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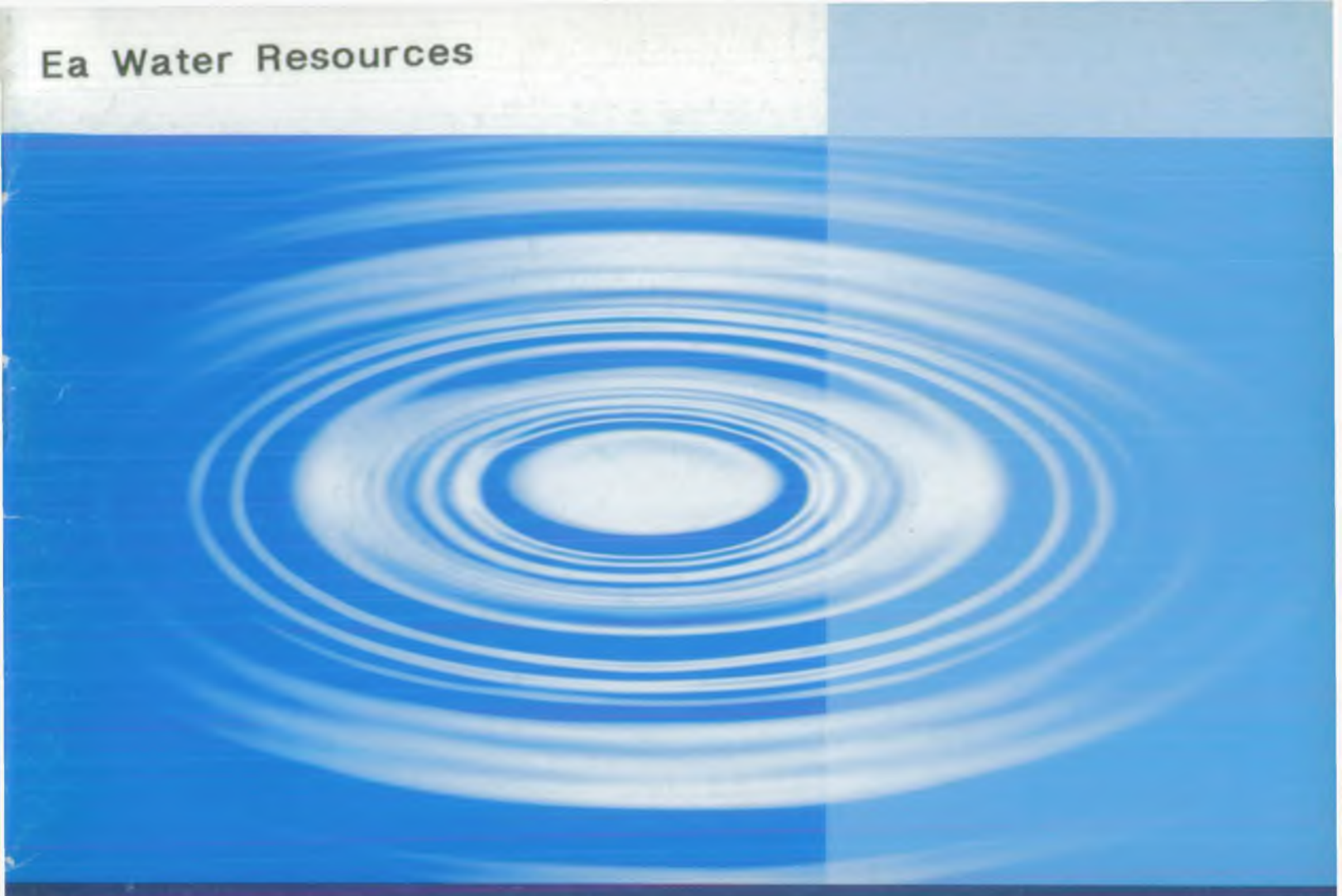

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Review of water company drought plans

A report to Government

ENVIRONMENT AGENCY

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Environment Agency
Rio House
Waterside Drive, Aztec West
Almondsbury, Bristol BS32 4UD
Tel: 01454 624400 Fax: 01454 624409

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EA – WATER RESOURCES

Summary

This is the Environment Agency's second review of water companies' drought plans. Ministers have asked the water companies of England and Wales to develop and maintain drought plans. These show how the companies will manage water supplies during periods of drought. Ministers have asked the Environment Agency to review these plans every three years. Our first report on water company drought plans was published in June 2000.

We are pleased to report that all water companies have drought plans in place. However, some need immediate action to ensure that all the necessary components are present.

The Agency issued a revised drought plan guideline in November 2002. We asked companies to submit their updated drought plans by 14 March 2003. We have reviewed these plans and our findings are outlined in this report.

Nearly all the companies submitted their revised plans on time. Portsmouth Water has told us that its previous plan is still current and will not be updated until after August 2003. Cambridge Water did submit a plan but this was the same as that in 2000.

Drought plans are an important element of prudent water resources management. They detail the operational steps that must be taken as a drought progresses. They complement the long-term strategic plans of companies and cover the range of actions necessary to deal with different drought situations. These range from publicity campaigns and communication strategies to customer restrictions and drought permits or orders. Companies have identified the various triggers that will lead to and initiate each action. By planning these actions in advance, there is time to consider potential impacts and mitigation measures.

In June 2000, we identified a number of areas in water companies' drought plans that needed improvement or further work. Good progress has been made although there are a number of companies with work outstanding from the previous review. We have identified some further ways that the plans could be improved and we will be looking for this work to be completed by the end of 2003.

- Two thirds of companies need to carry out baseline studies and agree the scoping of environmental assessments in relation to possible drought permit or drought order applications included in their plans.
- About a third of the water companies need to carry out further development of triggers and control rules, and to link them to the sequence of drought actions.
- A few companies have included options that could potentially affect another company. These companies must ensure that their plans are consistent.
- Three Valleys Water should develop and put in place a communications plan (a vital component of effective drought management).
- Sutton and East Surrey Water and Portsmouth Water need to work on providing a clear management structure in their plans. Cambridge Water should incorporate the management structure that was supplied in its covering letter into its plan.
- We recommend that Thames Water follow the lead of other water companies and make information on its drought plan publicly available.

We are pleased to note that over half the water companies will make their full drought plan available to the public for inspection, and nearly all the others will make a summary of the plan available.

The Agency's own regional drought plans have been updated recently. As part of this work we commissioned an independent review. This identified areas where further work would improve the plans. We have updated our plans in line with these recommendations and the revised plans are available for inspection at the relevant offices. We are also reviewing our drought procedures to ensure that we deal with droughts consistently across England and Wales.

It is important that water companies should continue to keep their drought plans up-to-date. Plans should be reviewed annually and any changes should be reported to the Environment Agency. We welcome the proposals in the Water Bill to make the regular submission of drought plans a statutory requirement.

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1. Introduction

Droughts are natural events. In extended periods of dry weather, groundwater levels and river flows drop and the volume of water stored in lakes and reservoirs falls.

The water companies, the Environment Agency and Government all have roles to play in a drought. Water companies make operational decisions to ensure water supplies are maintained. As part of this they may need to implement actions to manage demand, such as introducing customer restrictions, or to temporarily increase supplies, for example by applying for drought permits or drought orders. The Environment Agency is responsible for monitoring, and where possible, mitigating the impact of drought on the environment (for example, by organising fish rescues). The Agency works with abstractors to manage the resources and deals with applications for drought permits. Government determines applications for drought orders from water undertakers or the Agency. It is important to ensure that the responsibilities of each different party are clearly defined and understood. For this reason the Agency and the water companies have developed drought plans.

Water companies all have arrangements in place to collect, store and transfer water to cope with normal fluctuations in rainfall. All the companies have water resources plans, which they review on a regular basis and submit to the Environment Agency; these plans show how they will manage their water resources in the long term. The companies plan to be able to deal with a range of drought events and peak demands during short summer dry spells. However, due to the variable nature of rainfall it is essential that water companies should also be prepared for more unusual events that may lead to normal operational procedures becoming insufficient to guarantee security of supply.

In their drought plans, the water companies detail the short-term measures that they will implement in a drought situation. The plans enable the companies to ensure that important needs of the environment and other water users are recognised and protected. They make sure approaches are fully investigated beforehand and agreement in principle has been reached before the need to respond quickly.

At the May 1997 Water Summit the Government announced its 'Ten Point Plan'. This included the requirement for "water companies to agree a detailed, publicly available drought contingency plan with the Environment Agency". In a number of reports and consultation papers since then (DETR and Welsh Office, 1998, 1999a, 1999b), the Government stated its intention to make this a statutory requirement as soon as a legislative opportunity arose. The Water Bill contains provisions to give effect to this recommendation (Water Bill, 2003). Some key events in the development of water company drought plans are summarised in Table 1.

In March 2000, all the water companies in England and Wales submitted drought plans to the Agency. The Agency stated that it was broadly content with the plans in its report to Ministers in June 2000 (Environment Agency, 2000). Although some companies did have drought plans before this time, this was the first time that all water companies produced their plans to a consistent format.

Drought plans need to be kept up-to-date to ensure that they continue to be relevant. Ministers have asked the Agency to review water company drought plans every three years, or after a drought event. We requested that the water companies submit revised plans in March 2003. Nearly all the companies submitted plans by this deadline. We have examined all the revised plans in detail and are satisfied that all companies have drought plans in place. However, some need immediate action to ensure that all the

necessary components are present and there is still work outstanding on several plans which was identified in June 2000. Our detailed findings are summarised in this report which includes recommendations for further work.

Date	Event
May 1997	Expectation for drought plans outlined by Ministers at Water Summit
January 1999	Instruction from Government issued in *Maintaining public water supplies* (DETR and Welsh Office, 1999a)
January 1999	Draft *Drought contingency planning guideline* issued to water industry and Government for consultation
June 1999	Final *Drought contingency planning guideline* produced
November 1999	Water company draft drought plans completed
March 2000	Water company drought plans agreed with Agency
June 2000	Agency reported on water company drought plans to Ministers (Environment Agency, 2000)
November 2000	Draft Water Bill produced
November 2002	Revised *Drought plan guideline* issued to Government, Water UK and Ofwat for consultation
November 2002	Revised *Drought plan guideline* produced (Environment Agency, 2002)
February 2003	Water Bill produced
March 2003	Revised water company drought plans agreed with Agency

Table 1 Key events in the development of the water company drought plans

2. Drought plan guidelines

The Agency issued the first version of its drought plan guideline in June 1999. The guideline provides a good practice framework within which water companies should develop their drought plans. Following consultation with Government, Water UK and Ofwat, a revised version of the guideline containing some minor amendments was issued in November 2002. In this report, we have appraised each water company's drought plan against this guideline.

In their plans, water companies should prepare for a wide range of drought situations that might threaten their ability to provide secure supplies. Each drought is different in terms of severity, location and duration. The plans therefore need to have flexibility within an agreed approach in order to cope with all circumstances.

A drought plan should indicate the nature and sequence of measures that the company would expect to take in a drought event. The company should plan the actions that it could take to reduce demand and maintain supplies as a drought begins to threaten, as it intensifies and then later as it declines. These include measures such as hosepipe bans, increased publicity and possibly applications for drought orders or permits. The different stages of the plan and the measures that will be implemented should link to specific drought 'triggers' during the escalation and de-escalation of a drought. Triggers should be identified in advance, and the crossing of a trigger should prompt a company to initiate pre-determined actions or move to the next stage of drought management.

The plan should also consider the impact on the environment of drought actions taken by water companies. An assessment of environmental impact and risk should be undertaken for every proposed measure. Sites where drought permits and drought orders may be sought should be identified in advance. At such sites, baseline monitoring should be specified to enable the prediction or detection of any impacts on the environment, recreation, navigation and other water users. Mitigation measures should also be included where appropriate. Water companies should consider the need for consultation and liaison with the Agency and other relevant statutory and non-statutory bodies. This is particularly important for proposals that concern nature conservation sites such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated under the Habitats and Wild Birds Directives. The drought plans should take into account the time needed for consultation and recognise that the success of applications for drought orders and permits is not guaranteed. Water companies' drought plans are expected to include details of any baseline studies that have been carried out in preparation for, and in support of, potential drought permit or drought order applications.

It is important that water companies show the management structure that will be put in place during a drought. The plans need to show who will take responsibility for different aspects of drought management at a strategic level and who has overall responsibility for decision-making. This structure will vary from company to company.

An important component of a drought plan is the section detailing the company's communications strategy during a drought. This should contain information on:

- planned programmes for informing the public and other stakeholders;

- key messages on using water wisely and saving water in a drought;
- how the key messages will be communicated to different sectors;
- different stages of the plan linked to specific drought triggers during the escalation and de-escalation of a drought;
- contacts with the Agency at the beginning of and during the drought period. This part of the plan should include details of regular reports submitted to the Agency on current conditions, drought status and a forward look.

Ministers expect water company drought plans to be 'publicly available', and this is reflected in the Water Bill. Water companies will be expected to publicise the existence of their drought plan and to make copies available to the public on request.

3. Water company drought plans

3.1 General overview

All water companies have drought plans in place. Nearly all companies submitted revised drought plans by the March 2003 deadline. Portsmouth Water did not submit a revised plan but informed us that we could assume that its March 2000 plan was still current and that it would be updated after August 2003 when the company has revised its water resources plan. Cambridge Water's revised plan was effectively a re-submission of its March 2000 plan and as such did not take account of changes to the drought plan guideline, although supporting information on management responsibilities was provided in a covering letter. We are disappointed that these two companies have not submitted revised plans and will be writing to them on specific issues.

Our detailed comments on the company plans are given in Appendix 2. We are able to report, as we did in June 2000, that the drought plans of nearly all water companies are broadly satisfactory. Many companies' plans are significantly better than those submitted previously. However others have outstanding areas of work.

Some companies have resource zones with a tight supply-demand balance and are at a higher risk than others of having to implement drought measures during a dry summer. For these companies it is especially important to have robust drought plans in place.

This section of the report is divided into three parts. First we look at common characteristics of the plans. Next, we review areas in the plans that we highlighted as requiring improvement in our previous report. Finally, we make recommendations about where further work is required in a number of the 2003 plans.

3.2 Common characteristics

The drought plans share a number of characteristics.

Links to water resources plans

Water resources plans set out how the water companies will manage their long-term strategic needs to ensure sufficient water to supply their customers. Drought plans show how water companies will cope in dry periods. The two plans should complement each other and for most companies, it is clear that their drought plans are consistent with their water resources plans. This link will need to be kept under review following the work currently being undertaken by companies to review their water resources plans as part of the ongoing review of water company prices. The companies will be producing draft water resources plans in August 2003 and final plans in April 2004.

Baseline environmental monitoring

Previously we reported that companies had proposed and, in many cases, initiated baseline environmental monitoring programmes at sites where possible drought orders or permits had been proposed. Drought orders and drought permits that authorise the abstraction of additional water have the potential to affect the environment and this needs to be monitored against a known starting point. Two-thirds of companies still need to do more work in this area; we will discuss this in more detail in section 3.3 of the report.

Balancing demand and supply side options

Drought plans should incorporate a combination of measures to reduce demand for, and augment supplies of, water in order to provide a flexible solution during a drought. We expect additional demand reduction measures to be put in place before further abstractions are implemented. In their drought plans, most companies have recognised the need to have additional demand management measures in place before seeking authorisation for further abstraction.

Value of recent experience

In the June 2000 report, we commented that companies with recent drought experience had paid more attention to the development of their plans. No droughts have occurred since then. We re-iterate our recommendation that companies without recent drought experience should think carefully about their plans to ensure they cover an appropriate range of actions. Companies may wish to review whether it would be beneficial to arrange training exercises to

rehearse how a drought would be managed and the issues their staff may face.

Management structure

In our revised drought plan guideline, we included a requirement to detail management responsibilities within a company for drought actions. The majority of companies have included comprehensive information on accountabilities during a drought. However, two companies have provided limited information, Sutton and East Surrey Water and Portsmouth Water. It is essential that company staff are clear about individual responsibilities to ensure good communications and decision-making during a drought. It is also important that the Agency and other organisations know who to contact on specific drought issues to ensure they are dealt with effectively.

Communications plans

All companies except Three Valleys Water have included communications plans. Most are adequate with a number of companies providing comprehensive and detailed plans. We see the communications plan as an important component of a successful drought plan; it needs to be thought out well in advance of a drought to ensure that key messages are communicated effectively in order to influence customers to use water carefully. We would hope that companies would use data from metered customers to ensure that key messages are targeted at high water users in particular. Three Valleys Water should complete a communications plan as soon as possible and the Agency will be liaising with the company to agree a timetable.

3.3 Progress on areas highlighted as requiring improvement, or where further work was recommended in the previous review

A number of specific areas in some plans were highlighted in our June 2000 report as either requiring improvement, or where further technical work was recommended. We have analysed the plans received in 2003 to look at progress on these issues:

Triggers for different actions

In our 2000 report, we highlighted that some companies had not produced triggers (particularly for resource zones dependent on groundwater). We are able to report that many companies have made good progress in this area and that for the most part triggers for drought actions are in place where they are appropriate. However, we need to discuss further work in relation to triggers and the links with specific drought actions with about a third of the companies. We will also be seeking clarification from a few companies on how the triggers and associated control curves have been derived to ensure that they are workable. Some companies have not included triggers for the de-escalation of drought measures in their plans and we recommend that they consider this.

Savings from demand management measures

All companies have included a range of additional measures to control demand during a drought in their plans. In our 2000 report, we reported that information giving an indication of how much water could be saved by different actions was missing from a number of the company plans. More information has been included in the revised plans and most companies have included estimates of water savings. However, a few companies have still given incomplete information on this aspect of the plan. Some companies tell us that this is because they have no supporting data. We recognise that it can be difficult to estimate the savings in detail, but believe that it is useful to document the assumptions made by the company for the demand management measures listed.

Information in the public domain

Government expects water companies to make their plans publicly available; this is reflected in provisions included in the Water Bill. More than half the companies are now prepared to make their drought plans available for public inspection; this is an increase from the last review. Most of the other companies prefer to provide their customers with a summary document. Only Thames Water has stated that its plan is classified as confidential and that it has no immediate plans to provide a summary document to its customers. Several companies have some concerns about making their entire plans available, although some of these companies are open to discussion on ways forward. Table 2 details the companies' intentions for publicising their plans.

The lag between initiating actions and achieving results

In our 2000 report on water company drought plans, we asked companies to review their plans to ensure that sufficient time had been allowed to implement drought measures effectively. There is evidence that

many companies have taken this into account (there are examples of companies dismissing an option because of an unacceptably long lead-time). However, some companies have still included options that could take a significant time to implement; we will take this up with the companies concerned.

Review of any novel approaches developed in the plans

In their drought plans some companies have included approaches in the development of triggers that differ from the Agency's guidance. This review has highlighted the need for further discussion between the Agency and some companies on the development and use of control curves and triggers. Some new options have been included in some companies' plans with insufficient supporting information to demonstrate that they are realistic drought measures. We will be requesting more details on these options from the companies concerned.

Further work to identify appropriate environmental monitoring and mitigation procedures

In our last review, we recommended that further work be carried out to identify appropriate environmental monitoring and mitigation procedures. A number of the water companies have made satisfactory progress in this area. However, some of the water companies need to undertake studies to investigate the options that they are proposing and, in particular, to assess the risks and potential environmental impacts. Roughly two-thirds of companies need to provide more information in their plans on the baseline monitoring they need to undertake at certain sites, and their plans for mitigation where it is thought that there is potential for environmental damage at a site. In some cases, this information has not been provided at all. This is a particular issue where possible drought orders or drought permits have been identified which could potentially affect Habitats Directive sites. It is in companies' interests to undertake preparatory environmental work, as they otherwise risk delayed or unsuccessful applications for drought orders or drought permits. We shall be discussing with each relevant company what measures they propose to take in respect of monitoring and mitigation. We would expect any necessary work to have been completed by the end of 2003.

3.4 Recommendations for further work

Specific areas where further work is required in individual plans are indicated in the relevant company commentaries (see Appendix 2). We expect this work to be completed by the end of 2003 and will write to each company to clarify what is required. Some of the main areas that we have identified where further work is needed are indicated below.

- It is important that companies carry out necessary baseline studies and agree the scoping of environmental assessments in relation to possible drought permit/drought order applications included in their plans.
- Some water companies need to carry out further development of triggers and control rules, and to link them to the sequence of drought actions. Triggers should also be developed for the de-escalation of drought management.
- Further study on the potential savings from additional demand management during a drought would be beneficial. As a first step, we intend to compare the information on savings provided in the water company plans.
- A few companies have included options that could potentially affect another company. It is important that these companies ensure that their plans are consistent; we will inform the companies concerned.
- Three Valleys Water should develop and put in place a communications plan.
- Sutton and East Surrey Water and Portsmouth Water need to work on providing a clear management structure in their plans. Cambridge Water should incorporate the management structure that was supplied in its covering letter into its plan.
- We recommend that Thames Water should follow the lead of the other water companies and make information on its drought plan publicly available.

Company	Availability of drought plan to the public	Full plan available	Summary of plan available	Plan not available
Anglian Water Services (including Hartlepool Water Company)	Will make the full plan available on request and intends to publish digest of plan on its website, with a separate summary for customers who previously received the Hartlepool plan.	✓	✓	
Bournemouth & West Hampshire Water	The company has stated that the plan will be available on its website.	✓		
Bristol Water	Will make copies of its plan available on request.	✓		
Cambridge Water Company	Intends to publish a digest of the drought plan on its website and to make full copies available to enquirers on request.	✓	✓	
Cholderton & District Water Company	The plan will be made available to customers on request in line with the company's code of practice.	✓		
Dee Valley Water	Will inform the public of its plan, indicating that a copy is available on request, through a leaflet sent out with customer bills.	✓	✓	
Dwr Cymru Welsh Water	From the end of May 2003, the company website will include a section on drought management. Copies of the full drought management plan will be available for public inspection at the company's main offices.	✓		
Essex & Suffolk Water	Intends to produce a summary leaflet and will publicise the existence of the plan at an appropriate point in the future. Will look towards making the full plan available on request, following further discussion with the Agency.		✓	
Folkestone & Dover Water Services	A hard copy of the drought plan is available on request and its existence will be publicised shortly on the company's website. An executive summary of the document will also be available on the website.	✓	✓	
Mid Kent Water	Mid Kent Water intends to publicise the drought plan on its website, with some text summarising the content and application. The company has reservations about making the entire plan publicly available.		✓	
Northumbrian Water	Will make its drought plan available on request.	✓		

Table 2 | Public availability of water company drought plans

Company	Availability of drought plan to the public	Full plan available	Summary of plan available	Plan not available
Portsmouth Water	Has published a summary of its March 2000 drought plan on its website.		✓	
Severn Trent Water	Intends to publish a pamphlet for customers announcing the existence of the drought plan and outlining the company's resources and demand management measures.		✓	
South East Water	Will be publishing a summarised drought plan on its website and is considering making the full plan available at its head office to those who wish to look at it.		✓	
Southern Water	Intends to produce a publicly available summary, but regards the fuller detailed plan to be 'commercial' and submitted 'in confidence'.		✓	
South Staffordshire Water	It is not the company's intention to publish the plan in its entirety. A summary document outlining the company's approach to droughts will be made available to the public on request.		✓	
South West Water	The summary of the previous drought plan remains current and continues to be publicly available. Copies of the full plan will be made available on request.	✓	✓	
Sutton and East Surrey Water	Has stated that the plan will be available on the company's website.	✓		
Tendring Hundred Water Services	The existence of the plan and a statement that it is available for inspection at the company's office will be put on the company's website.	✓		
Thames Water	The whole plan has been classified as 'company confidential' by Thames Water and will not be available to the public.			✓
Three Valleys Water	The 2003 plan will be available on request. The company may produce a leaflet about its plan and/or put a summary on its website.	✓		
United Utilities	A public domain version of the plan will be made available to other bodies and individuals as appropriate or on request.		✓	
Wessex Water Services	The company will make this stand-alone plan available to the public on request.	✓		
Yorkshire Water Services	The drought plan will be made available on request and the company is considering publishing a summary leaflet.	✓		

Table 2 continued | Public availability of water company drought plans

4. Environment Agency drought plans

The Environment Agency has a central role in drought management and it takes this role very seriously. The Agency's activities encompass not only monitoring, and where possible, mitigating the impact of drought on the environment, but also working with abstractors and others to manage progressively scarcer resources in a worsening situation.

The seven Agency regions in England and Environment Agency Wales each have a drought plan in place outlining the steps that the Environment Agency will take in the event of a drought. We commissioned an independent review of our regional drought plans, which was finalised in October 2002. The review concluded that all documents had their own strengths and weaknesses, and that they contained most of the recommended information but to differing levels of comprehensiveness, depending on regional priorities and relevance to the local area.

The review identified areas where further work would improve the plans and assembled examples of good practice. We have subsequently updated our plans to take account of these recommendations. Following the review and subsequent updating we are satisfied that we have plans in place to manage a drought effectively. The plans will be kept under review and improved as appropriate.

The Agency's drought plans, which are available for inspection at relevant regional offices, cover:

- drought management teams (structures, roles and responsibilities);
- drought monitoring arrangements (drought triggers, environmental and hydrometric monitoring, both routine and enhanced during a drought);
- actions, including mitigation measures, the Agency will take (focussed on: public water supply, agriculture (in particular spray irrigation), industry, other users of water, the environment, Agency managed water transfer and river augmentation schemes);
- communications plan;
- reporting arrangements.

Building on existing internal reports and guidance the Agency has recently started to develop a national procedure for drought management. The objective is to have guidance in place to ensure that we follow a nationally consistent approach to drought management in line with other Agency procedures such as incident management. The national procedure will be developed in a structured way and will be linked to an appropriate programme for staff training. In addition, we will be reviewing our drought policies to ensure that they remain appropriate.

5. Conclusions

We are pleased to report that all water companies have drought plans in place. However, some need immediate action to ensure that all the necessary components are present.

The Agency issued a revised drought plan guideline in November 2002. We asked companies to submit their updated drought plans by 14 March 2003. Nearly all the companies submitted their revised plans on time. Portsmouth Water has told us that its previous plan is still current and will not be updated until after August 2003 when the company has updated its water resources plan. Cambridge Water did submit a plan but this was the same as its plan submitted in March 2000. We are disappointed that these companies have decided not to take this opportunity to ensure their plans are up-to-date. Three Valleys submitted a plan but it is lacking several components, including a communications plan.

In our report to Ministers in June 2000 we identified a number of areas in water companies' drought plans that needed improvement or further work. Good progress has been made and in general many companies' plans are better than before. However, there are a number of plans with work outstanding from the previous review. We have identified some further ways that the plans could be improved. We will be writing to, and subsequently liaising with the companies to clarify the areas where we feel the plans could benefit from further work. We will be looking for this to be completed by the end of 2003 and will inform Ministers on progress.

The main areas of work are:

- Two thirds of companies need to carry out baseline studies and agree the scoping of environmental assessments in relation to possible drought permit or drought order applications included in their plans. Drought permits and drought orders have the potential to affect the environment and it is important that companies assess this risk for those they propose in their plans. In order to do this it is often necessary to obtain information on the current status of a site by undertaking baseline monitoring.
- About a third of the water companies need to carry out further development of triggers and control rules, and to link them to the sequence of drought actions. We believe it is good practice to define the conditions that would lead to an action to manage a drought.
- A few companies have included options that could potentially affect another company. These companies must ensure that their plans are consistent.
- Three Valleys Water should develop and put in place a communications plan (a vital component of effective drought management).
- Sutton and East Surrey Water and Portsmouth Water need to work on providing a clear management structure in their plans. Cambridge Water should incorporate the management structure that was supplied in its covering letter into its plan. We believe it is important for it to be clear within a company who will be responsible for the different aspects of drought management.
- Government has asked the companies to make their plans publicly available. We are pleased to note that over half the water companies will make their full drought plan available to the public for inspection, and nearly all the others will make a summary available. This is good progress. We recommend that Thames Water follow the lead of other water companies and make information on its drought plan publicly available.

The Agency's own regional drought plans have been updated recently. As part of this work we commissioned an independent review. This identified areas where further work would improve the plans. We have

updated our plans in line with these recommendations and the revised plans are available for inspection at the relevant offices. We are also reviewing our drought procedures to ensure that we deal with droughts consistently across England and Wales.

We welcome the proposals in the Water Bill to make the regular submission of drought plans a statutory requirement. We believe that companies' current drought plans should be an appropriate basis for their statutory plans. However, the Water Bill may add additional requirements that will require further work from companies. We look forward to working with Defra and the Welsh Assembly Government to develop our existing drought plan guideline to meet the needs of the new legislation.

Drought plans are an important element of prudent water resources management as they explain the operational steps that must be taken as a drought progresses. They complement the long-term strategic plans of companies and cover the range of actions necessary to deal with different drought situations. These range from publicity campaigns and communication strategies to customer restrictions and drought permits or orders. Companies have identified the various triggers that will lead to and initiate each action. By planning these actions in advance, there is time to consider potential impacts and mitigation measures. It is important that water companies should view their drought plans as live documents and continue to keep them up-to-date. Plans should be reviewed annually to ensure that they are still valid and workable and any changes should be reported to the Environment Agency.

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Appendix 1:

Drought orders and drought permits

Drought orders and drought permits are legal mechanisms to allow additional flexibility in the management of water resources under conditions of exceptional shortage of rain.

Under the Environment Act 1995, water undertakers can apply to the Agency to authorise them by means of a drought permit to take water from specified sources or to modify or suspend conditions already contained in their abstraction licences. If the Agency refuses the application, then it is open for the undertaker to apply to the Secretary of State for a drought order under the Water Resources Act 1991. If the drought order relates to an area within Wales, undertakers should apply to the Environmental Protection Division of the Welsh Assembly Government, who will advise as to the procedure in respect to the cross border areas of the Dee, Wye and Severn.

Drought permits are issued by the Agency to water undertakers where the Agency is satisfied that, because of an exceptional shortage of rain, a serious deficiency of water supplies exists or is threatened. A permit can authorise the taking of water by the water undertaker, or modify or suspend restrictions to which the undertaker is subject. It is limited to six months duration.

Drought orders are granted by the Secretary of State or the National Assembly for Wales, (again only because of an exceptional shortage of rain) on the application of the Agency (in specific circumstances) or water undertaker. They fall into two categories:

- *Ordinary drought orders* are made where the Secretary of State or the National Assembly for Wales is satisfied that there exists, or is threatened, a serious deficiency of water supplies or such deficiency in the flow or level of water in any inland waters as to pose a serious threat to any dependent flora or fauna. Drought orders may go further than drought permits as they can deal with discharges of water, abstractions and discharges other than by the undertaker affected, supply, filtration, and treatment obligations. They can allow water companies to prohibit or limit particular uses of water.
- *Emergency drought orders* are made where the Secretary of State or the National Assembly for Wales is satisfied that there exists, or is threatened, a serious deficiency of supplies of water and is further satisfied that the deficiency is likely to impair the economic and social well-being of persons in the area. They go further than ordinary drought orders as they enable a water company to have complete discretion on the uses of water that may be prohibited or limited and to authorise supply by stand-pipes or water tanks.

Applications for drought orders are subject to advertisement and objection procedures. Ordinary drought orders may last up to six months while emergency drought orders are valid for three months. Further information on applying for drought orders and drought permits is given in *Drought orders and drought permits* (DETR, Welsh Office and Environment Agency, 1998).

Appendix 2:

Summary reports on water company drought plans

Anglian Water Services (including former Hartlepool Water Company)

Anglian Water now includes the former Hartlepool Water Company, which is included as a zone in the company's drought plan.

The company serves a wide geographic area in East Anglia with a mixture of surface and groundwater sources. The drought plan for this part of the company's area has been based on experience from previous droughts, particularly 1988-1992 and 1995-1997, taking into account new infrastructure and updated analysis where appropriate. It is clearly set out and linked to the main resource zones. The plan emphasises the varying characteristics of each drought and the associated need for flexibility of response.

The company has an ongoing programme to replace existing boreholes and develop new satellite boreholes to ensure deployable output can be maintained during droughts. The programme will be intensified as needed during droughts and linked to regional groundwater monitoring information (as happened during 1995-1997). The company has made allowance for the time required to obtain new or revised licences. However, we would like more information on the possible sites and potential environmental impacts where new licences may be required. Groundwater abstraction from the Northern Lincolnshire Chalk is managed under a Section 20 arrangement with the Agency.

The company has acted upon both the recommendations from our previous review and the additional points raised subsequently. However, further discussion is needed with the Agency on the details of how actions will be implemented and their sequence in relation to the revised reservoir control curves. The groundwater trigger information is still rather generalised with a reliance on borehole rehabilitation and replacement when water levels are low. This requires further liaison with the water company to determine the validity of the approach.

There are changes in levels of service with an increase in the frequency of non-essential use and hosepipe bans; this is consistent with the new water resources plan being developed.

Drought orders would only be sought as a contingency measure in exceptional conditions where there was a risk of a more severe drought developing beyond that experienced historically. The only specific locations included in the plan are drought orders to support the refill of Pitsford and Grafham reservoirs. The company has reported on additional studies arising from previous drought orders for these reservoirs; these studies provide relevant baseline environmental data and impact assessment information.

The Hartlepool supply area is entirely groundwater based, with a robust supply-demand balance. The droughts in the 1990s did not affect it significantly due to the deep confined aquifers and reduced demand. Relevant local information for the Hartlepool area is included in separate paragraphs within the plan. No issues are outstanding from the previous plan as it conformed to the guidelines. When the company has produced its new water resources plan, we may need to review the potential threats in managing severe droughts in this resource zone with the company. Drought orders and permits would be required only in exceptional circumstances and no specific locations are identified.

The company will make the full plan available on request and it intends to publish a digest of the plan on its website, with a separate summary for Hartlepool customers which will be sent to previous recipients of the Hartlepool plan.

Overall, the plan is consistent with our guideline and meets our requirements.

Bournemouth & West Hampshire Water

Bournemouth & West Hampshire Water is a supply only company serving Bournemouth and Christchurch on the south coast. An increase in the resident population in summer can increase peak demands significantly.

The company's sources of supply are obtained from the lower reaches of the Hampshire Avon and the Dorset Stour catchments, and have proved to be reliable in drought events. Therefore the revised drought plan triggers are based on managing demand rather than supply. Total demand and number of dry days forecast are the basis for initiating one or more of the seven stages of managing a drought.

Actions are based around customer awareness and maximising the use of sources. Hosepipe bans and other restrictions may be required as a drought situation worsens. A management structure is in place to deal with drought events and the plan will be reviewed on a daily basis during the event. The company has also provided evidence for how it would manage environmental impacts and is committed to reviewing the plan annually. The company envisages no need for drought orders or permits.

We are satisfied with the plan, which has followed our guidance and the company has addressed or is addressing the issues raised in our 2000 review. The company has stated that the plan will be available on its website.

Bristol Water

Bristol Water operates a single resource zone in which the individual sources are operated in conjunction with each other. The main sources are the River Severn via the Gloucester and Sharpness Canal and the Mendip reservoirs further south (including Chew Valley Lake). There are also a number of smaller groundwater sources.

The drought plan takes account of the reduced yield from the River Severn during dry periods when the river is subject to maximum regulation. Further work is needed on how the company would respond to more severe drought conditions when a drought order is in force requiring the company to reduce licensed abstraction from the Severn via the Gloucester and Sharpness Canal. We are pleased to see that the control curves for the Mendip reservoirs used to trigger actions have been further developed since March 2000 using a seasonally based operational model.

An appropriate range of demand and supply side measures has been considered. One of these supply-side options is to take water from the River Avon and pipe water to Chew Valley Reservoir. Wessex Water also considers the option of taking water from the Bristol Avon in its drought plan. The two companies should confirm with each other and the Agency that their plans are compatible in this respect and whether drought orders or drought permits are the appropriate permissions. We expect Bristol Water to consider further preparatory work on this and other options and to plan any baseline monitoring. The plan also needs to cover de-escalation of measures as a drought diminishes.

Overall, the plan can be understood without reference to other documents and follows our guideline. It expands on the March 2000 plan, addressing areas requiring further work which we identified at the time.

The company is releasing a summary of the drought plan on its website and will make full copies available on request.

Cambridge Water Company

The company supplies a relatively small area with a fully integrated supply system that is entirely based on groundwater. It currently has a surplus of supply over demand, which reduces its risk of difficulties during droughts. It has based its plan mainly on experience in recent droughts during the 1990s, with some reference to earlier droughts. The company has an adequate surplus of deployable output both against average daily demand and estimated peak week demand. The company has discounted drought orders as a feasible option to improve supply arrangements because it is not possible for the company to abstract more water from its groundwater sources than is currently licensed. A range of other options has been considered, but limited detail is presented in the plan.

The plan submitted is the same as that in 2000 and has not taken into account additions in our 2002 guideline. Certain aspects (including details of the company's drought management structure) are therefore missing, although the relevant information is provided in an accompanying letter. The plan broadly follows the guidance in other respects and

is appropriate given the company's healthy supply-demand balance.

Some issues are outstanding from the previous review and we will seek to clarify these with the company. In particular, more supporting information is required on the use of Fleam Dyke source as a single trigger for the whole company area and how this relates to drought management actions. The other main aspect is the environmental monitoring and mitigation procedures, which require further discussion with the company to ensure that updated information is taken into account.

The company intends to publish a digest of the drought plan on its website and to make full copies available to enquirers on request.

Cholderton & District Water Company

Cholderton & District Water is a very small water only company, supplying the Cholderton Estate and a range of properties and villages in Salisbury. The company is keen to promote water efficiency and maintains a robust source of supply during dry periods.

The company relies on one groundwater source serviced by two boreholes. The second borehole is generally used only in drought conditions. The company has a close relationship with its customers, which enables a significant scale of savings to be achieved voluntarily. Demand measures to be implemented include ensuring the distribution system is working effectively and appeals for restraint from customers. The company plans to manage any dry periods without the need for formal restrictions or drought orders and permits.

We are satisfied with the level of drought planning carried out by the company to date. We are encouraged by the company's aims to review and develop its drought plan in the future. The plan will be made available to customers on request in line with the company's code of practice.

Dee Valley Water

Dee Valley Water is dependent on the River Dee for 80 per cent of the water it supplies to its customers. Flows within the River Dee are controlled by a regulation scheme operated by Environment Agency Wales under powers established under the Dee and Clwyd River Authority Act 1973. The operating rules are known as the Dee General Directions. Large abstractors in the Dee system, including Dee Valley Water, are consulted on the operation of the Dee through the Dee Consultative Committee. One important element of the regulation of the Dee system relates to its operation in a drought period. This is set out in the Dee Drought General Directions, which include the triggers at each drought stage and the reductions in abstraction required of abstractors.

Given its dependence on the Dee system, Dee Valley's drought management plan is inevitably linked to the drought stages and triggers set out in the Dee Drought General Directions. The supply-side actions assessed by Dee Valley include recommissioning transfer pumping arrangements and the use of dead storage at Llyn Cyfynwy and Pendinas reservoirs. This latter option could potentially affect the fish population at these sites and an environmental monitoring and mitigation plan needs to be developed. Although demand management measures have been considered, they are not fully integrated in the plan. This gap needs to be addressed, with the demand management measures at each drought stage and the associated demand suppression effects properly documented within the plan. Table 1 must also be completed.

The company has provided a good communications plan that sets out how it intends to engage with different customer groups with appropriate messages relevant to different drought stages. The communications plan needs to be more fully integrated with the main body of the drought plan, linking with the relevant supply and demand actions at each drought stage.

Dee Valley Water will inform the public of its plan, indicating that a copy is available on request, through a leaflet sent out with customer bills.

The drought plan broadly follows our guideline and is adequate to enable the company to manage a drought, although there are a number of areas where improvements could be made.

Dŵr Cymru Welsh Water

Dŵr Cymru Welsh Water's drought management plan sets out the drought stages, triggers and actions for the 25 resource zones across its supply area. In line with the drought management approach set out in the 2000 drought plan, each resource zone has been classified, depending on the source type, into those with a storage element (reservoirs and groundwater sources) and those with no storage and dependent on direct river abstractions.

This classification informs the drought triggers and actions used within each resource zone. A limited set of supply and demand options has been considered within each zone including increasing public awareness, requests for voluntary restraint, hosepipe bans and recommissioning abandoned sources. Further refinement of the drought stages and drought triggers is required, as well as additional work to ensure that sufficient lead-in time is included for each drought action.

In the severe drought stage, 34 potential drought permit and drought order sites have been identified. Seventeen of these potential sites lie within catchments designated under the Habitats Directive as candidate SACs. To date, the company has made limited progress on scoping the potential monitoring and mitigation measures required at these sites. The company has made a commitment to discuss and agree the scope of the required work with the Countryside Council for Wales and Environment Agency Wales and to develop a project plan by the end of July 2003.

The company has developed a good, comprehensive drought communications plan, which identifies the messages targeted to the main customer groups at each drought stage. The plan sets out clearly the membership of the drought management team and includes the links with strategic partnership companies.

The company website will include a section on drought management from May 2003. Copies of the full drought management plan will be available for public inspection at the company's main offices.

The drought plan broadly follows our guideline and is adequate to enable the company to manage a drought although a number of areas are highlighted as requiring improvement or further work to make the plan more robust.

Essex & Suffolk Water

Essex & Suffolk Water operates in some of the driest parts of the UK. It is dependent primarily on surface water reservoirs in Essex and a mixture of surface and groundwater in Suffolk. The company has a narrow margin of supplies over demand, particularly in Essex, and gained extensive experience of managing droughts during 1989-1992 and 1995-1997. The plan discusses options and actions that the company would implement in a drought while allowing flexibility to adjust to the unique nature of a drought.

The company has acted on the recommendations from our previous review, in particular undertaking further work on control curves. The company provides two types of control curves for its two Essex reservoirs. How these two sets will be used in operational practice during a drought requires further discussion.

The plan identifies a wide range of options, both for additional supplies and managing demands. Greater clarity about the order of implementation of supply-side options is required. Some supply options still require assessments to be undertaken in order to identify environmental impacts.

The plan includes eight potential drought order locations. The most significant of these is the abstraction at Denver, which forms part of the Agency's Ely Ouse to Essex transfer scheme. Information is available from a range of studies to support a drought order application.

The plan has a good, detailed communications section.

The company intends to produce a summary leaflet and has said that it will publicise the existence of the plan when our review is completed. It will look towards making the full plan available on request, following further discussion with the Agency.

The plan is generally consistent with our guideline and meets our overall requirements. However, it is important that the further work on reservoir control curves is completed for operational robustness.

Folkestone & Dover Water Services

Folkestone & Dover Water has considerable experience of managing droughts with constrained water resources. The company obtains all its water from underground sources; around 80 per cent comes from deep boreholes in the chalk, with the remaining 20 per cent coming from the shallow gravel aquifer in the Dungeness shingle. The company continues to hold small abstraction licences for a number of greensand sources in the Hythe and Folkestone area, although these have not been used operationally for water supply in the last couple of years. In a dry year, the company's water resources plan indicates a deficit between the supply of, and demand for, water.

There are no significant rivers in the company's area of supply and it does not have access to any surface water abstraction or surface water storage. Monitoring is based on groundwater levels in six

representative sources and observation boreholes. Four drought curves are used to define drought action zones that are used to manage a drought as it develops.

The company has defined its supply and demand side drought management options clearly. It reports that its customers are aware of its tight water resources position and have a good record of responding to appeals for restraint. The company aspires to a standard level of service of no more than one hosepipe or sprinkler ban in ten years by 2005. We would like to see further evidence to support the company's levels of service, particularly with regard to its current supply-demand balance. An assessment of the risks and problems for each supply-side and demand-side measure also needs to be undertaken.

The company considers drought permits and orders to be unsuitable due to possible long-term environmental damage. Together with the Agency, the company is considering an operating arrangement to manage groundwater supplies from the Dour catchment. The company will need to update its plan to reflect such an arrangement once it becomes effective.

The plan is appropriate for managing a drought. Overall, it is in accordance our guideline. However, we will be writing to the company to request information on the review and updating of the plan. A hard copy of the drought plan is available on request and its existence will shortly be publicised on the company's website. An executive summary of the document will also be available on the website.

Mid Kent Water

Mid Kent Water operates across most of Kent from Ashford, Canterbury and Faversham to Maidstone and just east of Sevenoaks and Tunbridge Wells. The company has seven water resource zones, but the drought plan is essentially presented at company level, although with sufficient zone detail. The company is predominantly dependent on groundwater sources, but has a share of the Bewl Reservoir to River Medway scheme with Southern Water. A small bulk supply is provided to Folkestone & Dover Water.

The company's drought plan is a live document that is updated each autumn. Its latest drought plan stands alone and is independent of previous documents. All of the main concerns raised by the Agency in relation to the company's March 2000 plan have been addressed. The plan now includes strategic groundwater monitoring curves with trigger levels, thorough indication of supply-side options and possible locations for drought orders.

The company has included a detailed month by month action plan which provides a thorough communications plan, as well as giving confidence that the company would follow a sound systematic approach in the event of a developing drought.

Some details of the plan require further discussion. The company is still unable to specify savings from demand management measures and further discussion is needed on some of the supply-side options, mitigation and baseline monitoring, particularly around potential drought orders. The company needs to pay attention to drought management of shared resources and bulk supplies and also to de-escalation of drought management as a drought diminishes.

There are eight potential drought orders involving increased groundwater abstraction listed in the plan. These generally propose seeking to exceed licensed peak abstraction rates.

The plan is not currently available to the public. There will be a mention of the plan on the company website this year, but the company has reservations about making the entire plan publicly available.

Overall, the plan follows our guideline and provides an acceptable means of managing a drought in the company area.

Northumbrian Water

Northumbrian Water consists primarily of a supply system supported by Kielder Water. This integrated system is managed by an operating agreement within the Agency, which identifies operational triggers for reservoirs supported by Kielder Water and extends to operational management during periods of drought. As with the drought plan of 2000, the company believes that infrastructure constraints in the supply network may become more critical during severe droughts than the reliability of supplies.

While the operating agreement meets our guidelines for the Kielder-supported supply zone, triggers for the smaller Berwick zone are not detailed. In 2000 we asked Northumbrian Water to develop triggers for the Berwick zone as it was thought to be vulnerable.

Since then, improvements have been made to the water supply system in this zone and the company believes it is now secure. However, we will ask the company to develop triggers for this zone to protect against the worst droughts.

The plan demonstrates the robustness of Northumbrian Water's supplies against droughts through consideration of drought scenarios. Consequently, the company does not identify drought orders and permits within its plan. Over and above the Kielder operating agreement, the drought plan identifies only generic demand management measures. Triggers for these demand management measures are not detailed explicitly and we would like to see these developed in future drought plans. The plan implies that additional supplies will not relieve drought pressures, as the system is unable to deliver greater volumes.

The company believes that, due to infrastructure limitations, the Kielder system is fully committed to supporting Northumbrian Water's drought plan in an extreme drought. However, Yorkshire Water has stated in its drought plan that, in extreme droughts, it will look to Northumbrian Water for additional supplies through a Tees emergency transfer from Kielder Water. We have informed Northumbrian Water of Yorkshire Water's intention to review this matter with the company.

Northumbrian Water will make its drought plan available on request.

In light of Northumbrian Water's healthy supply-demand balance, we are broadly satisfied that the plan meets our guideline.

Portsmouth Water

Portsmouth Water's drought plan has not been altered since the previous review. This is despite reminders that we expected an updated plan to be resubmitted by March 2003. The company has written explaining its decision not to submit, saying the previous plan is still current and will be reviewed after August 2003 when it has revised its water resources plan. The comments below are based on the March 2000 drought plan.

The company relies predominantly on chalk groundwater, either directly from boreholes or springs or indirectly as base-flow to rivers. It has one surface water abstraction from the River Itchen, supported by bank-side storage. The company relies on monitoring at the Havant and Bedhampton springs and at the Idsworth Well. Control curves and triggers are associated with these two sites.

Portsmouth Water has given clear drought management options for both demand and supply sides. Further discussion about supply-side options is still necessary. Some licences are currently being dealt with by Agency area staff and the drought plan may need updating in respect to these determinations. The company has included details of seven possible drought permits in the plan, some of which require further discussion. Baseline monitoring arrangements still need to be agreed.

We are disappointed that the company has not re-submitted its plan and feel it reflects badly on Portsmouth Water's commitment to drought planning. The company may be over-confident due to its healthy resource position. The plan submitted in 2000 remains generally adequate but needs updating. More work could be done to make the plan more specific, for example in relation to the sequence of actions and the membership of the drought group.

The company has published a summary of its March 2000 drought plan on its website.

Severn Trent Water

Severn Trent Water has produced a drought plan based on nine drought contingency zones. A drought supply-demand balance for each zone has been calculated based on a 1995 summer peak scenario.

Control rules have been produced for a number of sources; these trigger the formation of an internal drought action team. This team would then phase in a number of supply and demand side options to manage the company's response to a drought. We will be discussing with the company how the control rules can be developed to trigger a phased implementation of actions.

A potential drought permit application for the River Wye has been added to the plan since the 2000 submission, giving five potential locations. Work to add information on the potential environmental impacts and required monitoring was identified in our previous report and is still outstanding for these sites, and more opportunities to mitigate the overall environmental impacts of droughts need to be identified. We will be discussing these matters with the company.

Severn Trent intends to publish a pamphlet for customers announcing the existence of the drought plan and outlining the company's resources and demand management measures.

The drought plan is broadly consistent with our guideline and subject to the concerns outlined above, is appropriate for managing a drought in the company's area.

South East Water

South East Water comprises two geographically distinct operating regions - one is in Surrey and Hampshire, while the other is in Sussex and Kent.

Consultation with the Agency has been carried out and incorporated within the drought plan. The plan is divided into three sections: monitoring, management and communication. The company updated its hydrological data requirements during 2002. This work is evidence of the company working to implement the recommendations made in 2000 and of treating the plan as live and operational.

A detailed summary of the drought management actions is included in the plan. Arrangements are described for assessing potential environmental impacts of droughts and drought actions, although these require further discussion and agreement with the Agency. Drought curves have been provided for groundwater boreholes, Sussex reservoirs and the River Thames. Four action zones are identified, including one relating to emergency storage in the reservoirs.

The plan's Table 2 refers to at least three options in which drought orders or drought permits would be needed. However, each of these could involve multiple applications. The company needs to detail the risks and problems associated with supply-side measures, in particular relating to their environmental impacts. Monitoring and mitigation actions should be detailed for proposed drought orders and drought permits, which also need to be defined against specific sources.

We would like to see further consideration of South East Water's levels of service. Intended levels of service are clearly indicated in the plan as being hosepipe bans once in every ten years. Nevertheless, the company's current water resources plan shows a supply-demand deficit persisting for some years. This will be followed up in consideration of the company's revised draft water resources plan later this year.

South East Water's drought plan is comprehensive, generally of a good standard and follows our guideline. This is particularly important in view of the tight supply-demand balance in some of the company's resource zones.

The company will be publishing a summarised drought plan on its website and is considering making the full plan available at its head office to those who wish to look at it.

Southern Water

Southern Water has ten water resource zones across Kent, east and west Sussex, Hampshire and the Isle of Wight. These are largely isolated from each other, although there is some capability for water transfers locally (for example between north Sussex and the coast). Supplies are about 70 per cent derived from groundwater, with direct run-of-river contributing about 20 per cent and reservoirs about 10 per cent. Most groundwater output is derived from the chalk aquifers, while reservoir capacity is supported by pumped storage. Some localities, notably in Sussex where the chalk aquifer is in contact with the sea, suffer from saline intrusion. Each supply area can respond differently in drought. Some resources are shared with other water companies. Bulk supplies are provided to other companies and are soon to be received from another company.

Southern Water's March 2003 drought plan contains notable revisions to its March 2000 plan. The new plan stands alone and is independent of the previous document. The plan has been restructured to draw out generic aspects common to all supply areas, while retaining a thorough description of the issues, sources and options in each individual supply area. The plan also includes further discussion of the types of drought that could be relevant, while recognising that future droughts may be different. The new plan lends itself to operational use and there is obvious connection to routine management. A continuum of supply-demand management is recognised across normal operations, water resource planning and drought planning.

In revising the plan, Southern Water has consulted us in relation to overall intentions and expectations, and has taken account of our comments. Southern Water will progress understanding of outstanding issues by the end of June 2003. The plan will then be revised in these areas in the months after submission of the company's draft water resources plan in August 2003.

The issues outstanding include the need to:

- develop and agree baseline monitoring and mitigation plans in relation to potential drought orders identified in the plan;
- confirm routine data exchange requirements;
- discuss some of the supply-side options;
- progress and demonstrate the proposed risk assessment model.

The company has improved the plan to include example trigger curves and control curves, although some details require confirmation. In addition, reservoir emergency storage provision, shared resources and bulk supplies need attention. Completion of the further work should enable refinement of the monitoring, decision-making and communications elements of the plan and allow more specific aspects to be included.

The company has complied with our guideline and, although aspects require further attention, the details provided give confidence that the company has appropriate monitoring in place and would react appropriately as a drought developed.

The company intends to produce a publicly available summary, but regards the fuller detailed plan to be 'commercial' and submitted 'in confidence'.

South Staffordshire Water

South Staffordshire Water has a clearly defined management process for dealing with a drought. As a drought increases in severity, control rules provided for the company's two main sources trigger a phased implementation of both supply and demand side actions.

The plan has been updated to ensure that it is linked to the Agency's drought plan for the River Severn. Work proposed in 2000 to develop drought triggers for groundwater sources has not been completed. This is because the company's utilisation of its groundwater sources is not influenced by drought conditions. Groundwater levels vary little and normal operational measures ensure that quality criteria and borehole stability are maintained under both normal and drought conditions. The company has provided details of additional reserve groundwater sources that could be brought into production if required.

Work to develop the company's water resources model is still ongoing. Further revisions to the plan are expected once control rules have been tested fully. Investigation work is still required to refine the list of supply-side options.

The company has identified four licences as potential drought permit locations and one as a possible drought order site. Information on the potential impacts, monitoring requirements and mitigation measures of these permits is absent from the plan. It is also unclear how these permits will be phased into the company's drought management process. We will be discussing these issues with the company over the coming months.

Subject to the concerns about the availability of information to support potential drought orders or permits, the plan is broadly consistent with our guideline and is appropriate for managing a drought in the company's area.

The company does not intend to publish the plan in its entirety. A summary document outlining the company's approach to droughts will be made available to the public on request.

South West Water

South West Water's resources are dominated by surface water abstractions with storage provided by numbers of reservoirs. The company operates three resource zones covering Devon and Cornwall, with each zone dominated by a single strategic reservoir (Wimbleball, Roadford and Colliford). The strategic reservoirs are supported by a number of smaller reservoirs and some small groundwater abstractions.

Overall, the plan has been developed in line with our guideline. The reservoir drought management curves that trigger actions continue as a solid basis for the company's response to drought and we are pleased to see that these have been updated. The monitoring in place for groundwater sources and indicators for groundwater drought are also considered appropriate.

A suitable range of demand and supply-side measures has been considered. The supply-side measures include 23 options requiring drought order or permit applications. Many of these are to reduce compensation releases from reservoirs or prescribed flows in rivers. Monitoring details relating to these options will need to be agreed to ensure it is targeted and integrated with our monitoring programmes.

With regard to the demand-side options, we note that the company considers further leakage control

to be a highly inefficient option since its current leakage target is below the economic level and that further leakage reduction, even at very intense levels of activity, will have little additional effect. Despite this, we encourage the company to consider this as an option on a local basis where there may be particular problems.

The company published an excellent summary of its drought plan after March 2000. This remains current and continues to be publicly available. Copies of the full plan will be made available on request.

Sutton and East Surrey Water

Sutton and East Surrey Water is a supply only company serving east Surrey and parts of west Sussex, west Kent and South London. 85 per cent of supplies come from groundwater sources with a further 15 per cent coming from Bough Beech Reservoir, representing the company's only surface water resource.

The company submitted a revised plan based on operational experience. Two trigger levels have been presented covering the whole company. Separate operating curves are presented for the groundwater and surface water sources (each with three trigger levels or 'zones') and the associated actions to be taken as drought conditions become apparent. Provision of more background information regarding trigger levels would improve the plan further.

The company's actions are based around customer awareness and maximising the use of its sources. Online peak sources, together with transfer schemes, are brought on line in zone 1, and the output gradually increases as the drought situation worsens. The company states that one drought order or permit for surface water abstraction could be required. Studies should be undertaken to assess any potential impact of this order/permit.

In general, the company needs to undertake further work on supply-side options; in particular, risk assessment should be undertaken for each option. One of the supply options that is identified is dependent on Thames Water; Sutton and East Surrey Water should ensure that appropriate agreements are put in place with this company.

The plan produced by the company largely follows our guideline but does not contain details of the company's management structure for dealing with a drought; the company should look to include this in its plan. The company has stated that the plan will be available on its website.

Tendring Hundred Water Services

Tendring Hundred Water is a small water company supplying the Tendring peninsula in Essex. The company can supply all its customers from its groundwater sources, but also shares Ardleigh Reservoir with Anglian Water. It operates in one of the driest parts of the country, but has an adequate surplus of resources over demands.

The plan details the options that the company would consider in a drought. It proposes to utilise all its sources that are presently licensed but not fully committed before opting for formal demand management restrictions. The company has good communications with its customers; it is pro-active in promoting water conservation and would step up its campaign in a drought.

The company does not consider the use of drought orders or permits to be a necessary or viable option for its sources.

The drought plan produced by the company is consistent with our guideline and meets our overall requirements. It successfully conveys how the company plans to deal with a future drought and is a well-structured and clear document. There are no significant concerns with the plan and there were no major recommendations following the previous review.

The existence of the plan and a statement that it is available for inspection at the company's offices will be put on the company's website.

Thames Water Utilities

In our third annual review of water company water resources plans in December 2002, we reported to Ministers that there is currently a potential deficit in the water supply for London. This means that customers in London are at a greater risk of shortages in times of drought than customers in the rest of England and Wales.

In the short term and until a satisfactory supply-demand balance has been restored, there would be great pressure on Thames Water to manage its water supplies efficiently and to reduce customer demand in the event of a prolonged drought. However, for the coming summer the company's resource position appears to be adequate because groundwater levels

are relatively high. We are satisfied that there are probably adequate mechanisms in the plan to cope with a prolonged drought over the next few years. However, we are uncertain about the magnitude of the potential demand savings and supply-side measures identified in the plan. We intend to seek clarification about this from the company. The company has set out in its plan arrangements to re-submit the plan to us for review on an annual basis to take into account any changes in the supply-demand balance or to reflect the company's current resource position.

The new drought plan improves on the previous version and accommodates the key changes we requested. It now includes details of triggers (for example for Farmoor Reservoir) although groundwater triggers are still in a draft form. The drought plan is not a self-contained document as the details of a number of the drought measures are contained in the separate Lower Thames operating agreement.

Overall, the company's drought plan broadly complies with our guideline and includes a wide range of options.

The company indicates that, if appropriate, it would apply drought restrictions to part of a water resource zone. It will use the operating agreement for the Lower River Thames abstractions to support decisions for the London supply area and Farmoor Reservoir triggers to support the Upper Thames Valley decisions.

We will be seeking further information from the company about a number of areas. In particular, Thames Water has not presented a set of tables showing the demand and supply measures in its plan. We would also like to clarify the company's drought management options. Given the current imbalance of supply and demand, we would like to see a clearer explanation of how the existing supply system would cope in a very dry year. We will also work with Thames Water to ensure there is a clear understanding of the operational capabilities of the West Berkshire Groundwater Scheme in relation to Thames Water sources for public water supply.

The company has classified the plan as 'company confidential' and is not willing to make it externally available. We urge the company to make information on its plan publicly available, as it should be willing to show customers and stakeholders that it is fully prepared for a drought.

Three Valleys Water

The drought plan produced by Three Valleys Water has been developed from that used to manage successfully the severe drought conditions experienced by the company from 1996 to 1998. It consists of three parts: a monitoring plan (normal conditions), an action plan and a reference section.

Monitoring is based on groundwater levels in three observation boreholes and flow in the River Thames to identify possible drought risks. Two trigger levels are defined for each borehole. A seasonally varying level provides a warning that a drought situation may potentially develop within the next 12 months while a constant level trigger indicates a drought condition. Following a breach of these triggers, a heightened state of monitoring would take place and a drought management group would be convened if deemed necessary. Due to the novel nature of the trigger levels, these should be kept under review and modified as appropriate as additional information becomes available.

The main threat to the company's River Thames abstraction during a drought event relates to the need to temporarily close intakes from the River Thames due to water quality problems. Bank-side storage is available to provide alternative supplies in an emergency.

The company has not considered pressure reduction as a drought management option. Task plans are provided for demand and supply-side drought actions. However, the sequence of increasing drought actions should be stated clearly using drought curves. No assessment of the risks associated with each option is undertaken; Three Valleys Water should undertake a risk assessment for each of the options identified.

Six supply sources have been identified where drought permit or order applications for temporary variations to the existing licence conditions may be made in the event of a severe drought. It is important that the company provides information, or outlines plans to undertake baseline studies, in support of any such potential drought permit or order applications.

The plan documents the company's existing drought management process and would provide a basis for the company to manage a drought event. However, there is substantial room for improvement. The plan does not comply fully with our guideline and does not provide sufficient information. In particular, it

does not include an adequate commentary on changes since the last plan was produced, such as the acquisition of North Surrey Water and, more importantly, a communications plan.

Three Valleys Water will make the 2003 plan available on request. The company may produce a leaflet about the plan and/or put a summary on its website.

United Utilities

United Utilities supplies customers in north west England. The company's minimum preferred level of service for water supply includes a hosepipe ban frequency of not more than once in 20 years. The plan sets out the measures that the company will consider implementing to protect essential supplies in drought events. It benefits from extensive experience gained during the 1995-1996 drought, which was the most severe on record in the north west.

The plan emphasises the varying characteristics of droughts and the need for flexibility in timing and approach. The company's largest resource zone is managed in a highly integrated and flexible manner. This means that security of supply can be maintained over a large geographic area, for a wide range of drought scenarios, utilising an extensive range of operating options in different permutations. In the 1995-1996 drought the company developed the use of trigger curves linked to a phased drought response and gives examples in the plan. Experience has convinced the company that the best way to take advantage of the flexibility in its system is, once a potential drought has been identified, to refine the general curves to meet specific circumstances as part of a detailed drought action plan. However, there are risks associated with this approach and we are talking to the company to be sure that the right actions will be taken at the appropriate time.

The plan identifies a wide range of options for managing demands and providing additional supplies, although it has not completed Tables 1 and 2. A detailed plan for a drought communications campaign is also provided. These actions are linked to phases as a drought intensifies and recedes. Many of the company's drought actions are an integral part of normal source operational management.

The company has identified around 20 potential drought permit or order locations based on previous drought experience, but aims to minimise the number of applications and their impact. Extensive information is provided on the potential impacts and monitoring and mitigation measures required at these sites. However the company has not explicitly recognised the risks associated with applications for drought permits or orders that could potentially affect sites designated under the Habitats Directive.

Subject to the concerns identified above, the plan is broadly consistent with our guideline and provides an appropriate basis for managing a drought in the company's area. We will be writing to the company to clarify the position regarding these concerns.

A public domain version of the plan will be made available to other bodies and individuals as appropriate or on request.

Wessex Water Services

Recent droughts have not seriously challenged the supply arrangements in the Wessex Water supply area. This is partly because a large number of groundwater sources provide up to 80 per cent of supplies and most are reliable during short drought periods. We worked alongside the company to ensure that its first drought plan met the expectations of our guideline.

The plan does not remove concerns, raised in the previous review, about the appropriateness of triggers for drought action but communication processes are improved. Wessex Water is not convinced, contrary to the Agency guideline, that pre-determined triggers/control rules for drought action are applicable for the company. The triggers/control rules presented, derived by Wessex Water, are based on the 1975-1976 drought sequence and the water company expects to take action based on forecasts prepared during the drought and not on pre-determined triggers/control rules. The Agency intends to discuss this further with the company to explore why the Agency approach is not acceptable to it.

The further work to provide evidence that the plan sufficiently meets the requirements of the guideline involves the analysis of the output from the company's water resources model. This is expected to show the response of the company's water supply system to a variety of droughts.

There is insufficient evidence in the plan to persuade us that the 1975-1976 drought sequence used to define the company's level of service has the stated frequency of implementation of around 1 in 30 years. The development of the company's water resources

model should also clarify the expected frequency of customer restrictions.

We are concerned that there would be a potential risk to the environment if sources identified for closure or significant reduction in use in the National Environment Programme (NEP) were fully used as allowed for in the plan. In relation to this the company and the Agency have recently signed an operating agreement which details the operation and monitoring of three sources to minimise their impact on the environment at times of low flow.

Two supply-side drought options propose to take water from the River Avon. Bristol Water is also considering the option of taking water from the Bristol Avon to support Chew Valley Reservoir under drought conditions. The two companies should confirm with each other and the Agency that their plans are compatible in this respect including any requirements for drought orders or permits. As part of this the need for and extent of preparatory work and any baseline monitoring should be considered.

In summary, the plan follows most of our guidance on drought plans. However further work is required to show that the proposed actions are appropriate to meet the expected variety of drought sequences.

The company will make this stand-alone plan available to the public on request.

Yorkshire Water Services

Yorkshire Water supplies much of its area through the Yorkshire grid zone which is largely based on surface water. Its smaller rural zones are more dependent on groundwater. It has produced a good and succinct drought plan. The company remains aware of the importance of drought management and the plan is built on the experience and lessons learnt from the 1995-1996 drought.

The plan identifies a range of supply and demand management measures including customer awareness appeals, operational campaigns and the implementation of drought orders and permits. The drought orders and permits identified within the plan include variations to surface and groundwater abstraction licences, variations to reservoir compensation flows and demand reductions. The company has included a River Tees emergency transfer from Kielder Water as a measure that would require an emergency drought order. However, Northumbrian Water has stated in its drought plan that it believes that the existing infrastructure is fully committed to meeting its own needs in a severe drought. We have reported this back to Yorkshire Water which has agreed to review its requirements with Northumbrian Water.

At our request, Yorkshire Water has instigated an early warning liaison trigger based on reservoir and groundwater contents. This will ensure that the company and the Agency communicate in a timely way during the onset of a drought.

In future plans, we would like to see greater definition and detail on the triggers within the drought plan.

Yorkshire Water's drought plan will be made available on request and the company is currently considering publishing a summary leaflet.

Overall, the plan is consistent with our guideline and meets our requirements.

CONTACTS:

ENVIRONMENT AGENCY HEAD OFFICE

Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS32 4UD
Tel: 01454 624 400 Fax: 01454 624 409

www.environment-agency.gov.uk
www.environment-agency.wales.gov.uk

NATIONAL GROUNDWATER & CONTAMINATED LAND CENTRE

Olton Court, 10 Warwick Road, Olton, Solihull B92 7HX.
Tel: 0121 708 4714 Fax: 0121 708 4637
Email: ngwclc@environment-agency.gov.uk

ENVIRONMENT AGENCY REGIONAL OFFICES

ANGLIAN
Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough PE2 5ZR
Tel: 01733 371 811
Fax: 01733 231 840

MIDLANDS
Sapphire East
550 Streetsbrook Road
Solihull B91 1QT
Tel: 0121 711 2324
Fax: 0121 711 5824

NORTH EAST
Rivers House
21 Park Square South
Leeds LS1 2QG
Tel: 0113 244 0191
Fax: 0113 246 1889

NORTH WEST
PO Box 12
Richard Fairclough House
Knutsford Road
Warrington WA4 1HG
Tel: 01925 653 999
Fax: 01925 415 961

SOUTHERN
Guildbourne House
Chatsworth Road
Worthing
West Sussex BN11 1LD
Tel: 01903 832 000
Fax: 01903 821 832

SOUTH WEST
Manley House
Kestrel Way
Exeter EX2 7LQ
Tel: 01392 444 000
Fax: 01392 444 238

THAMES
Kings Meadow House
Kings Meadow Road
Reading RG1 8DQ
Tel: 0118 953 5000
Fax: 0118 950 0388

WALES
Cambria House
29 Newport Road
Cardiff
CF24 0TP
Tel: 029 2077 0088
Fax: 029 2046 6404

ENVIRONMENT AGENCY
GENERAL ENQUIRY LINE
0845 9 333 111

ENVIRONMENT AGENCY
FLOODLINE
0845 988 1188

ENVIRONMENT AGENCY
EMERGENCY HOTLINE
0800 80 70 60

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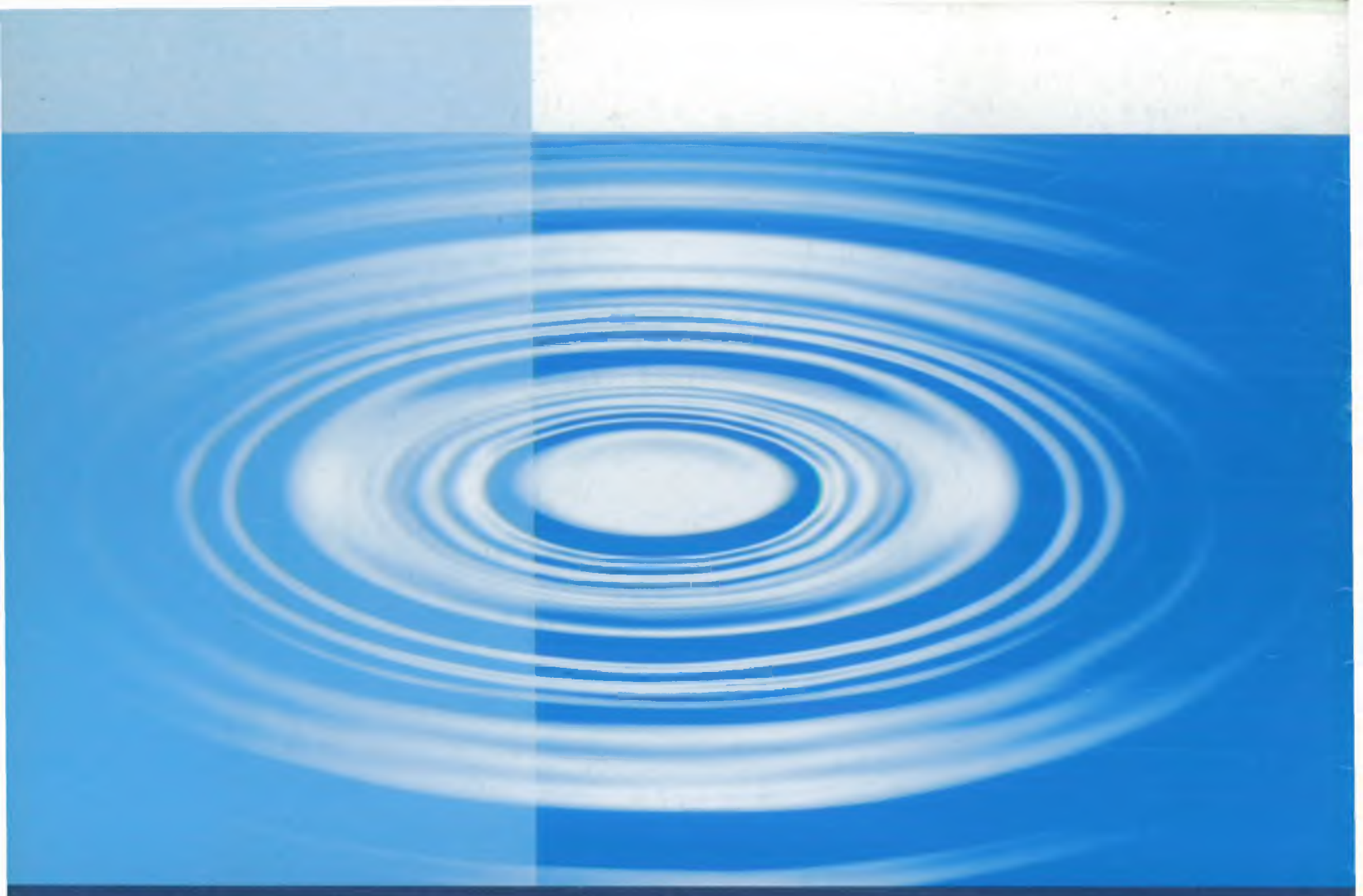

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