rounding rules applied. For the avoidance of doubt, all outages below 24 hours are excluded, and rounding does not apply. The duration may span a calendar day.

By way of an example of rounding, an unplanned outage of 79 hours would be 3 days whereas an unplanned outage of 115 hours would be 5 days.

The company shall identify the start of an outage period using telemetry data wherever possible. If the company uses another source of data to indicate the start of an outage period it shall specify the data source and demonstrate auditable record keeping.

The end of the unplanned outage period should be recorded as the time when the asset was returned to a state meaning the availability of PWPC is restored. For the avoidance of doubt this should not be when the individual asset is repaired or work completed but when the recommissioning process is completed, except when there is no immediate requirement to put an asset back into service.

In this case the repair time is taken as the end of the unplanned outage period. If when the asset is next required to be put into service, it operates in a way that would count as an unplanned outage (i.e. not delivering full PWPC as expected), the start time for the reported unplanned outage should be that of the original outage.

For example:

- if a borehole pump is replaced due to an unexpected failure or planned works the end of the unplanned outage is not when the pump replacement is completed but when any subsequent pumping to waste and water quality testing is finished and full PWPC is restored, if the pump is required in service immediately; or
- if the pump is not required in service immediately, then repair or replacement time is taken as the end of the unplanned outage. When the pump is next required to be put into service, should it operate in a way that would count as an unplanned outage, the start time for the reported unplanned outage should be that of the original outage.

Where the company chooses not to respond immediately to an unplanned outage such as a failure at the weekend for which alternative water can be deployed the duration may be longer than it might otherwise have been. The company shall make no adjustment for this in the measurement of the duration of the unplanned outage. This may result in reporting higher unplanned outage figures but given that alternative sources are available it is unlikely that the unplanned outage in this example would be contributing a large amount to the overall company PWPC and so would therefore have a relatively small impact on the overall measure.

Repeated unplanned outages at the same water production site should be treated as separate events with independent start and finish times unless the initial outage repair and recommissioning was not concluded and there was not full restoration of available PWPC.

Reduction in Peak Week Production Capacity

For each unplanned outage the impact of the outage is recorded as the reduction in PWPC. For asset failures or programmed work resulting in the total loss of water production from the site then the impact of the outage is recorded as the total PWPC for the site. Some asset failures or programmed work may result in a reduction of PWPC.

For example, a groundwater source with a PWPC of 10Ml/d may have three boreholes on site, all with capacity of 5Ml/d. Under normal circumstances boreholes 1 and 2 may be operated to provide the site output of 10Ml/d. If the pumps in boreholes 1 and 2 fail then borehole 3 is switched on but can only replace half the lost capacity. The lost PWPC in this instance would be 5Ml/d. The replacement of the failed pumps may require the whole output to cease for the period of the works. From the point at which the output is zero the lost capacity would increase to 10Ml/d and would have a separate duration to the initial partial reduction in capacity.

1.3 Specific exclusions

None.

1.4 Reporting and assurance

The company shall maintain verifiable records for all unplanned outage irrespective of whether they are included. The aim of the records is to provide an auditable method for identifying specific incidents and shall be subject to each company's assurance process which is applied to all measures reported annually.

The company shall maintain a methodology statement, which shall be used as a decision support tool for this performance commitment. It shall record any changes in approach compared to previous years and will be reviewed as part of the company's assurance process.

The company shall report unplanned outages and planned outages separately. The company shall report its current company level PWPC (Ml/d), the unplanned outage (Ml/d) and planned outage (Ml/d). The company shall also provide a summary of data quality and compliance in accordance with the reporting requirements.

The company is expected to:

- record unplanned outages over 24 hours in duration;
- record unplanned outages as unplanned even if they result in a programmed outage later;

- measure duration to the nearest whole day;
- record the start and end time of an outage using telemetry data;
- record the end of an unplanned outage as when recommissioning is completed and PWPC is fully restored except when there is no immediate requirement to put an asset back into supply. In this instance the repair time is taken as the end of the unplanned outage. When the asset is next required to be put into service, if it operates in a way that would count as an unplanned outage, the start time for the reported unplanned outage should be that of the original outage;
- approve and schedule each planned outage before any work commences and any outage occurs. Expected times that outage will start and end for operational planning must be recorded as part of this. Any outage exceeding the end time that was expected before the work began is to be included within the unplanned outage figure;
- make no adjustment for unplanned outages which are not responded to immediately; and
- justify use of data sources other than telemetry.

The compliance checklist below shall be completed and presented with the reported figure.

We expect the company to continuously improve in the short and medium term through innovation, new technology, data quality improvements and staff training.

The company shall ensure that its outcome delivery incentive payments only relate to real performance changes and not definitional, methodological or data changes in performance commitments.

Compliance checklist

The company is requested to complete the checklist below and report by exception to Ofwat if any element is not green. Where an element is not green, we may intervene to protect customers and ensure that the company does not benefit from insufficient data quality. See Annex 1 for assessment rules for each element.

Table 1 Compliance checklist for unplanned outage

	Component	Component R/A/G	Reason for any non-compliant component	Confidence grade
1	PWPC			

	Component	Component R/A/G	Reason for any non-compliant component	Confidence grade
1a	Annual review			
1b	PWPC by production site			
1c	Water resource zone PWPC			
2	Asset failure /unplanned outage			
2a	Source data			
3	Planned outages			
3a	Source data – programme of works			
4	Duration			
4a	Start time			
4b	End time			
5	Rounding reduction in capacity			
5a	Reduced capacity			
5b	Total outage			

Table 2 Definition parameters

Parameters	
Measurement unit and decimal places	Percentage of peak week production capacity, reported to two decimal places.
Measurement timing	Reporting year
Incentive form	Revenue
Incentive type	Outperformance and underperformance payments
Timing of underperformance and outperformance payments	In-period
Price control allocation	100% water network plus
Frequency of reporting	Annual
Any other relevant information	N/A
Links to relevant external documents	N/A

Annex 1 Compliance Checklist

This annex sets out the criteria on which to report checklists where specified in the performance commitment definition.

Compliance for elements is reported against:

R	Not compliant with the guidance and having a material impact on reporting
A	Not compliant with the guidance and having no material impact on reporting
G	Fully compliant with the guidance

An overall RAG to be assigned for each component based on the following rules:

Compliance for overall components is reported against:

R	There are one or more red elements in the component, or the combined effect of amber elements is considered to produce a material impact.
A	Half or more of the elements in the component are amber and the combined effect of the amber elements is considered not to produce a material impact
G	More than half of the elements in the component are green

For each component on the checklist, and for the overall performance measure, the company will report a confidence grade. Confidence grades provide a reasoned basis for the company to qualify the reliability and accuracy of the data.

The company shall employ a quality assured approach in the methodology used to assign confidence grades, particularly if sampling techniques are in place. The confidence grade combines elements of reliability and accuracy, for example:

A2 - Data based on sound records etc. (A, highly reliable) and estimated to be within +/- 5% (accuracy band 2) Reliability and accuracy bands are shown in the tables below.

Reliability Band	Description
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment.
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, some use of extrapolation.
C	Extrapolation from limited sample for which Grade A or B data is available.

D	Unconfirmed verbal reports, cursory inspections or analysis.
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Accuracy band	Accuracy to or within +/-	But outside +/-
1	1%	-
2	5%	1%
3	10%	5%
4	25%	10%
5	50%	25%
6	100%	50%
X	Accuracy outside +/- 100 %, small numbers or otherwise incompatible (see table below)	

Certain reliability and accuracy band combinations are considered to be incompatible, and these are blocked out in the table below.

Compatible confidence grades				
Accuracy band	Reliability band			
	A	B	C	D
1	A1			
2	A2	B2	C2	
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5			C5	D5
6				D6
X	AX	BX	CX	DX