

YKY.OC.A27

Unplanned Outages

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About this document

We submitted our PR19 business plan to Ofwat in September 2018. Ofwat reviewed the plan and published its initial assessment in January 2019. The assessment included a series of actions for Yorkshire Water to complete by 1 April 2019 along with several actions that required completion post 1 April 2019. This document summarises our response to IAP action YKY.OC.27 submitted on the 15 May 2019 and includes a commentary in support of the data supplied.

The action that we are responding to in this document is:

'Unplanned outage PC (PR19YKY_23): The company is required to provide fully audited 2018-19 performance data by 15 May 2019. This should take the form of an early Annual Performance Report (APR) submission, but only for Unplanned Outages. Board assured data can be provided with the main APR in July 2019, any changes will be taken into account for the Final Determination. Based on the latest performance and updated methodologies, the company should resubmit 2019-20 to 2024-25 forecast data in the 15 May 2019 submission. The company should also report its current and forecast company level peak week production capacity (PWPC) (Ml/d), the unplanned outage (Ml/d) and planned outage (Ml/d) in its commentary for the May submission.'

In this document we have supplied Ofwat with fully audited information relating to the unplanned outage performance commitment, including:

- 2018/19 early submission performance data.
- 2019/20 to 2024/25 PR19 updated forecast data.
- Level peak week production capacity, the unplanned outage and planned outage.

This IAP response has resulted in a review of the unplanned outage targets documented in the unplanned outage section, chapter 14, Water network plus price control, of our PR19 plan.

Assurance of our IAP response

Good assurance needs to be provided at the right time, be proportionate to the level of risk identified, ask the right questions and assess the quality of evidence supporting the statements made. Our assurance approach is risk based and aligned to the 'three levels of assurance' framework. This is best practice and is set out in Yorkshire Water's published Assurance Plan for 2018/19 and 2019/20.

- Our assurance has followed the three levels of assurance as set out in our published Assurance Plan.
- The assurance process includes audit checks and challenges by data providers, data managers, senior managers, directors and independent technical auditors (Jacobs).
- All data changes and action responses have been subjected to review and sign-off through our internal level 1 and 2 assurance activities. This has tested completion and compliance of the information submitted in the IAP response submission.

As stated in the Ofwat IAP action, the early APR data and commentary have not been assured by our Board. Our July 2019 APR will however receive full Board assurance.

In appendix 1 we have provided an independent audit report on the data provided in this response.

Delivering outcomes for customers

Unplanned outage performance commitment

This section contains extracts of data from table 3S of our early APR data and commentary submission along with extracts from our updated App1 PR19 forecasts.

Unplanned outage represents the temporary loss of maximum production capacity reported as lost capacity. This is represented as percentage of the total peak week production capacity of the company.

Table 1 shows the long term unplanned outage performance that we reported in our PR19 September 2019 submission - App 1 Line 23.

Table 1 - Unplanned outage, PR19 plan submission September 2018.

Remaining AMP unplanned outage performance (%)		Long term unplanned outage performance (%)															
2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033	2033-2034	2034-2035	
Forecast							Long Term Forecast										
8.00	8.00	7.89	7.78	7.65	7.46	7.25	7.1	6.95	6.8	6.65	6.5	6.35	6.2	6.05	5.9	5.75	

In response to this IAP action we have revised the data. Table 2 details the actualised unplanned outage value for the reporting year 2018/19 and the updated forecast. We have provided an excel spread sheet containing this information in appendix 2.

Table 2 - Unplanned outage, early APR submission and update PR19 forecast data.

Remaining AMP unplanned outage performance (%)		Long term unplanned outage performance (%)														
2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033	2033-2034	2034-2035
		Forecast					Long Term Forecast									
5.81	5.81	5.73	5.65	5.56	5.42	5.27	5.16	5.05	4.94	4.83	4.72	4.61	4.50	4.39	4.28	4.18

The forecast presented in table 2 differs from that of our September 2018 PR19 plan as it is based on a more complete and accurate data set.

Before 2018 outage had not been recorded in the detail required by the reporting guidelines. We estimated the figure using the best historical information available.

The early APR 2019 and updated PR19 forecast data is based on analysis using a full year of outage events (2018/19). Our PR19 plan was also based on a different PWPC to that used in our early APR 2019 and updated PR19 forecast data. We reviewed our PWPC following changes to the reporting guidelines for unplanned outage and have calculated PWPC in line with the updated guidelines.

The rate of improvement forecast between 2018/19 and 2024/25 remains the same as that forecast in our PR19 plan submission.

Our PR19 plan submission did not include a financial outcome delivery incentive (ODI) for unplanned outage, on the basis that the measurement and reporting of this measure was not mature enough.

As the industry only finalised the definition and started reporting the measure in 2017/18, we still consider that this measure lacks sufficient maturity to apply a financial ODI. We continue to caution against the use of a financial ODI for this performance commitment.

Table 3 - PWPC early APR submission and forecast data.

PWPC Forecast MI/d						
2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	Forecast	Forecast				
1649.67	1649.67	1677.73	1677.73	1677.73	1691.51	1691.51

Table 3 details early APR 2019 and forecast PWPC. This value increases as planned capital work will restore the throughput capacity of several of our water treatment works.

Table 4 - Unplanned outage, early APR submission and forecast data.

Unplanned Outage MI/d						
2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	Forecast	Forecast				
95.85	95.85	96.13	94.79	93.28	91.68	89.14

Table 4 details our forecast unplanned outage shown as MI/d. This is representative of the percentage of unplanned outage forecast (shown in table 2) of the overall PWPC shown in table 3.

Table 5 - Planned outage, early APR submission and forecast data.

Planned Outage MI/d						
2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	Forecast	Forecast				
24.41	24.41	24.41	24.41	24.41	24.41	24.41

Table 5 details our forecast planned outage. We are currently forecasting a stable level of planned outage.

Outage Methodology

This section explains our latest methodology for calculating and reporting unplanned outage sub-components. The components and subcomponents are:

1. Peak Week Production Capacity
 - 1a PWPC: Annual Review
 - 1b PWPC: Production Site
 - 1c PWPC: Water Resources Zone

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2. Asset failure/unplanned outage: source data
 3. Planned outage: source data/programme of works
 4. Duration
 - 4a Duration: Start time
 - 4b Duration: End time
 - 4c Duration: Rounding
 5. Reduction in capacity
 - 5a Reduction in Capacity: Reduced capacity
 - 5b Reduction in Capacity: Total outage
 6. Exclusions
 - 6a Exclusions: Normal water quality operating bands
 - 6b Exclusions: Evidence of Water Quality Events

1. Peak week production capacity

This section details the methodology applied to PWPC sub-components 1a, 1b and 1c. PWPCs are reviewed annually; initially, flow data from the last 5 years is used to determine the rolling seven day average peak production capacity of each site. Where a site can produce more than the rolling average the target is increased to the known maximum.

In some cases, the historical maximum has been manually reduced because of long-term outages that require capital investment. Following delivery of asset improvement capital work a site's PWPC will be reviewed as part of the annual review process and adjusted accordingly.

Sites that are decommissioned or 'mothballed' have had flows set to zero MI/d.

PWPC sub-component information has been externally assured and will continue to be externally assured as part of future APR submissions.

2. Asset Failure/unplanned outage - source data

Currently the maximum availability (the maximum throughput achievable if required) of a water treatment works (WTW) is recorded by our operational teams through a smart-phone-based application. An entry is made whenever any change in maximum availability occurs. If no change in availability occurs, a minimum weekly entry is made to confirm the WTW's availability. Any shortfall in availability is assigned an outage type, including unplanned outage. A reduction in maximum throughput availability is recorded as unplanned outage. Exceptions not recorded as unplanned outage are:

- planned maintenance or capital work.
- water resource planning.
- water quality exclusions.

Operational site experts assess the impact of an outage event, this is reviewed at weekly operational team hubs. Data is analysed and reviewed regularly by a central reporting function.

Once development is complete, outage reporting will be integrated into our SAP reporting process.

3. Planned Outage - source data/programme of works

Planned outage is recorded and reported in the same manner as unplanned outage. Any reduction in maximum availability that is a result of scheduled asset maintenance or capital works is categorised as planned outage.

4. Duration

This section details the methodology applied to duration sub-components 4a, 4b and 4c. On reporting of an outage event (a deviation of availability from the target PWPC) an assessment of the start and end time is made and recorded by the site expert. The start time is when the reduction in availability from the PWPC occurs and the end time is when the maximum availability of the WTW is restored. Any event lasting over 24 hours is rounded to the nearest whole day using normal rounding rules, for example 1.4 days would be rounded down to one day and 1.6 days would be rounded upward to two days.

5. Reduction in capacity

This section details the methodology applied to reduction in capacity sub-components 5a and 5b. Each outage event is calculated using the following formula:

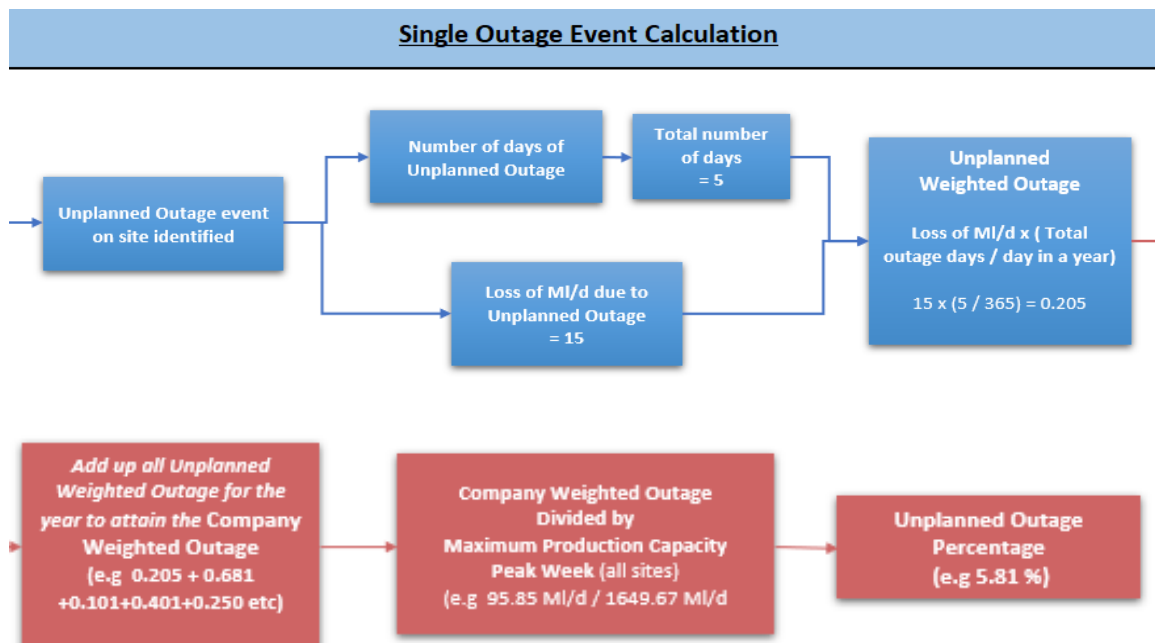
$$\frac{\text{Reduction in peak week production capacity} \times \text{Duration in days}}{365}$$

To report our overall company outage, each water production site’s outage events are summed over the reporting year to give a total actual outage for that site. The total outage for each site is then summed to provide a company total outage. The weighted outage (MI/d) is then normalised based on overall company PWPC and reported as a percentage.

Planned outages and exclusions can then be removed from the total outage, allowing us to report the unplanned outage figure.

The following process diagrams show how this calculation is applied.

Figure 1 Process diagrams to show application of the calculation.



6. Exclusions

6a Exclusions: Normal Water Quality Operating Bands

Normal water quality operating bands have been determined for sites where we have known throughout impacting intermittent raw water conditions. For these sites we have identified the impacting factor, for which examples include (but are not limited to):

- Colour.
- Turbidity.
- Ammonia contents.
- The parameter levels within which the site can operate.

Once this parameter has been exceeded, any reduction in maximum availability away from PWPC associated with the raw water quality would be categorised as a water quality exclusion.

These parameters are based on historical water quality sample information and site design.

6b Exclusions: Evidence of Water Quality Events

Water quality events are evidenced through the recording of raw water sample results in a centrally held database. The frequency of sampling will be appropriate to the nature of an outage event and the exceeded parameter.

Compliance status and confidence grades

In line with Ofwat's reporting requirements we have provided the RAG status and confidence grades of the unplanned outage components.

Table 6 Ofwat's confidence grading.

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.

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)	

Table 7 provides an extract of our unplanned outage early APR submission data table, Table 3S. We have provided an excel spread sheet containing this information in appendix 3.

Table 7 - Planned outage, early APR submission, Table 3S.

D	Unplanned outage	Units	DPs	2018-19
7	Proportion of unplanned outage of the total company production capacity	%	2	5.81%

1. Peak week production capacity (PWPC)	1. Peak week production capacity (PWPC)	1. Peak week production capacity (PWPC)
1a (annual review)	1b (PWPC by production site)	1c (water resource zone PWPC)
2018-19	2018-19	2018-19
Green	Green	Green

2. Asset failure / unplanned outage	3. Planned outages	4. Duration	4. Duration	4. Duration
2a (source data)	3a (source data - programme of works)	4a (start time)	4b (end time)	4c (rounding)
2018-19	2018-19	2018-19	2018-19	2018-19
Amber	Amber	Amber	Amber	Amber

5. Reduction in capacity	5. Reduction in capacity	6. Exclusions	6. Exclusions
5a (reduced capacity)	5b (total outage)	6a (normal water quality operating band)	6b (evidence of water quality events)
2018-19	2018-19	2018-19	2018-19
Amber	Amber	Red	Red

1. Peak Week Production Capacity (PWPC)

Green – Components 1a, 1b, 1c have been assessed as compliant with the reporting guidelines.

Confidence grade – A2, see table 7.

2. Asset failure/unplanned outage

Amber - In APR 2018 we assigned component 2 a red status as we had little historical data on which to base our analysis. We have developed a process to record both unplanned and planned outages. This process requires further development to provide an increased level of accuracy and requires integration with our corporate systems to achieve green status. A level of outage has been recorded as 'unaccounted for' as PWPC targets have changed because of the definition change. We have proportionally distributed this outage so there is a degree of assumed data in our analysis. Water quality exclusions have also been classified as unplanned outage, as the business process is not mature enough to evidence them. This has impacted the overall accuracy of the outage data. These issues have now been resolved and will not impact reporting for APR 2020.

Confidence grade – B3 see table 7 above.

3. Planned outage

Amber - Planned outage is also impacted by target changes and unallocated outage, which has impacted the confidence level in the reporting. This issue has been resolved and will not impact reporting in APR 2020.

Confidence grade – B2 see table 7.

4. Duration

Amber - Our 2018/19 data does not contain the level of detail required to comply fully with the definition, this does not however have a material impact on the overall reported value.

Confidence grade – B3 see table 7.

4a Start time

Amber - Our 2018/19 outage events are not time stamped, they are a record of the start date of an event. 2019/20 will include time stamping and increased levels of accuracy through enhancement of the business process.

Confidence grade – B3 see table 7.

4b End time

Amber - As with start time, 2018/19 outage events are not time stamped.

Confidence grade – B3 see table 7.

4c Rounding

Amber - As time stamping of events is not available for 2018/19, we have made some assumptions in the analysis of the data. It is assumed that the start day of an event contributes one full day (>12 hours) and the end date of an event does not contribute a full day (<12 hours). Over the period of a year we assume this under and over reporting will balance out and will not materially impact the overall reported figure. 2019/20 data will be rounded to the nearest day in line with the methodology set out in the definition.

Confidence grade – B3 see table 7.

5. Reduction in capacity (to include 5a reduced capacity and 5b total outage)

Amber - In APR 2018 we assigned components 5a and 5b as red due to a lack of source data. Through development of our reporting procedures, the data set for 2018/19 is more accurate. Some assumptions, as detailed in components 2 and 3, are currently impacting the accuracy of the reported data. This has been resolved and will not impact APR 2020 reporting.

Confidence grade – B2 see table 7.

6. Exclusions

Red - Exclusions have been included in the unplanned outage reported figure for the 2018/19 period as they are not yet sufficiently defined. This has impacted the accuracy of the level of unplanned outage (as described for component 2).

Confidence grade – DX

6a Normal operating water quality bands

Red - Operating bands were not defined for the reporting period 2018/19, therefore water quality events cannot be excluded. Site operating bands have now been defined and will be used for APR 2020 reporting.

Confidence grade – DX see table 7.

6b Evidence of water quality events

Red - The evidence that we recorded against water quality events is insufficient to allow for these events to be excluded from the reported unplanned outage figure. Development of the existing business process will allow for exclusion of water quality events in our APR 2020 reporting.

Confidence grade – DX see table 7.

In summary

We have made significant developments in the reporting procedure from 2018 to 2019, particularly regarding the recording of outage events. Site water quality parameters have been developed, which enable the exclusion of water quality excludable events in the reporting period 2019/20.

Peak week production targets have changed in the reporting year 2018/19, meaning unaccounted for outage has had to be managed by making proportional assumptions.

We recognise that further development of the business process and integration with corporate systems is required to achieve a higher level of reporting accuracy.

