



BATTLE OF INTERMITTENT WATER SUPPLY INSTRUCTIONS QUESTIONS & ANSWERS

This document will include the different comments received by the organisation and the corresponding responses.

Q1. Page 11: Last sentence is incomplete.

There was an error in the process of generating the pdf file. The new version of the pdf file will be updated on the website. The complete sentence is: *"A depression is considered to be present when the simulation result shows a value of $p < 0$ in all or part of the pipe. If at both ends $p < 0$, the whole pipe is considered to be depressed. If $p < 0$ only at one end, the proportional part under depression is determined by linear interpolation."*

Q2. The evaluation is going to be performed based on the .INPs provided by the applicants. In the section "All participants will be verified to comply with the following restrictions:" It is not stated that any modification not stated in the template is not approved, eg.: actually deleting parts of the network. It would be clearer to generate the INP's and perform the evaluation directly from the excel template, rather than leaving parts up to the applicants.

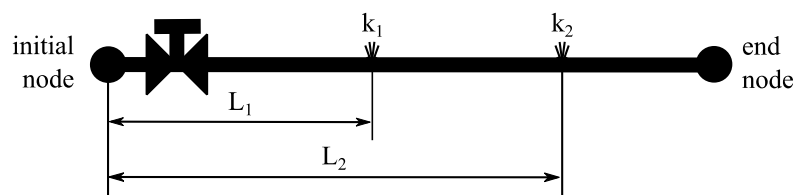
The INP files submitted by the participants will allow to analyse how each of them has modelled the leakage and consumption in the network. However, the evaluation of the solutions will be based on the investments and control actions defined in the corresponding Excel files.

Only network modifications defined in the template may be included in the INP files. No network modifications that have not been defined in the INP file should be made. Specifically, pipes may not be deleted. Any pipes to be shut off must be shut off by the installation of the appropriate isolation valve.

Q3. In the published .INP file some of the pipes have initial status CLOSED. Are we allowed to open them? For example, the initial status of pipe L1004 is CLOSED and the leakages file states that there is a leak in that pipe therefore an error is raised.

Indeed, there are a number of pipes in the .INP file that are initially closed. These pipes are allowed to have an isolation valve connected next to the initial node. The pipes initially closed with this isolation valve are shown in the following table. In the same way, the attached figure shows the interpretation of the location of the leaks with respect to the valve. The figure shows the case of a pipeline with two leaks located at distances (L_1 and L_2) from the initial node and whose leakage coefficients are k_1 and k_2 .

Pipe ID	L1143	L2088	L1063	L2446	L2450	L1156
Initial Node	N94	N1781	N1069	N2537	N2540	N1152
End Node	N1129	N1782	N1072	N2538	N2537	N1134
Pipe ID	L1544	L1004	L2616	L1921	L3271	L1155
Initial Node	N1521	N997	N1951	T4_CU	T3_MO	N1137
End Node	N1522	N72	N1508b	N1913	N621	N1130





Q4. It there any requirement to participate in the challenge. Can researchers join the challenge? Can hydraulic engineering students or PhD students join the challenge?

There is no restriction to participate in the challenge. Anyone who wishes to can participate. The only restriction is that one of the team members must present the solution obtained during the conference. Researchers and PhD students are especially welcome.

The only restriction is that one of the team members should present the solution obtained during the conference.

Q5. There was an error in the initial definition of I_5

The fifth indicator I_5 measures the level of pressures available at the consumption nodes. Originally it was defined as

$$I_5 = \frac{\sum_{j=1}^6 \sum_{h=1}^{168} \sum_{i=1}^N \min(p_{i,h,j}, p_{ref})}{168 \cdot 52 \cdot 6 \cdot p_{ref}}$$

This definition contained an error. The correct formulation of this I_5 index is:

$$I_5 = \frac{\sum_{j=1}^6 \sum_{h=1}^{168} \sum_{i=1}^N \min(p_{i,h,j}, p_{ref})}{168 \cdot N \cdot 6 \cdot p_{ref}}$$

Thus, in the event that all nodes acquire the reference pressure, the value of the index will be 1. This modification has been introduced in the new version of the Instructions.

Q6. The ‘coefficient’ and ‘length from the initial node’ values provided in the spreadsheet “Leakages.xlsx” are different than the values provided in ‘Table 3. Leakages position and value data’ provided in the ‘BIWS_Instructions’ PDF shared. Can you confirm which values are to be used in the analysis?

Indeed, the leakage characteristic values (coefficient and position) are different in the Leakages.xlsx file and in Table 3. Table 3 was only intended to show an example of the structure of the Leakages.xlsx file. La the values in this table did not match those in the xlsx file. The values to be used for the calculation are those in the Leakages.xlsx file. In any case, to avoid confusion, Table 3 of the Instructions has been modified so that it now represents the first rows of the Leakages.xlsx file.

Q7. There is a statement in the ‘BIWS_Instructions’ PDF which says, “In any case, the model used to evaluate the solutions submitted by the participants will be the one that defines the intermediate nodes in each pipe”. However, the statement above it says that “Alternatively, other methods of representing leakage (e.g. concentrated at pipe end nodes) can be used” which means other methods for representing leakage at pipe end nodes are valid. Can you confirm if having intermediate nodes present at pipe leakage locations is mandatory and would form the basis of solution evaluation?

Defining intermediate nodes is advisable, but not mandatory. However, when assessing final solutions, intermediate nodes will be defined. If a participant considers that distributing leakages in the end nodes can be a valid estimate for leakages, they can do it. But we will use our own model using intermediate nodes to assess all solutions.

Q8. Are the isolation valves those indicated as TCVs in EPANET? In the EPANET model, there are some closed pipes. Are they other isolation valves or what else? I then understand that isolation valves can be accounted for either by closing the pipe or by installing a TCV and closing it. The already present valves (PRV, FCV,PSV) can also be considered as isolation valves without extra cost. Finally, since TCVs are not included as regulation valves in the instructions, they cannot be purchased and installed for regulation purposes, based on their head loss setting.

There are not many valves installed in the network. The TCV valves of the EPANET model can be considered as isolation valves. Any other type of valve of the model (PRV, FCV, PSV) can also be considered as isolation valve if appropriate. Additionally, there are a number of initially closed pipes in the model. These pipelines are considered to have an isolation valve connected immediately adjacent to the initial node in the model (see question 3 of this document).

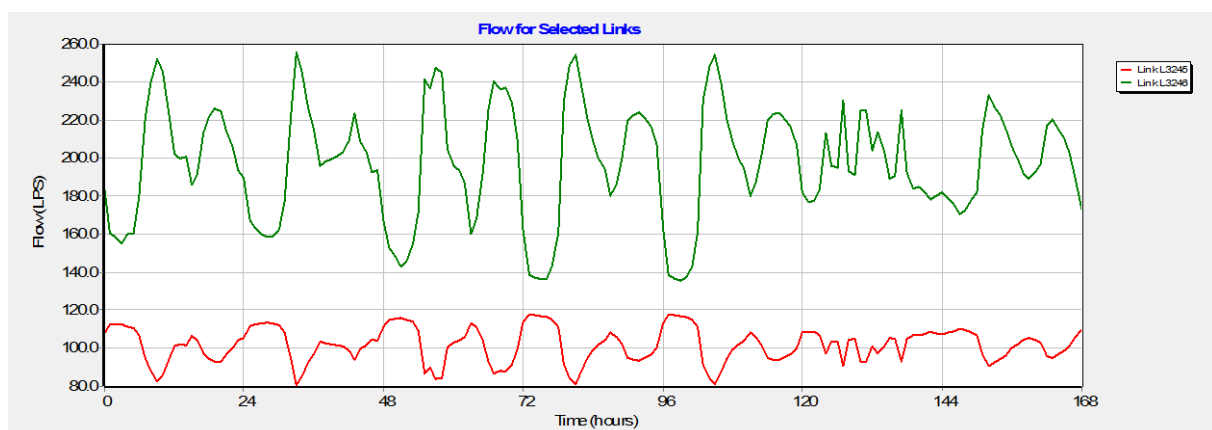
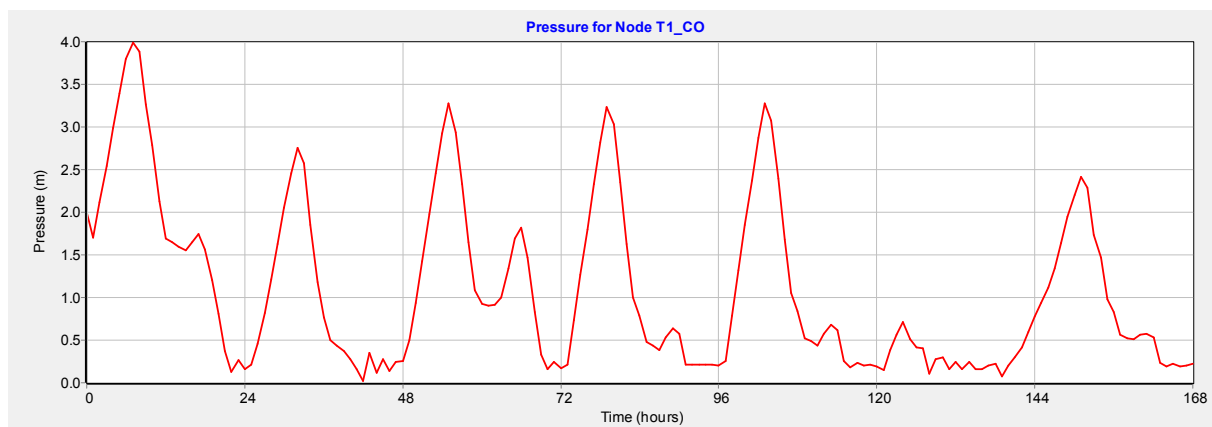
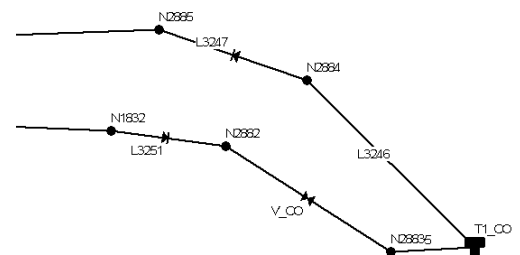


In short, there are different types of valves in the model:

- Isolation Valves: are those that are in the model as closed lines. They are valves that can be completely open or completely closed. They cannot be used for regulation by introducing a pressure drop.
- Regulation Valves (TCV). These are manual regulating valves in which the loss coefficient can be defined. They can be used as isolation valves since they can be fully opened or closed.
- Automatic valves (PRV, PSV, FCV). They can be used as isolation valves as they can be fully opened or closed. Additionally they can function as control valves.

The operation and use of these valves is completely free of charge. The change of any of these functionalities implies the need to install a new valve, and therefore consider its cost.

Q9. I have a question about tank T1_CO in the network BIWS.inp, before adding leakage and doing anything else. I ran the simulation as the file is. The output with the tank level is the one shown in the figure below. It seems weird that the outgoing water discharge is always larger than the incoming water discharge (see figure below). The water discharge patterns are not in agreement with the tank pattern. The problem is solved is the tank is replaced by a no-storage junction. Maybe, I am using EPANET 2.2 badly and I would apologize if this is the case. Please, can you help me with this?



Answer to Q9.

Apparently, the tank outlet flow rate is at all times higher than the inlet flow rate. The explanation for this phenomenon is in the dynamic behavior of the tanks in EPANET. I believe there has been no change in this issue since version 2.0. That is, the problem occurs the same in version 2.0 as in version 2.2.



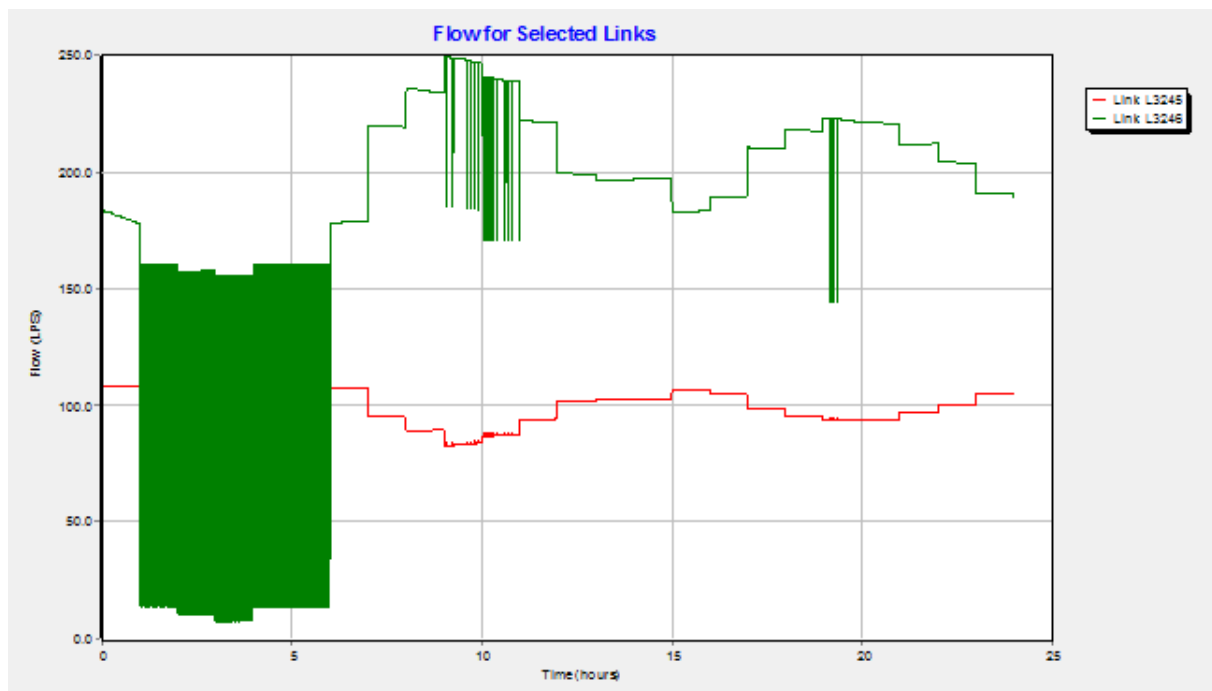
How do the tanks behave dynamically in EPANET?

The tanks in EPANET have a control system that works on the lines connected to the tank when tank is either completely full or completely empty. If the tank is completely filled (level equal to the maximum level), all pipes that attempt to introduce water into the tank are closed. If the tank is emptied (level equal to the minimum value) all lines that take water out of the tank are closed. This is done automatically without the need for user definition. The maximum and minimum levels at which this occurs are the maximum and minimum levels defined in the tank.

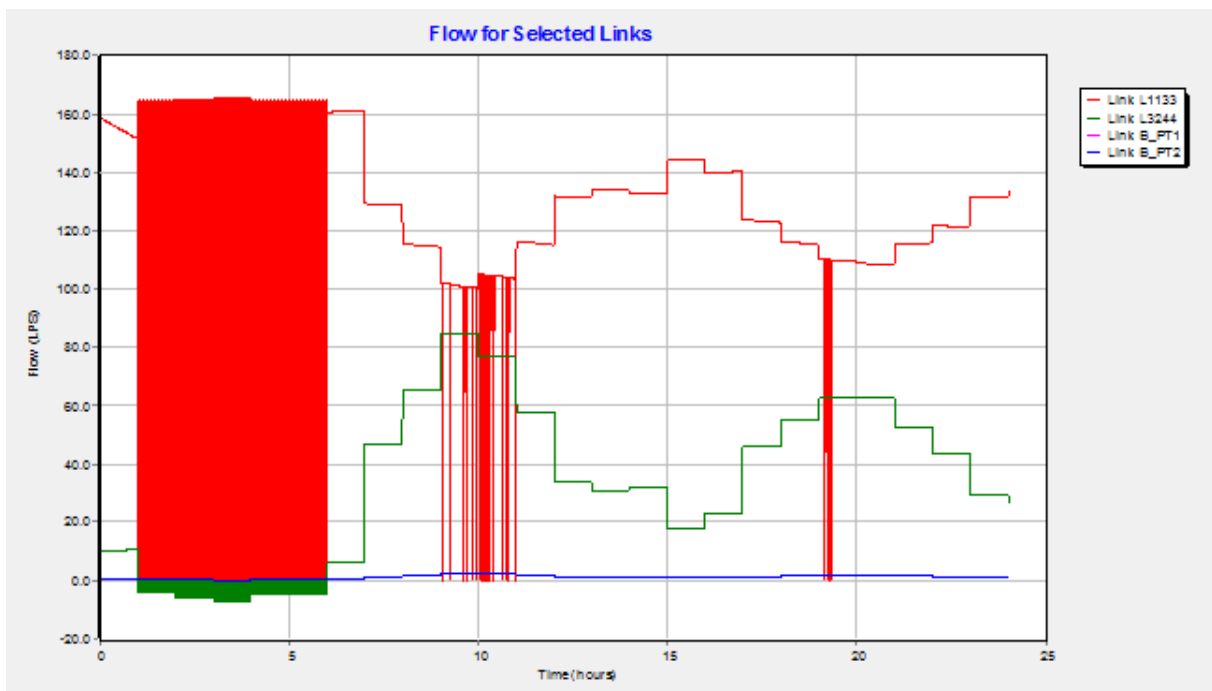
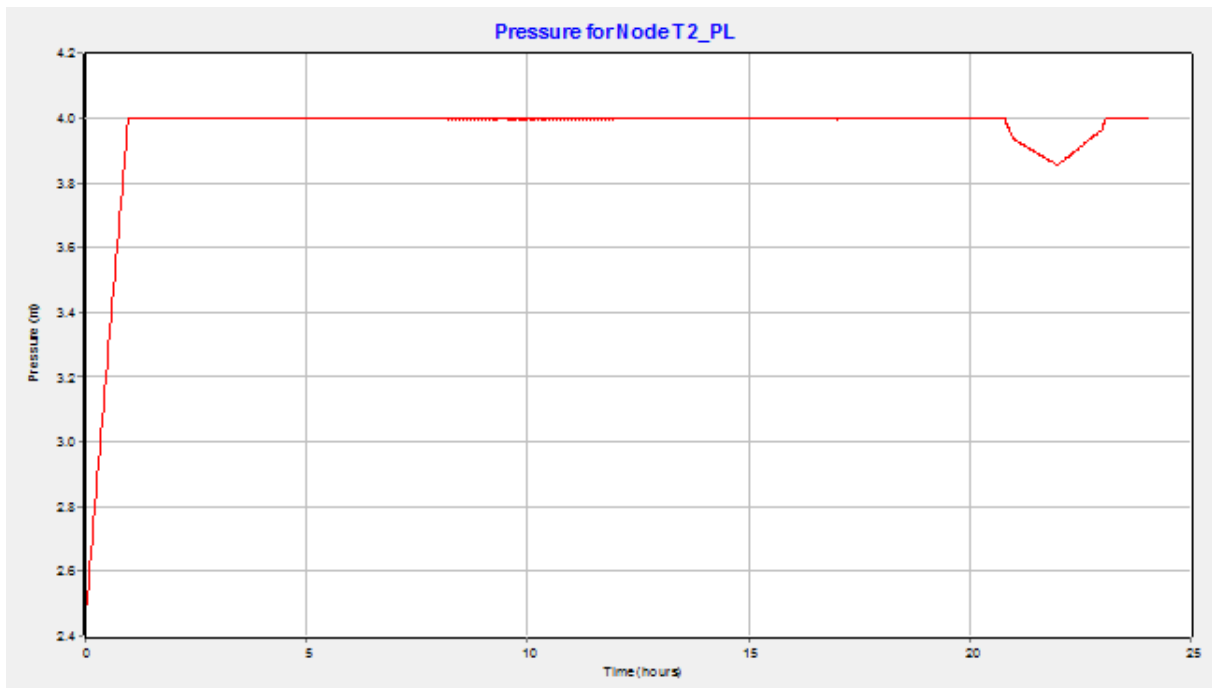
Additionally, EPANET's dynamic analysis module does not only perform the calculations at the time instants defined by the hydraulic time step. This module determines when a tank is full or empty. If a tank is filled (by closing the inlet pipes) or emptied (by closing the outlet pipes) at an intermediate instant between two hydraulic time steps, the hydraulic calculation is performed at this instant when the tank state changes. These changes can be checked if a Full Analysis Report is requested or if the calculation is performed using the EPANET Toolkit.

What is happening in this system?

To explain it best we will analyze in detail the behavior of the system, either with the use of the Toolkit or with the use of a smaller hydraulic time step. If we analyze the behavior of tank T1_CO during the first 24 hours with a hydraulic time step of 20 seconds, the inlet and outlet flow rates of this tank are:



As can be seen, there are times when the inlet flow rate is higher than the outlet flow rate. Why is this behavior occurring in line L3246? Why are these variations occurring? The problem is not in tank T1_CO but in tank T2_PL. The level and flow rate graphs in this tank are as follows:



As can be seen, the T2_PL tank reaches its maximum level. This starts the EPANET automation to prevent the tank from overflowing. That is, it closes the inlet piping. However, when the inlet pipe is closed and there is still an outlet pipe from the tank, the level decreases slightly. This causes the inlet pipe to open again and water enters. Quickly the maximum level is reached again and the pipe closes again. This phenomenon becomes a continuous process of opening and closing the inlet pipe. It is a phenomenon that can only be observed if the analysis is performed with small hydraulic time steps or using the EPANET Toolkit. If the network is analyzed with hydraulic time step 1 hour this phenomenon is not observed and it seems that the inlet flow is always lower than the outlet flow.

The operation of the T2_PL tank causes the outflow of the T1_CO tank to be intermittent. That is the explanation that the outflow is not always higher than the inflow. When the T2_PL tank is open, flow comes out of T1_CO. However, when T2_PL is closed, hardly any flow comes out of T1_CO. If the volumetric balance is performed, the equation of continuity in the tank is fulfilled in all cases.



What is our recommendation?

Our recommendation is twofold. On the one hand, continue to use a hydraulic time step of 1 hour, but control the intermediate instants that may occur and that are detected by the EPANET Toolkit. On the other hand, the best way to solve this is to use simple controls in EPANET that prevent the tank automation in EPANET from working.

For example, controls such as the ones below could prevent the tank automation in EPANET from operating.

```
LINK L3245 CLOSED IF NODE T1_CO ABOVE 3.95  
LINK L1133 CLOSED IF NODE T2_PL ABOVE 3.95
```

Logically the piping would be closed and another control would have to be defined to define when the piping is reopened.

Modification of instructions

Given that some participants may have a different interpretation of the behavior of the tanks in EPANET, the instructions have been modified by adding an additional restriction:

The maximum and minimum allowable levels in a tank should always leave a safety margin of 5 centimeters with respect to the values collected in the EPANET file. That is, for a tank with a minimum level of 0 meters and a maximum level of 4 meters, the maximum and minimum allowable levels are respectively 3.95 and 0.05 meters.

Q10. There are multiple pipes that have more than one leak on them. How does the cost change if I choose to replace/ reconstruct the whole pipe? Can I omit all the detection costs and get rid of the leaks by reconstruction without additional cost?

There are two options that can be performed on a pipeline. The first is to repair one of its leaks. In this case it is necessary to consider the costs of detection and repair. The second option is to replace the pipe. In this case, the replacement costs are admitted to include the possible previous analysis of the possible leaks that the pipe would have. In other words, if a pipe is replaced, it is only necessary to consider the replacement costs; it is not necessary to consider any additional costs.

Q11. The FCV “V_R1” is set with a limiting flow of 180 L/s. However as per the BIWS Instructions, the limiting flow should be 200 L/s (as provided in Table 1)

There is an error in the EPANET file. The FCV limit value is 200 l/s as indicated in the instructions. We will correct the information and soon there will be a new version of the EPANET file on the website.

Q12. All the wells also have limiting flows specified as per Table 1, but the model does not have any FCV downstream of them to limit the flow

The flow limitation in the wells is due to the maximum authorized extraction capacity. No more than this flow rate can be extracted. The control of flow rate extraction must be done by each participant managing the network properly. In the case of installing a flow limiting valve at the well outlet it will be necessary to consider the cost of installing this device.

Q13. All the TCV’s, 1 PRV and 1 PSV are all initially “Inactive” (fully open)

The proposed challenge was intended to collect the valves in their current state. Participants are free to change the initial state of these valves if they wish. Their setpoints can also be freely changed, as long as this does not affect the constraints of the problem. Specifically, V_R1 should not have setpoints with values different from 200.



Q14. Pumps B_SM, B_SA and B_AB are initially “Off” and remain “Off” for the entire run duration of 168 hours

There are pumps in the model that may be initially off. Managing the operating mode of all pumps in the model is one of the objectives of the challenge. It is possible to define the initial state of each pump at the beginning of each of the 6 simulations to be performed.

Q15. All pump definitions have maximum flow rate specified as 2 times that of the design flow rate whereas the BIWS Instructions (Section 3.5) states that “The maximum operating flow rate of any pump shall never exceed the design flow rate of the pump (Q0) by more than 50%. That is, the maximum flow that a pump can deliver is 1.5•Q0.” Also pumps have constant efficiency of 70% whereas the BIWS Instructions state an efficiency of 80%.

The definition of the pumps has been done by a single point: the maximum efficiency point (BEP). In this way, the maximum flow rate (zero head) is represented when visualizing the shape of the characteristic curves. However, the pumps will not be able to operate with flow rates 50% higher than the BEP value. That is, the characteristic curves of the pumps will be those in the EPANET file, but there will be an operating limitation so that the flow rates must be less than $1.5 \cdot Q_0$.

With respect to pump performance, it is necessary to use the performance curves described in the Instructions and use the correction published by Marchi and Simpson (2013). Participants can enter the appropriate curves in EPANET or perform the energy calculation outside EPANET. The 70% performance values in the model are the default values, but only the specifications given in the Instructions should be used.

Q16. Do we have to use the initial conditions as they are without changing them during analysis? For example, if pipe L2450 is “Closed” as per the model, do we keep it “Closed” for all our analysis (base year + next 5 years)? Or are we allowed to “Open” or change the initial status of these elements during analysis.

The initial conditions can be changed every year.

Q17. I am writing for a clarification on pumps installable in the WDN. In the instructions I found the Table 2.. In this table, the pump C_90/50 has flow of 50 and head of 90. Inside EPANET, the pump C_90/50 has flow of 90 l/s and head of 50 m. Which is the right one? If it is the one in the instructions, should we correct all EPANET curves?

The valid values are those listed in Table 2 of the Instructions. The EPANET INP file has been modified on the website to correct the pump characteristic curves.

Q18. No loss coefficient was given for the valves, hence hydraulically they are equal regardless the diameter (which diameter is used to calculate the velocity in the valve only). The cost doesn't reflect the cost of fittings if one installs a valve with different size than the connecting pipe.

The localized head losses introduced by a valve when it is fully open have not been considered in this challenge. The selection of the valve diameter should be made considering aspects such as upstream pressure, downstream pressure, flow, velocity and cavitation conditions. Initially, no criteria for valve size selection had been defined. In a recent update of the Instructions the following criterion has been introduced: *The diameter of the valve shall always be the closest to the diameter of the pipe in which it is installed.*

Q19. In the new version of the file (21/12/03), the assignment of demand patterns is not made explicitly in the form of each node. no consumption patterns have been defined in the nodes.

Indeed, the INP file we had not defined the consumption patterns at the nodes. Instead of detailing the consumption pattern at each node we chose to assign a default pattern.

If you check the Options->Hydraulics section you will see that by default the P0 pattern is assigned. That is, all those nodes that have not been assigned a pattern will use this consumption pattern. I send you a screenshot where the value of the default pattern is indicated.



Q20. In all I_1 indicators there is a 6 in the denominator indicating the valuation of the six scenarios considered (initial state and the state after five years of investment). However, in indicator I_2 a 5 appears. Is this intentional or is it an error and a 6 should appear?

Unfortunately, this is a mistake. The denominator of the I_2 indicator should show a 6 instead of a 5. This error will be corrected in the Battle Instructions. Thus, the definition of the I_2 indicator is:

$$I_2 = \frac{\sum_{j=1}^6 \sum_{i=1}^N w_{i,j}}{N \cdot 6}$$

Q21. What is the roughness of the new pipes?

The value of the Hazen-Williams coefficient of the new pipes is 120. This has been updated to the new version of the Battle Instructions.

Q22. When modeling the leakages, we found that many of them have a negative flow rate, which means that the leaks are behaving as water sources. We consider that the flow should always be positive for a correct simulation analysis. Is there a solution that all the participants should adopt for this problem? We think that a solution option could be installing a check valve in these areas, but we would like to know if the cost of this element can be taken as zero.

Regarding leakage, it is true that the conventional use of EPANET 2.2 assumes the nodes with emitters where and negative pressure behave as water sources. There are different solutions to avoid this. One of them would be to update the values of the emitter coefficients according to the pressure values through the Toolkit. Another option would be an additional node for the emitters that are connected to the main pipe through a dummy pipe that can additionally act as a check valve. Logically, the use of these computational solutions should not involve any investment cost. Whatever the solution is, it will be valid as long as it is ensured that the negative pressures do not lead to a water supply to the network.

Q23. There is a problem with the B_SM well. The upstream junction (W4_SM) has a level of 32 m, while the downstream junction (N3002) has a level of 60 m, which means a difference in levels of 28 m. According to the pump curve (C_SM), the maximum head that the pump can deliver is 13.33 m. Therefore, we would like to confirm that the settings of this pump are correct, which would imply that we cannot use this well in the initial model.

It is possible that the existing well pumps are insufficient. In this particular case it is due to a very sharp drop in the aquifer level of the well. The existing pump model cannot supply water. This means that in the initial situation the pump should not work. In the actions for the following years it can be considered whether it is convenient or not to install a new pump.

Q24. The calculation method of the cost of installing the inverter C_{np} have not been given in the section of 5.6 of the BIWS introduction.

There is an error in the definition of terms in section 5.6. Where it says C_{np} it should say C_{inv} . This will be corrected in the next update of the Instructions.

Q25. In the initial situation of the network we get from the input files, pumps extract more water than the MFR from the corresponding wells. Should we consider this as initial situation, or do we have to modify it without making any investment (i.e. changing the operation of pumps and valves)?

The maximum flow that can be extracted from each well at any time is limited (table 1) For this purpose, each participants can use the strategy that they consider appropriate. One option would be to manage the operation of the network so that the maximum flow rate is not exceeded at any time. Another option would be to introduce some type of valve that controls the maximum flow rate provided by the wells. Logically, this second case (adding valves) can only be done once the investment in valves has been made. That is, the option of placing valves will have an associated cost and therefore cannot be used to adjust the initial situation (year 0) of the network.



Q26. Pumps extract more water than the MFR defined in the wells. Is there a penalty in the final score if the flow rate extracted from the wells exceeds the MFR?

One of the constraints of the problem is that depending on the network operation, some of the pumps draw more flow than the MFR allowed in each well. In no case the MFR set at each well can be exceeded. There is no penalty associated since exceeding this value means salinization of the well and therefore making its use useless. Therefore, all the solutions presented must respect this restriction.

In any case, this constraint could be really difficult in scenario 0, where no investment is possible. The other scenarios are developed after an investment has been made. Therefore, if the participants wish, they can invest in the regulation elements necessary for the operation of the wells.

Q27. Since we are representing an entire year by single week, how should we treat the tank levels from one year to the next? Do we assume that the tank levels at the start of year 2 are equal to the tank levels at the end of year 1, even though the latter values are really just the levels at the end of the first week in year 1?

It is assumed the six simulations (initial year and the following five years) are independent. That is, the level at the end of the first year does not necessarily have to be the same as the initial level at the beginning of the following year. There is an extension of the Instructions in this respect. Please refer to the clarifications made in section 3.7 of the Instructions.

Q28. Regarding your response to Q9 in the Q&A document, do you recommend that the maximum and minimum tank values be set to 3.95 and 0.05, or do you recommend that we keep the tank bounds and 0 and 4 and add control rules to close the inlet pipes if the tank level exceeds 3.95?

The only option that will be controlled is that the tank is not filled or not emptied. The dimensions of the tanks must be the same and the control manoeuvres of the network must be designed to prevent the tanks from reaching the extreme values of 0.05 and 3.95. When evaluating the solutions, the tanks will have the initial dimensions and the control strategies proposed by each team will be applied. Then it shall be verified whether or not the upper and lower tank level limits are complied with.

Q29. To clarify the point made in Q15 of the Q&A document, do we use the pump curve specified in equation (2) to compute the energy consumption in the pump ourselves as opposed to using a fixed value in EPANET? And the value for η_0 is to be 80% for new pumps and 65% for existing?

The performance curves of the pumps are variable with the flow rate. It is therefore necessary for the participants to include these curves. The efficiency cannot be considered constant. The performance curves have been given parametrically so that the curves are different if the pumps are already installed or if the pumps are new.

Q30. Does the correction by Marchi and Simpson (2013) affect the actual simulation or is it just to accurately account for the energy calculation of a pump using a frequency inverter? If it does affect the hydraulic model, is it essential to directly edit the `getenergy()` function in the EPANET source code instead of doing our own calculation?

The energy calculation criteria of EPANET 2.2 will be followed, as it includes the modification of Sarbu and Borza and the correction of Marchi et al. The comment in the instructions is only for those participants who will not use the EPANET energy calculation module. We will perform the energy assessment of the solutions with the EPANET energy calculation. There is a specific comment on this issue in section 3.4 of the updated version of the Instructions.

Q31. In section 3.4 of the instructions, it is stated that one of the alternatives for investments is replacing existing well's pumps. The network has 2 pumps which are not well's pumps but regular pumps adding pressure to the system - B_PT1 and B_PT2. Are these pumps also can be replaced although they are not well's pumps?

Paragraph 3.4 of the Instructions only referred to the alternative of replacing the existing well pumps. In the case of B_PT1 and B_PT2 they are not well pumps. They are pumps that are in a pumping station. For this reason we have added a comment on this in the update of the Instructions. Pumps B_PT1 and B_PT2 are not considered to be well pumps. They are considered to be in a pumping station. Therefore, only in this pumping station, pumps can be



installed in parallel with the existing ones. However, the range of available pumps is the same (Table 3 of the Instructions). The installation cost function of these pumps is the same.

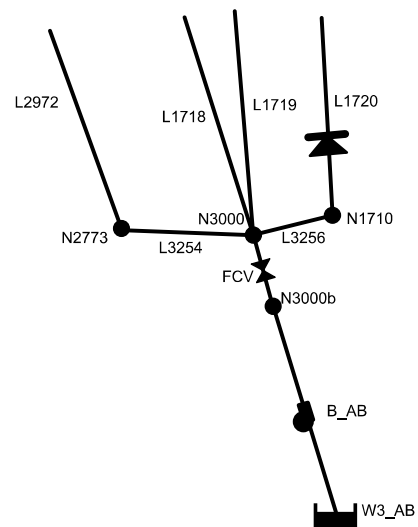
Q32. On the definition of pipelines and lines in the BIWS instructions it is mentioned "When a pipe is renewed, the entire line of the model shall be renewed". Is the definition of a line a single pipe or a series of pipes with the same diameter?

The sentence "... when a pipe is renewed, the entire line of the model shall be renewed ..." was referring only to lines of the model. It refers only to any of the pipelines defined between an initial node and an end node of the EPANET model. Thus, if there is a series of pipelines (same dimensions and characteristics) but defined in the EPANET model as different pipelines, the renewal of each of these pipelines can be done individually. It would not be necessary in that case to renew the whole series.

Q33. We have a question regarding the location of FCVs for limiting the flow in the pumps. The downstream node of pump B_AB (N3000) has 4 pipes. In that case could we add a new node upstream of N3000 with the characteristics of the biggest pipe, or it is necessary to add 4 FCVs? Attached is an image of the proposed layout modification around node N3000 to include an FCV. Would this be possible?

Although formally the Instructions indicate that only valves can be installed in existing pipes defined in the model ("*...it is possible to install valves in all defined pipelines...*"), we understand that given the configuration at the outlet of the B_AB pump, the inclusion of a node to install a valve at the outlet of the pump is correct. In this case the diameter of the valve must be at least equal to the larger of the diameters of the pipes connected to the N3000 node.

An analogous configuration could be applied for the pumping station with pumps B_PT1 and B_PT2. In the rest of the pumps of it is not necessary to make this layout modification since all of them have a single pipe immediately downstream of the pump.



Q34. How do we consider pipelines where there is a check valve and leakages are defined? Lines L3247 and L3251 are CV (check valve) type. Where is the check valve considered to be installed with respect to the check valve?

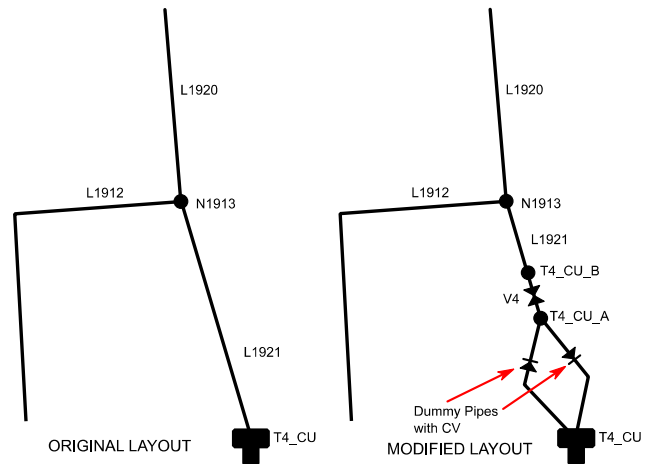
The location of the check valve with respect to leakage is the same as the interpretation of the position of the isolation valves in the pipelines that were initially closed in the model (see Q3 of this document or section 3.3 of the update of the Instructions). It is assumed the check valve is next to the initial node of the pipeline. That is, leakage will always be downstream of the check valve.

Q35. We were wondering if it is possible changing the initial status of a pipe by inserting a CV or it should be considered an investment cost to be made from the first year on?

Considering a check valve (CV in the pipeline status) implies that such a valve must be considered in the investment made in the corresponding year. Logically, this cannot be done in year zero.



Q36. Regarding the recommendation to use simple controls to avoid tank exhaustion or overflow (Q9 of the Q&A file) the problem is focused on tanks T3_MO and T4_CU which include a single inlet-outlet pipe. Is it possible to use two additional, fictitious pipes and two CVs to model the inlet and outlet of the tank and for which to specify simple controls? The attached figure shows a modification in which a valve (V4) has been installed at the outlet of the T4_CU tank. The proposal is to place two dummy pipes at the outlet of the tank to be able to control separately the filling and emptying of the tank. Is it possible to use this modification?



Although formally the Instructions indicate that no new pipes can be installed to the existing ones, we understand that given the outlet configuration of tanks T3_MO and T4_CU, the inclusion of the two dummy pipes to be able to control the operation of the tank is correct.

In any case, the installation of these dummy pipes will require the installation of valves for their operation. Therefore, we understand that the configuration of the attached figure is correct, but the installation of two regulating valves (TCV) of a diameter equal to the diameter of line L1921 will have to be counted as an investment cost.

Q37. We modelled the scheduling of network pumps by creating weekly pump patterns, that is patterns of 168 elements with value of 0 or 1 according with the status of each pump at each hour of the simulation period. However, we noticed that the Template.xlsx spreadsheet does not include a space where to add pump patterns. Do we have to turn this information into a series of simple controls and include them in the "Actions based on simple controls" table?

We have updated the Template on the website. The new Template includes a section for the introduction of the Patterns for the pumps.

Q38. In our network solutions we need to install many CVs and we know they have to be considered as investment costs but in the BIW instructions we found only the costs relative to isolation and regulation valves. Should we consider CVs as one of these categories even though its functioning cannot be associated to any of them? Which category should we choose?

Indeed, There is no reference to the installation of this type of valve. We understand that if one of these valves is installed it should be considered a cost equal to the cheapest of the valves quoted. In other words, the cost can be considered to be equal to that of an isolation valve.

Q39. How do we submit all the files with the solution for the BIWS? Do we have to use the OCS platform?

Instructions on how to submit the solutions will be emailed to the participating teams shortly. In any case, the full paper should be uploaded to the OCS platform while the rest of the files (excel, INP) should be sent by email to the address wdsa-ccwi2022@upv.es.

Last update: April 25, 2022