TGN3 - DISTRIBUTION SYSTEM (REPAIRING MAINS)

Introduction

A burst or damaged main and the process of its repair are potential opportunities for contamination to enter the distribution system. A risk assessment should be carried out immediately prior to all repair activity; this should be dynamic and respond to any new developments during the repair process. Precautions are necessary to prevent contamination and minimise the risk to public health when responding to these circumstances and during subsequent repair work.

Good Practice

1. Repair activities on all water mains are restricted operations. All personnel undertaking repairs must be registered under an approved hygiene scheme and carry a valid water hygiene training card.

2. The risk of contamination is greatest when the main is depressurised, whether from the burst or damage itself, or during subsequent isolation for repair when contaminated water or other material can enter the main directly or from backflow through service pipe connections.

3. An on-site assessment should be performed in each case to establish whether there is a risk of contamination and if so its nature and severity. The risk assessment should take account of the possibility that the surrounding soil may be contaminated with chemical or biological materials (for example, petrol or sewage).

4. Where the main is leaking, but still under pressure, for example from a crack around the circumference of the main, a simple repair can be effected with a collar. The excavation should be drained below pipe level (at least 150mm below the invert of the pipe), and the water should remain under a positive, but if necessary reduced, pressure while the repair is made.

5. Where possible, the excavation should be made and pumped so that the water is below pipe level prior to the main being depressurised. For more serious bursts (where there is risk of flooding to properties, danger to the public or significant loss of downstream pressure) the main should be isolated as soon as possible at the nearest downstream valve first. Under these circumstances it is likely that a cut-out repair or pipe length replacement will be necessary.

6. Where the main has to be replaced or cut out for repair, the excavation should extend to a sump well to at least 150mm below the invert of the pipe. The water level should be kept below the bottom of the pipe throughout the repair process, when necessary by suitable pumping.

7. Fittings and pipes should be inspected prior to installation to ensure they are clean and free of defect. Replacement pipes and pieces of pipes together with all fittings and cut ends should be spray disinfected with a fresh solution of 1000mg/L of free available chlorine ensuring that all surfaces are covered.

8. After completing any repair on a depressurised main, including installations of new sections or components, the main should be flushed at the nearest downstream hydrant to remove any debris and excess chlorine. Where practicable, flushing should ideally

achieve three volume changes. Due consideration must be given to the potential for contamination of watercourses. Sufficient neutralising agent (e.g.: sodium thiosulphate) should be added to de-chlorinate the water where this is necessary.

9. Measurement of the downstream chlorine residual should be carried out in order to determine whether sufficient flushing of the repaired section has been completed and the residual has returned to background concentration.

10. Where depressurisation occurs during the repair, the precautions necessary prior to return-to-service should be documented. Where the repair requires a cut-out, but the risk assessment indicates no reason to suspect contamination and the appearance and smell of the water is satisfactory, a sample should be taken for chlorine residual, taste and odour properties, physicochemical and bacteriological analysis from the nearest available downstream hydrant or property. The main may be returned to service pending the results. In the event of a failing sample, the main should be re-sampled and additional samples taken in the adjacent distribution system. Further actions proportionate to the circumstances should be considered to protect public health including disinfection or the issuing of protective advice as necessary.

11. If it is known or suspected that groundwater or other material has entered the pipe, on completion of the repair the main should be flushed (and where necessary swabbed), disinfected and sampled. Dependant on the nature and extent of the contamination, the main may be returned to service prior to receipt of analytical results. Where the risk assessment suggests significant contamination may have occurred (e.g.: from sewerage) the main should remain out of service until results are known, or if it is critical to restore the supply immediately after repair precautionary advice (such as Boil Water Advice or Do Not Drink Advice) should be issued.

12. Where the on-site risk assessment has determined the necessity for disinfection of the isolated section of main this should be carried out with a minimum of 50mg/L of free available chlorine for 30 minutes (or equivalent method). Levels should be checked during this period to ensure that the concentration of chlorine is maintained throughout the process.

13. During this time all service connections should be closed. If this is not possible, steps should be taken to protect any customers who may be affected. After disinfection the main should be flushed as in 8 above.

14. Where "Thermopipe" is used as a repair material it should be treated as an epoxy or polyurethane spray lining. Disinfection by steam is not acceptable. For further information refer to the codes of practice for In-situ Lining of Water Mains.

15. Repairs requiring more than 3 pipe lengths or more than approximately 20 metres long should be disinfected as new mains.

16. The table below is designed to provide a summary of the operational requirements for various types of mains repair and circumstances.

Job	Risk Assess	Hand Spray Disinfect	Flush	Charge & Disinfect	Sample	Water Quality clearance required
Repair on pressurised main	√	√				
Repair on depressurised main (e.g.: cut-out repair or piece-up).	√	√	√		√	
Repair on depressurised main - risk of contamination*	√	√	√	√	√	√

*Note: This includes possible foul contamination for example due to the proximity of a damaged sewer.