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FOREWORD

Background

DOMS stands for ‘Distribution Operation & Maintenance Strategy’ and is being used by Scottish Water to:

- safeguard the quality of water to customers
- ensure that Scottish Water apply due diligence to their Scottish Water distribution network

The DOMS procedures and work instructions affect all functional staff who work on the network, which includes internal employees and employees of external organisations (i.e. planners, operators, delivery teams, Framework Contractors, or any other contractors).

Through the application of the DOMS principles in day-to-day network activities, Scottish Water and their approved contractors will operate and maintain their water distribution networks through operational ‘best practice’. This will allow Scottish Water to meet the following objectives:

- to maintain water quality;
- to maintain continuity of supply;
- to maintain water supply hygiene;
- to undertake water quality incident management;
- to maintain a cost-effective water supply.
- to ensure a course of action for timely network intervention (Capex and/or opex)
- to maintain statutory obligations and customer satisfaction.

Responsibility

The responsibility for adoption and implementation of all DOMS procedures and work instructions rest with Scottish Water General Managers and senior managers of external organisations. It is the responsibility of all Scottish Water employees and those of external organisations to comply with DOMS procedures and work instructions.

Document Control

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Change Request

A change to this document can be requested by completing a Change Request Form - refer to document ‘DISTRIBUTION OPERATION and MAINTENANCE STRATEGY GOVERNANCE (DOM-WN-GOV-00000001)’ for change request procedure.

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1. **PREAMBLE**

1.1 **Work Instruction Objectives**

It is essential that valves be operated in an efficient and controlled manner within the network to maintain an accurate knowledge of where water is being supplied, minimise interruptions to supply, and minimise possible discoloration.

1.2 **Related Parent Documents**


1.3 **Related External Controlled Documents**

None.

1.3 **Related Internal Controlled Documents**

- Tool Box Talk DOMS IAF Guidance for the completion for access to Working on SW water Network DOMS Impact Assessment Form
- Hydrant Operations

2. **PLANNING CHECKLIST**

2.1 **Complete Health & Safety Risk Assessment, including**

- Single Man Working
- Traffic Safety (valve within roadway)

2.2 **Water Quality Impact Issues**

- Opening Boundary Valves
- Creating an interruption to supply
- Closing valve quickly and creating burst
- Scouring the pipes and causing discoloration.

2.3 **DOMS Impact Risk Assessment**

- Risk assessment produced and approved. Issues as detailed above.

2.4 **Risk Mitigation/Contingency Plan**

- Dependant on strategic importance of valve
- Possible identification of alternative feed.
2.5 Sensitive and Key Account Customer Issues

- Risk assessment to identify

2.6 Communication Plans

- Update Operations Log re valve operation from site for both Pre and Post valve Operation Contact number 0131 445 6659

3. PRESCRIBED WORK INSTRUCTION

This work procedure details the actions, which should be followed on-site by all employees, contractors and consultants, etc, who will carry out valve operations while working for or on behalf of Scottish Water.

All valve operations on the water network **must** only be completed by staff trained in DOMS both internal and external (**EU Skills registered**).

All Boundary Valves will only be operated by designated staff who are authorised by the local Water Operation Regional Manager.

Boundary Valve Authorisation Levels have now been increased (Sept 2012) for all Scottish Water NSO’s / LFT’s and any other designated staff authorised by the local Water Operation Regional Manager Up To DMA level ONLY.

All valve operators will be required to complete formal training in water supply hygiene practices and also in Scottish Water's Distribution Operations Maintenance Strategy (DOMS). Scottish Water will make training modules available to support this process and employees, contractors and consultants must complete this training in the relevant category of DOMS with a training provider that has been approved to deliver this training on behalf of Scottish Water. This training will be formally recorded and registered with Energy & Utility Skills (EU Skills) as part of the Water Industry Registration Scheme (WIRS) and an authorisation card will be issued by EU Skills on behalf of Scottish Water for both water hygiene and Scottish Water DOMS procedures. Note: EUS Skills hygiene training will be equivalent to module 1 of SW DOMS.

**DOMS TRAINING GUIDELINES – EVIDENCE OF DOMS TRAINING**

In 2007, Scottish Water set the goal that all staff working on the water network receives the relevant DOMS training by the end of the year. The result - over 9,000 people have currently completed DOMS training to support their network activities since it has been introduced within SW.

All staff, both internal and external, who work on the water network, **MUST** complete the relevant Distribution, Operation and Maintenance Strategy (DOMS) training associated with their specific network activities and as a result **MUST** carry two cards which confirm their training.

DOMS training is available through a number of approved Training Providers and the registration of the training units taken by individuals is administered through EU Skills.

The first card relates to training given around the Hygiene Code of Practice (HCoP) and the card usually coloured light blue, confirms the cardholder has completed this element, which includes a health screening questionnaire.
The second card, usually coloured white, relates to training given around DOMS and the training units shown on the back of the card detail the type of DOMS related site activities that the cardholder can undertake.

Both cards detail the name of the cardholder, along with their picture, which will allow confirmation that the cardholder is the person holding the card.

Scottish Water staff may and will challenge all internal and external staff working on the water network at anytime to produce both their cards to ensure that cardholder has the relevant training and understanding of DOMS Procedures and Work Instruction for the specific task that they are undertaking.

The following guidelines should be followed for deciding the course of action to take when either internal or external staff were found to be working on the water network, or any infrastructure that will be connected to our network, without the requisite HCoP/DOMS cards confirming training.

1) **New starts** - expectation that they will have their necessary HCoP/DOMS training organised by their employer within the first 4 weeks of them joining their company. They will not be allowed to work on the water network without the HCoP/DOMS training, even though they are being supervised by a person who has gone through the training. There is a minimal health risk here, which the health questionnaire, completed during the HCoP training, will confirm as acceptable or unacceptable.

2) **Completed HCoP/DOMS Training but no card issued by EU Skills** - staff in this situation can work on the water network as long as they can demonstrate that they have a 'cover note' issued by training providers. If a 'cover note' is produced, then the person challenging can ensure that 'cover note' refers to the actual person by checking the EU Skills web site against name or reference number.

This will be done in conjunction with the relevant DOMS Working Group representative.

3) **Person challenged on site and person has no HCoP/DOMS relevant training** - if this scenario occurs then the person who has made the challenge will remove the person from working on the water network and contact the relevant business unit DOMS Working Group representative as the first point of contact. Together, the site contact and the DOMS Working Group representative will make the decision on whether work can or cannot continue after discussions with the employee’s relevant organisation.

4) **Person challenged on site and cannot produce HCoP/DOMS relevant training cards, but claims to have undergone training** - if no cards can be produced, then the person challenging can not confirm that the person has had the relevant training by checking the EU Skills web site against name or reference number. This will be done in conjunction with the relevant DOMS Working Group representative.

5) **Person challenged on site; DOMS CARD EXPIRED.**

If a DOMS card has expired and the person is waiting to attend a SW DOMS training course, a signed and dated cover note, with the course reference confirmation number and Registration Status clearly shown, must be issued by the person’s line manager, in order to allow access to the network.
The person must present this cover note on site.

(Failure to provide cover note will result in the individual being removed from working on the network until a cover note is issued, or the individual is retrained and re-registered with EUSR) The cover note will only be valid for 3 months after the original card expiry date. After 3 months has elapsed, if the person has not re-registered and is NOT in possession of a new card or a cover note stating the person is awaiting delivery of a new card, then access to work on the network will be refused.

All internal and external staff working on the water network must have completed the relevant training. If the site challenges are made by SW staff (and on occasions the DWQR) for all those working on the network, the message will be sent clearly that

'IF YOU HAVEN’T HAD THE TRAINING – YOU CANNOT WORK ON OUR NETWORK OR ANY INFRASTRUCTURE THAT WILL BE CONNECTED TO OUR NETWORK.’

While we all want to be balanced and professional in our company approach to this matter, water quality and customer satisfaction in our product is our paramount concern.

Finally, can all Scottish Water staff note that for out-of-hours advice on public health issues, a representative from the Public Health Team can be contacted 24/7 through the ICC.

3.1 General

3.1.1 Gate Valves < 200mm (8”)

- The majority of valves within the network are gate valves up to 200mm (8”).

- The number of turns to open / close a typical gate valve is twice the imperial diameter of the valve plus one e.g. a 100mm (4”) valve = 9 turns, a 200mm (8”) valve = 17 turns.

- The vast majority of gate valves open clockwise and close anti-clockwise. However, there are valves within the network, which operate contrary to this. Some are noted within GIS.

- When a valve is opened approximately 25%, this equates to about half the flow through the valve.

- When a valve is being closed, the last 25% of closure equates to about half the flow through the valve.

- Any valve should be opened slowly, particularly through the first 25% of valve operation.

- Any valve should be closed slowly, particularly through the last 25% of valve operation.

- When a valve has not been closed for some time, debris may have collected at the bottom of the valve seat and may prevent a lock-tight shut. Working the valve up and down slowly may dislodge the debris.
• Sounding a valve will assist in determining if there is a flow through the valve:
  − There should be no sound on a closed valve.
  − A noise can be heard on a partially closed valve.
  − When a washout or scour valve is opened, a distinct noise will be heard.
  − When a boundary valve, which separates two significantly different pressures, is opened a distinct noise will be heard.

• The "normal" position of most valves within the network is open.

• Typical closed valves within the network are Boundary Valves, washouts or scour valves and bypass valves to e.g. PRVs

3.1.2 Large Valves, Geared Valves, Valves with Bypasses

• Larger diameter valves may be geared and / or electrically operated. Where a 400mm (16") geared valve has a ratio of 4 to 1, it would take 132 turns to close the valve.

• Where a large valve is fitted with a bypass, this is normally fitted because there is a significant pressure differential across the valve and/or the large valve is not electrically operated. The bypass reduces the effort, which is needed to operate the valve.
  − Before opening the main valve, the bypass is opened to reduce the pressure differential across the main valve.
  − Before closing the main valve, check that the bypass is open. After the main valve is closed, the bypass valve is closed.

Operating Valves
Valve Operations

Planning checklist: - before operating any valve on the Water Network.

1. Complete H&S Risk Assessment. including:
   − Single man working
   − Traffic safety (valve within roadway)
   − Audit can only be done outside of working hours.
   − Valve below 2 man access cover.

2. Complete a DOMS Impact Risk Assessment Form.
   Consider Increased Pressure to the water network and Water Quality Issue:-
   • Is it a boundary valve- if so what will be the impact of operating?
   • Who will be affected? – Key Customers, Hospitals?
   • Is an alternative feed required? – Tankering, Overland supplies?
   • Is a contingency plan required?
   • Correct Sequence of valve operations to prevent back siphonage / contamination.
3 Obtain approval to proceed from Team Leader / Regional Manager when / if required.
4 Update Operations Log Pre Valve Operation confirming area and property numbers affected by either an Interruption to supply (Stop / Start times) or possible or likely water quality issues.
5 Should a valve be found to in the incorrect status , The operator must contact SW Regional Manager or Team leader or Ops Log as there may be other work being done on the network.
6 Any valve found in the incorrect status should be checked before it is operated as the valve may have lay in the incorrect position for some time and have a volume of stagnant water.
7 Any valve found lying shut that is sounding during its operation to re open should be closed back down and upstream and downstream investigation CARRIED OUT.
8 If the valve closing direction of a valve cannot be established because the valve turns continuously in both directions, the operator should record and raise a task related request for work and escalate to their Team Leader and to the Leakage Delivery Team Leader.

Authority to operate a Valve
All valve operation should be enabled and checked that the valves are accessible and operatable then detailed on Scottish Waters DOMS IAF and authorised by relevant level of SW Staff.
(Refer to DOMS TBT14 Network Authorisation)

Note
Boundary Valve Operations are included within DOMS TBT 2 Boundary Valve Management. All Boundary Valves will only be operated by either a Scottish Water NSO`s / NSI & or Leakage Delivery LFTs or Stand By NSO`s or as Designated by the Regional Manager.

When operating any valve on the water network either Opening or Closing there is a risk to the water network through a combination of either poor knowledge, experience or with the actual operation of the valve either by the operator opening or shutting the valves to quickly causing
- Opening or Closing a valve quickly and creating a burst.
- Causing transient pressure within the water network.
- Creating an interruption to supply (shutting of other areas of the network)
- Scouring the pipes and causing discoloration or milky cloudy water.
- Water Quality Impact Issues i.e. introducing stagnant water

All Valves should be operated in the correct manner order and sequence to prevent any possible contamination from back siphoned water entering the main especially during any burst mains repairs.

- Produce plan from GIS.
- Carry out a DOMS impact assessment and obtain approval for the valve operation. Where multiple valve movements are associated with a single job, one DOMS impact assessment is needed for the job.
• Make reference to DOMS tool Box talk Tool Box Talk DOMS IAF Guidance for the Correct completion for access to Working on SW water Network

• Update Operations log for Pre & Post valve movements. Contact number 0131 445 6659

• If operating a Boundary Valve comply with the Work Procedure for the Operation, Maintenance and Audit of Boundary Valves (DOM-WN-PRC00000327)

• Complete a health and safety risk assessment. Refer to the H&S Management system manual on the SW intranet site.

• Where the valve is within the public highway, adhere to appropriate safety procedures.

• **When closing a valve:**
  
  – Calculate the number of turns to close.
  
  – Count the number of turns when closing.
  
  – Close the valve *slowly*, particularly over the last 25% of spindle travel.
  
  – Sound the valve to confirm watertight. If not, working the valve up and down *slowly* may dislodge the debris in the valve seat and assist closure.
  
  – If unable to close a valve, **do not** overstress the valve spindle. Report the problem to your Team Leader.

**Isolation of the Network**

The first valve for isolation of the water network should be the down stream valve with the last valve operated being the up stream valve to maintain a positive flow & pressure out of the main for as long as possible.

• **Remember**, where competing priorities exist between minimising the risk of contamination and restoring the supply as soon as possible / completing a job by a target date, the over-riding consideration must be to ensure that public health is not compromised.

• **If in doubt escalate to your team leader or Line Manager ASAP**

• **When opening a valve:**
  
  – Calculate the number of turns to open.
  
  – Count the number of turns when opening.
  
  – Open the valve *slowly*, particularly over the first 25% of spindle travel.
  
  – Do not over stress the valve spindle.
− The valve should be fully opened, then checked back half a turn.
− If unable to open a valve, **do not** overstress the valve spindle. Report the problem to your Team Leader.

**Re-Charging the Network**

The valve operations when re-charging a main should be the down stream valve opened firstly by ¼ or ½ a turn on the valve to start the re-charge process with a hydrant or air valve at the highest section of the main left open to air and flush the system.

Only when the water network has been properly flushed and aired from a hydrant or air valve etc

Should the remaining valves be re-opened fully to re-charge the system and return the water network to its original status.

**Remember**, where competing priorities exist between minimising the risk of contamination and restoring the supply as soon as possible / completing a job by a target date, the over-riding consideration must be to **ensure that public health is not compromised.**

**If in doubt escalate to your team leader or Line Manager ASAP**

**The valve operator must:-**

1. Valid & Authorised DOMS IAF on site to either Complete & or Update the DOMS Impact Assessment Form pre / post valve ops
2. Update the Operations log before operating any valves.
3. During an Incident Record any instruction given with the operation of any valves required capturing any names, date, time etc
4. Isolate the main in the correct sequence of valves ops and drain the main in a controlled manner.
5. Check and validate the isolation of the network using Hydrants, Air Valves, Scours and or pressure gauges.
6. Re-charge the main in the correct sequence and Flush and Air the system.
7. Return the water Network to its correct status.
8. If the valve closing direction cannot be established because the valve turns continuously in both directions, the operator should record and raise a task related request for work and escalate to their Team Leader and to the Leakage Delivery Team Leader.
Good Practice for Valve Operations.

1  DOMS IAF Completed.
   Available onsite populated with the correct information and authorised correctly by SW.

2  Sequence of Valve Ops
   Isolation and Re-charging the system must be done in the correct sequence to prevent potential contamination and Water Quality issues i.e. discoloration etc.

3  Always Count the Number of turns  2 x imperial diameter + one turn to open/close i.e.
   4" inch valve = 9 turns

4  Direction to open/ close.
   Be aware that this may differ within different regional areas. Within the North East area of Scotland
   the majority of Valves close in the clockwise direction. The majority of Valves within SW are
   anti clockwise closing.

5  Operate valve slowly.
   Particularly through the first & last 25% of the valve operation.

6  Sound valve.
   To ensure valve is tight shut, work up and down if need be.

7  Hydrants & Air Valves Scours etc
   Hydrants up stream and down stream of valve operations should be used and monitored for checking
   changes in Water Quality or Flows / Pressures.
   All Hydrant /Air valve / Scours within the isolated section must be checked to confirm the main has
   been isolated and De-pressurised correctly and that the work to cut into the Water main is safe to
   continue.

8  Valves
   Should a valve be found to be in the incorrect status, the operator must contact SW Regional
   Manager or team leader as there may be other work being done on the network. Any valve found in
   the in correct status should be checked before it is operated as the valve may have lay in the
   incorrect position for some time and have a volume of stagnant water behind the valve.
   On-site the valve should have the nearest hydrants up and down stream opened and checked for
   water quality issues as well as flows and pressures as well as being flushed to remove any potential
   risks of contamination from stagnant water.
   Onsite locate the nearest hydrant upstream and downstream and open both up at the same time as
   the valve is opened to flush any dirty water out the system.

9  Valves
   All valves should be returned to their original status when the work is complete. The valve should be
   fully opened, and then checked back half a turn when the work is complete.
   The valve should be fully opened,
   Any valves not returned to their normal status should be recorded and updated on GIS. Any valve
   that is unable to be returned to its correct status i.e. broken, seized or leaking etc must captured on
   the DOMS IAF and reported ASAP and a work order raised for the repair and maintenance of the
   faulty valve.
DOMS IAF’s especially any Complex shuts are to be reviewed by the Water Operations and/or Leakage Delivery person who authorised the network intervention to confirm the water network and all subsequent valves have been returned to the correct status with any issue from site highlighted and captured for further investigation and resolution when and if required.

I.e. Poor pressure, Valve missing, Seized or Leaking valves, No water complaints as a result of the work being carried out etc.

All staff both internal and external should notify SW of any issues incurred during their work activity for SW to take the relevant action and update its corporate GIS.

**Any Valve left in the incorrect status will cause SW future operational issues.**

After the work has been completed all completed DOMS Impact Assessment Forms are to be e mailed to

doms@scottishwater.co.uk

For record keeping and any future internal audits or investigations either internally or by the DWQR.

Always remember to disinfect all materials and fittings for any network intervention or repair etc, update the Ops log to say work is complete, fill in the ITS form and take a water sample when and if required.