Chapter 12
Non financial measures
Water explanatory factors

Covering:
Source types and pumping
Treatment types

Non financial measures
Chapter 12
Water explanatory factors

Guidance

This table has three blocks and a total of 13 lines. It is used in water service operating efficiency studies. It covers:

- **Source types and pumping**
- **Treatment type**
- **Potable mains**

The information collected in this table is used in NIAUR's operating efficiency studies. It provides explanatory factors for the amount of pumping required for treatment and distribution, and the relative complexity of a company's water treatment works. Changes in these factors can have a significant impact on a company's costs.

NIAUR have also included the required tables for PPP inclusion into the models. These are for information purposes only and should not be completed this year. Table 12 has remained the same as previous years for this reporting period. However it is expected that the requirements will change in the future when PPP reporting becomes an issue. Instead of reporting distribution input proportions in lines 1-3, the company will be asked to provide distribution input by source as measured in Ml/day.

Section A - Source types and pumping

This section includes the number of sources in each of the following categories, and the proportions of distribution input derived from sources in category, and the proportion of distribution input obtained from bulk supplies for each category:

- impounding reservoirs;
- river abstractions, and
- boreholes.

It also includes the average pumping head.

We use the information provided in this table about a company's sources in two ways in our relative efficiency modelling. Firstly we use the total number of sources to calculate a company's average source size. Secondly we use the proportion of water from different sources as a measure of how difficult a company's water is to treat. Since the information about sources is used in two different ways we have split the guidance in this table into two sections clarifying how we expect the company to report both number of sources, and proportion of water from different source types.

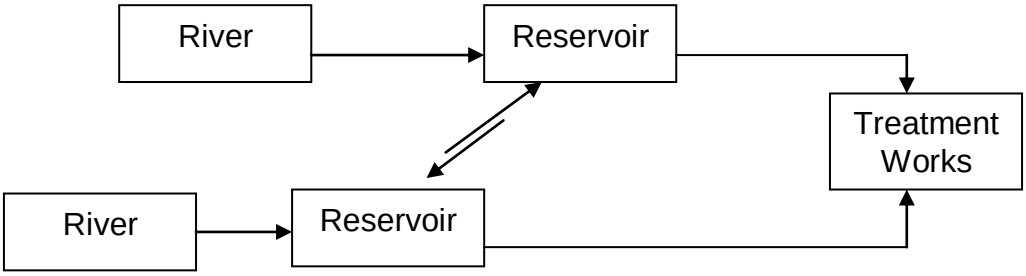
Number of sources

We collect the total number of sources operated by a company for our econometric modelling. A source here is to be defined as an independent raw water supply to a treatment works. Standby or mothballed sources from which no water has been obtained in the year should not be included in the number of sources. We expect the company to consider when it is appropriate to report sources which have produced very small outputs during the report year.

To ensure consistency of reporting source numbers, the company should follow these guidelines:

- If a treatment works receives water from three boreholes on one site, this would be classed as one source.
- If a treatment works receives water from a reservoir that has been filled by a river this would be classed as one reservoir source.
- If a treatment works receives water directly from two reservoirs this would be classed as two reservoir sources.
- If a treatment works receives water directly from two reservoirs, but water can be transferred between the two reservoirs, this would still be classed as two reservoir sources.
- If a treatment works receives water from a reservoir that has been filled by another reservoir then this would be classified as one reservoir source.
- If a source supplies more than one treatment works then it should only be reported once in the reported source numbers.
- Reservoirs used only to regulate river flows should not be reported in the source numbers.
- Bank side storage, gravel pits and non-impounding reservoirs should not be included as sources in their own right. If a river supplies a treatment works via bank side storage then this should be reported as one river source.

In the example below the arrows represent the flow of water. There is one reservoir, filled by a river, which feeds into one inlet at the treatment works. There is another reservoir that is fed by a different river, this reservoir feeds into a different inlet at the treatment works. It is possible to transfer water between each of the reservoirs.



A company should report this as two reservoir sources.

We expect the company to use common sense and be honest when reporting source numbers. If the company is unsure how a certain source configuration should be reported, then details of the configuration should be included in the commentary, or advice can be taken from NIAUR.

Proportion of distribution input from each source category

The proportion of water in each source category is a measure of how difficult a company's water is to treat. When classifying the water into one of the categories, the following guidelines should be followed.

- Water abstracted from boreholes or springs and pumped directly to a treatment works should be classified as borehole water.
- Water abstracted from a river and transported directly to a treatment works (either by pumping or by gravity) should be classified as river water.
- Water that is transported directly to a treatment works from a reservoir which has been filled by a river should be classified as water from reservoirs (this is because, in general, while the water is stored in the reservoir, sediments will settle making the water easier to treat).
- Water that is transported from a reservoir, via a river, to a treatment works should be classified as water from a river.

If multiple sources feed a works (for example a river and a number of boreholes) and the flow from these sources is combined prior to treatment, then all of the flow entering the works can be categorised as the more difficult to treat water. (In this example, all of the water would be categorised as river water.)

In the table, the company must report the proportions of distribution input derived from the various sources as a number between zero and one (not as a percentage). The sum of the proportions of distribution input from the various different sources, including bulk supply imports, must add up to one. (That is, on line 4 the sum of columns 2 and 3 must be one).

Bulk supplies

Bulk supply imports should be included in section A of the table. The proportion of distribution input from bulk supplies should be included in column 3 and the number of bulk supply import sources should be included in column 1. Bulk supply exports should be excluded from this table. The distribution input obtained from them should not be included in the proportion of DI in either column 2 or 3. If a source is used by a company only to provide a bulk export it should not be included in the source numbers in column 1.

Non-potable supplies

Non-potable supplies for water should not be included in this table. The water supplied should not be included in the distribution input figures in column 2, and if a source only provides non-potable water it should not be included in column 1. This includes sources that are used only to provide stream support.

Line 5: Average pumping head

The key reason we collect this data is as an explanatory factor for power costs. Therefore the variable needs to reflect the amount of pumping that a company needs to do. In order to do this we need to know, in effect, how much each Ml of water is pumped through the process, from abstraction to supply. Obviously this cannot be measured in practice so a calculation is used instead.

$$\text{Average pumping head} = \frac{\Sigma_i(l_i * WP_i)}{V_p + V_g}$$

where:

l_i = annual mean lift at site i

WP_i = volume of water pumped at site i

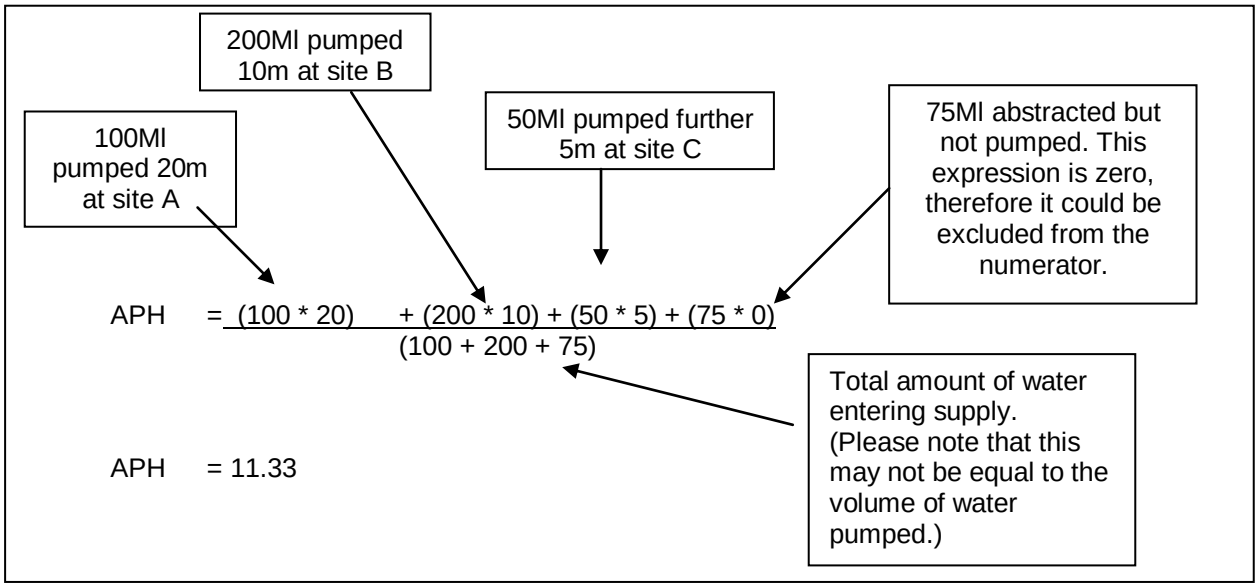
$V_p + V_g$ = total volume of water that enters supply (pumped and gravity fed)

Included below is an example of how average pumping head should be calculated (the numbers are not representative of a real life situation, just for illustrative purposes.)

A company has the following processes:

- 100 Ml of water is pumped 20m at site A
- 200Ml of water is pumped 10m at site B, then 50Ml of this water is pumped a further 5m at site C (a booster station). The remainder of the water is gravity fed to customers
- 75Ml of water is abstracted and reaches supply without ever being pumped.

The average pumping head for this company would be calculated as follows:



The average pumping head should be calculated using data from all sites if possible. The company should state in their commentary if sites have not been used in calculating the average pumping head, and why they could not be used.

Pumping of **non-potable water** into supply (for example for stream support) should not be included in the average pumping head calculation.

Pumping of water that is exported to another company (**bulk supply exports**) should not be included in the average pumping head calculation.

We would expect all other pumping used in the abstraction, treatment and supply of water to be included in the pumping head calculation. This includes pumping as part of the treatment process and the pumping of process water.

Section B - Treatment type

This section covers the proportion of distribution input derived from works falling into each category of water treatment and the numbers of works in each category as detailed in the table.

For both groundwater and surface water, a **works** is here defined as an individual location which receives raw or partially treated water for treatment (excluding secondary disinfection) and ultimate delivery to customers. Where the total treatment process is split between a number of sites, banding should be carried out on the basis of the size and treatment category of the sites at which the greatest proportion of costs are incurred.

The company should state in their commentary if they have included treatment works that have not been used in the report year.

Lines 6 – 12: Treatment type

The categories of treatment types are:		Examples
SD:	Works providing simple disinfection only;	• Marginal chlorination
W1:	Simple disinfection plus simple physical treatment only;	• Rapid gravity filtration • Slow sand filtration • Pressure filtration
W2:	Single stage complex physical or chemical treatment;	• Super chlorination • Coagulation • Flocculation • Biofiltration • pH correction • Orthophosphate dosing • Softening • Membrane filtration
W3:	More than one stage of complex treatment; but excluding processes in W4.	
W4:	This category is intended to capture processes with very high operating costs;	• Ozone addition • Activated carbon / pesticide removal • UV treatment • Arsenic removal • Nitrate removal

Section C - potable mains

This section includes the breakdown of all potable mains into size bands. When added together, the total length of main should equal the total length of main reported in table 11 line 12. The company should ensure that 6'' mains are included in Band 1 and 12'' mains are included in band 2.
The company should detail assumptions made in order to provide their data, and comment on areas where they consider that more information is required for the proper interpretation of the results.

Company commentary

The company must:

- comment on the changes which have occurred since previous years and provide clear explanations for them;
- state whether changes are one-off revisions because of exceptional circumstance (e.g. drought) or whether they are due to permanent changes in a company's assets or operations;
- include inset appointments as they are part of the regulated business. Provide details in your commentary of the amounts included for any inset appointments in the relevant lines; and
- where treatment types are not covered by this guidance, state in their commentary what assumptions they have made in categorising these processes.

Guidance for Reporters

Reporters must:

- bring to NIAUR's attention any areas where the company has failed to explain changes to the reported information and comment on their significance
- comment on the reasonableness of any changes;
- comment on the average pumping head methodology, including the sites that have not been included in the calculation; and
- comment on whether the company's approach to counting and categorising sources is appropriate and in line with the guidance.

Table 12 line definitions

A SOURCE TYPES AND PUMPING

1	Impounding reservoirs	nr prop'n from 0 to 1 prop'n from 0 to 1	0dp 3dp 3dp
Definition	Column 1 - number of sources. Column 2 - proportion of distribution input derived from impounding reservoirs Column 3 - proportion of distribution input derived from bulk supplies. Operational sources from which no water has been obtained in the report year should not be included in the number of sources.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

2	River abstractions	nr prop'n from 0 to 1 prop'n from 0 to 1	0dp 3dp 3dp
Definition	Column 1 - number of sources. Column 2 - proportion of distribution input derived from river abstractions. Column 3 - proportion of distribution input derived from bulk supplies. Operational sources from which no water has been obtained in the report year should not be included in the number of sources.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

3	Boreholes	nr prop'n from 0 to 1 prop'n from 0 to 1	0dp 3dp 3dp
Definition	Column 1 - number of sources. Column 2 - proportion of distribution input derived from boreholes. Column 3 - proportion of distribution input derived from bulk supplies. Operational sources from which no water has been obtained in the report year should not be included in the number of sources.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

4	Source types and pumping; total.	nr prop'n from 0 to 1 prop'n from 0 to 1	0dp 3dp 3dp
Definition	(Column 1) total number of sources, (Column 2) total proportion of distribution input, and (Column 3) total proportion of distribution input obtained from bulk supplies.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Calculated: Column 1 is the sum of lines 1, 2, 3 Column 2 is the sum of lines 1, 2, 3 Column 3 is the sum of lines 1, 2, 3 Input: Confidence Grade. The sum of columns 2 and 3 must equal 1.		
Responsibility	Comparative Efficiency & Performance Team		

5	Average pumping head – total	m.hd	1dp
Definition	Total average pumping head. For information on how this should be calculated see the introduction to this chapter.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

B TREATMENT TYPE

6	Proportion of distribution input – simple disinfection	prop'n from 0 to 1 nr	3dp 0dp
Definition	The total proportion of distribution input derived from works and total number of works providing simple disinfection only (columns 1 and 2 respectively).		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

7	Proportion of distribution input - W1	prop'n from 0 to 1 nr	3dp 0dp
Definition	The total proportion of distribution input derived from works and total number of works providing simple physical treatment only (columns 1 and 2 respectively).		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

8	Proportion of distribution input - W2	prop'n from 0 to 1 nr	3dp 0dp
Definition	The total proportion of distribution input derived from works and total number of works providing single stage complex physical or chemical treatment but excluding processes in W4 (columns 1 and 2 respectively).		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

9	Proportion of distribution input - W3	prop'n from 0 to 1 nr	3dp 0dp
Definition	The total proportion of distribution input derived from works and total number of works providing more than one stage of complex treatment but excluding processes in W4 (columns 1 and 2 respectively).		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

10	Proportion of distribution input – W4	prop'n from 0 to 1 nr	3dp 0dp
Definition	The total proportion of distribution input derived from works and total number of works providing processes with very high operating costs. (Columns 1 and 2 respectively).		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

11	Proportion of distribution input – total	prop'n from 0 to 1 nr	3dp
Definition	Total proportion of distribution input for all treatment categories.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Calculated: sum of column 1, lines 6, 7, 8, 9 and 10. It must equal 1.		
Responsibility	Comparative Efficiency & Performance Team		

12	Total numbers of works	nr	0dp
Definition	Total numbers of treatment works.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Calculated: sum of column 2, lines 6, 7, 8, 9 and 10.		
Responsibility	Comparative Efficiency & Performance Team		

C POTABLE MAINS

13	Potable mains (nominal bore)	km	2dp
Definition	The length of all potable water mains broken down by size band. The total length of main should equal table 11 line 12.		
Primary Purpose	Informing relative performance and efficiency assessments.		
Processing rule	Input		
Responsibility	Comparative Efficiency & Performance Team		

CHANGE CONTROL SHEET
CHAPTER 12

2008/1.0	First issue of chapter for the SBP period