

ON-SITE PLAN FOR RESERVOIR DAM INCIDENTS

DEFRA GUIDANCE ON RESERVOIR EMERGENCIES

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1. GENERAL

1.1 Purpose of Plan

Reservoir undertakers/operators are responsible for their assets and for preparing and maintaining on-site plans and emergency arrangements to enable them to respond to emergency incidents relating to their reservoirs. An on-site plan provides a generic framework of procedures for use by the Undertaker and Local Responders in the development of a more detailed co-ordinated response to a possible, probable or actual dam incident for the specific location which aims at either:

- trying to prevent the dam failing in the event of an emergency or incident; or
- minimising the actual impact through measures which could reduce the discharge from the breach or delay the failure so that other actions can be taken off-site to reduce the loss of life and / or damage caused.

In order to facilitate the above, the plan:

- provides useful information about the dam's location, construction, capacity, and the operation of its valves and other key equipment;
- provides clear definitions of the roles, responsibilities and actions of each agency at particular stages of the on-site response;
- provides a response escalation procedure and the actions to be taken as part of the incident management from the initial alert, full plan implementation through to stand-down;
- sets-out the links to the off-site plan and the co-ordination and control arrangements for each level of response which should be agreed with the relevant agencies from the Local Resilience Forum;
- specifies the manner in which information should be communicated to staff and partners in an accessible and consistent fashion;
- provides contact details to facilitate an efficient call-out of resources.

1.2 Contents and Reservoirs Act

When preparing an on-site plan, it should be assumed that:

- it will be used by people who are unfamiliar with the reservoir, for example a temporary Supervising Engineer, a newly appointed Inspecting Engineer, the emergency services and the Environment Agency;
- the Prescribed Form of Record is available;
- any existing drawings of the dam(s) are available; and
- information about catchment diversions may be available.

The Reservoirs Act 1975 and the Reservoirs Act (Registers, Reports and Records) Regulations 1985 and the Water Act 2003 set out the required information that is statutorily required including key information, water level observations, leakages,

settlement, etc, and names and addresses of Inspecting Engineer, Supervising Engineer, and certificates and reports and details of works including direct and indirect catchment area details and other relevant information. The on-site plan should state where all the above information, reports, drawings, records, etc are kept. This should be in a readily available location.

A key diagrammatic plan should be included, based on the above relevant information showing the locations of all relevant reservoir works, access roads, tracks and footpaths, pipelines, valves and controls that may be required in an emergency.

The Reservoirs Act 1975 applies to reservoirs designed to hold or capable of holding, water above the natural level of any part of the land adjoining the reservoir, and is designed to hold, or is capable of holding, more than 25,000 cubic metres of water above that level.

1.3 Scope of Plan

This plan confines itself to addressing the on-site consequences arising from an actual or potential dam breach at the reservoir.

The plan should be developed and used in conjunction with the off-site plan maintained by the top tier local authority in which the dam is located, and any other relevant procedures maintained by local responders which would inform the overall response.

1.4 Off-site Plan

The overall aim of the off-site plan is to provide a framework of procedures to facilitate a co-ordinated multi-agency response to the off-site consequences of a potential or actual dam breach.

If a dam breach is occurring or deemed imminent, the initial alert or notification is provided by the undertaker to the Police for the activation of the off-Site Plan. The Police then activate the off-site plan and instigate the co-ordination of the multi-agency response of the emergency services, local authority/ies and other key partners under the control of the Police.

During implementation of an off-site plan the reservoir Undertaker is to continue to implement the on-site plan where necessary and provide information to off-site responders when required.

1.5 Administering the On-site Plan

An onsite plan is to be issued only to those people who genuinely require it. However, in an emergency the plan may be issued to those involved in managing the emergency, and other individuals in the organisation. Information in the plan may be sensitive for the following reasons:

- The need to keep the information secure against possible terrorist threats
- Personal information such as phone numbers and addresses;
- Commercial sensitivity.

If there is any information in the plan that is considered too sensitive for wide distribution it is recommended that it be included in an appendix which would be controlled and only issued to a list of named individuals.

1.6 Plan Preparation Guidance

When preparing an on-site plan this document should be read in conjunction with the 'DEFRA Guidance on Reservoir Emergencies, Preparation Guide, On-site Plan for Reservoir Dam Incidents. This document provides guidance on the type of information, and level of detail, that a reservoir undertaker should include in an on-site plan.

2. CONTROL

2.1 Roles and Responsibilities of Agencies Covered By the On-site Plan

2.1.1 The Reservoir Undertaker/Owner

In a potential or actual dam breach incident, the reservoir undertaker/owner is responsible for:

- maintaining a log;
- undertaking an initial situation assessment and providing on-going surveillance and situation reports;
- implementing the on-site plan and undertaking a range of appropriate measures to avert failure in conjunction with the relevant engineer(s)¹;
- making contact with the relevant engineer(s) to obtain suitable advice on how to proceed;
- notifying the Police of a heightened risk or actual occurrence of a dam incident together with any relevant details (e.g. status of warning; anticipated failure mode; actions being taken to avert failure; estimated probability of failure and timing) in line with arrangements set out in the on-site plan;
- nominating suitably-qualified people from amongst the undertaker's staff, or consultants, to participate in control arrangements for the on- and off-site response who can provide timely updates on the progress of the incident to relevant parties.

To manage the potential or actual dam breach incident, the on-site plan should include any relevant standard company procedures, including triggers to activate the plan, in particular:

- a list of staff authorised to take action and manage an emergency;
- how decisions are made, and what would happen if key staff were absent;
- how technical advice is obtained within and outside the organisation, for example, from the Supervising Engineer, and how an Inspecting Engineer is appointed to advise on technical issues during an emergency;
- how incidents outside of normal working hours would be dealt with;
- target response time for staff on site to assess the situation.

The names, addresses, phone numbers and any other contact information for the following people are required in the on-site plan to enable easy contact in an emergency:

- Supervising Engineer and Inspecting Engineer (or Inspecting Engineer responsible for last Section 10 Report, Panel Engineer from the appropriate Panel or a Qualified Civil Engineer);
- undertaker's staff; including at least one contact for each function likely to be involved (dam safety, operations, etc) and, where relevant, any staff that live near the dam;

¹ NB Whilst the dam's Supervising Engineer might be responsible for determining if an Inspecting Engineer should be alerted, it is Inspecting Engineer's role to make key decisions for use in mitigation.

- details of term (or framework) contractors, any arrangements for suitably qualified contractors, including how to contact them and resources which can be provided.

External organisations who would need to be involved on-site, and who would contact the reservoir undertaker during an emergency, should be included in the on-site plan. These may include:

- Environment Agency regarding co-ordinating any potential impacts on the environment, including flooding;
- off-site installations and organisations who may be affected, in particular highways, electricity, gas, etc and nationally important infrastructure;
- the media;
- the undertaker's insurers.

It is good practice to have emergency contact signs at the reservoir to enable the general public to report an incident. The signs should be displayed in prominent public access locations around the reservoir and contain the undertaker's / owners name, the reservoir name, identification number and location, and a 24 hour emergency contact phone number.

2.1.2 The Supervising Engineer

In a potential breach incident, the Supervising Engineer might be responsible for:

- visiting the site and undertaking an inspection with the undertaker;
- advising on the need for increasing frequency of readings or surveillance;
- providing advice on appropriate measures to be taken by the undertaker to avert failure or reduce the effects of an actual breach in line with the on-site plan;
- assisting the undertaker to obtain the services of an Inspecting Engineer, a Panel Engineer from the appropriate Panel or a Qualified Civil Engineer, if a dam breach is possible.

2.1.3 The Inspecting Engineer

In a potential or actual dam breach incident, the Inspecting Engineer is responsible for:

- providing opinion on how, why and when the failure will occur and what the impacts may be;
- providing advice on appropriate measures to be taken by the undertaker to avert failure or reduce the effects of an actual breach in line with the on-site plan;
- providing information to the undertaker that can be passed on to the Category 1 responders on the likely off-site consequences of the dam breach as part of the off-site response;
- making arrangements to attend the site as a matter of urgency and/or providing other suitably-qualified persons as required.

If an Inspecting Engineer is not appointed the Inspecting Engineer responsible for the last Section 10 Report, a Panel Engineer from the appropriate Panel or a Qualified Civil Engineer, should be contacted.

2.1.4 Police

In a potential or actual dam breach incident, the Police are responsible for:

- receiving details of the initial alert from the reservoir undertaker/owner and invoking the off-site plan – in conjunction with key partners (e.g. local authority emergency planning), the undertaker and Inspecting Engineer;
- overall co-ordination of the off-site response of the emergency services and local authorities as set-out in the off-site plan.

2.1.5 Fire and Rescue Service

In a potential or actual dam breach incident, the Fire and Rescue Service is responsible for assisting in the emergency draw-down of water levels contained within the reservoir or lake.

2.1.6 Local Authority

In a potential or actual dam breach incident, the local authority may be able to:

- in conjunction with the Police, receive details of the initial alert from the reservoir undertaker and invoking the off-site plan;
- assist in operations to reduce the likelihood of dam failure as agreed;
- provide technical advice and material support for the on-site response as appropriate;
- help with off-site response and emergency rescue services.

The Local Authority will be responsible for maintenance of the off-site plan.

2.1.7 Environment Agency

In a potential or actual dam breach incident, the Environment Agency (EA), or Scottish Environmental Protection Agency (SEPA), may provide support for operations forming part of the on-site response by providing materials, equipment, information and staff where resources allow.

2.2 Co-ordination and Control Arrangements

2.2.1 Undertaker's Operational (Bronze) Control / Emergency Control Centre

Following discussions between the undertaker and appropriate members of the Local Resilience Forum, the undertaker (if practicable²) will initiate the on-site response at a designated location near the incident scene; the emergency control centre. This location ideally would be suitably equipped for use as a Bronze Control by the Category 1 responders. For this the emergency control centre is to be equipped with rooms with desks, multiple fixed telephone and data lines, toilets, rest and refreshment rooms, as appropriate. It is unlikely that a single, small reservoir

² If the undertaker lacks the resources to provide this, then local responders may have to find alternative solutions.

owner will be able to provide this and therefore alternative arrangements will need to be made.

2.2.2 Multi-Agency Control Arrangements

- (1) Following the initial alert from the undertaker to the Police for the activation of the off-site plan, the Police alert partner agencies in the contact list and take the lead in implementing multi-agency command and control arrangements at an appropriate location as detailed on the off-site plan.
- (2) The Operational (Bronze) Control for the on-site co-ordination will be located at premises provided by the undertaker as noted under Section 2.2.1 or as determined by the Police on the day.
- (3) The Police will establish a Tactical (Silver) Control which will be located at a suitable location.
- (4) The Police may also set-up a multi-agency Strategic (Gold) Control at suitable location to provide appropriate leadership at the most senior level.

3. RESERVOIR DESCRIPTION

The on-site plan should give a description of where the reservoir and dam(s) are located, including the valley both upstream and downstream of the dam and dam category. A map may be necessary to convey the information clearly.

The on-site plan should also contain key construction drawings that highlight the type of dam, location of key features and draw-down arrangement.

3.1 Detailed Records

The on-site plan should clearly indicate where important documents relating to the dam are kept if they are not to be included in the on-site plan itself. The documents should also be kept at the same location as the on-site plan so that they can be quickly referred to in an emergency. These documents could be in hard or electronic copy.

Records could include:

Essential:

- Prescribed Form of Record (Regulations prescribe the information to be given as SI 1985 No 177, as amended by SI 1985 No 548).
- Inspection Reports under Section 10 of the Reservoirs Act 1975.
- Annual Statements under Section 12 of the Reservoirs Act 1975.
- Other construction drawings.
- Other records of construction works (original, matters in the interests of safety, other upgrades).
- Valve schematics and schedules.

Desirable:

- Operational Incident Management Procedure including post incident requirements.
- Photographs, instrumentation readings and other surveillance data.
- Feasibility studies for upgrades and / or rehabilitation works (including assessments of spillway adequacy, safety factor against sliding, etc.).
- Relevant technical papers (for example in ICE journals, ICOLD and British Dam Society conference proceedings).

Information which may be relevant in an emergency, that is not contained elsewhere, should also be included in the on-site plan.

In particular:

- If the level of detail and the dam characteristics in the Prescribed Form record are inadequate, then either the detail in the Prescribed Form of Record could be improved, or further information provided as part of the emergency planning process.

- Knowing about any past or ongoing problems is often extremely important in understanding how the dam behaves. This should be included in the Section 10 inspection reports and the Supervising Engineer's annual Statements.
- The on-site plan should list all people who know about the dam and who may be able to help in an emergency.

It is only acceptable to rely solely on electronic data if the undertaker has a control room that is manned 24 hours a day, and that has back-up power. In all other cases, it is important that at least one, and preferably two or more sets of hard copy data are readily available.

3.2 Physical dimensions and features

The key dimensions and features of the reservoir and dam are to be included in the on-site plan. This should include:

- Diversion capacity into and out of reservoir;
- Available information on other reservoirs in the cascade (if applicable);
- Dimensions and the form of construction of dam(s);
- Dimensions and capacity of the draw off works;
- Summary of all valves that may be used for emergency drawdown at each dam, including plans and / or sections showing the valve locations and identity, how to identify the valve on site, the method of operation and the number of turns to fully open the valve. It would also include where any valve keys etc. needed to operate the valves are located;
- Staff resources required to carry out a full emergency drawdown; including a risk assessment of the health and safety and environmental risks involved in that operation.

Some of the above information is available in the Prescribed Form of Record and does not have to be repeated (based on the fact that the Reservoir Record should be readily available). However, there is often not enough data in the Record to write a meaningful and site specific plan.

For cascades, a summary of the heights and levels of all the dams in the cascade is useful.

3.3 Other facilities relevant to on-site operations

The on-site plan should identify other installations on or immediately adjacent to, the undertaker's land, which may be relevant in an emergency due to potential additional hazards and / or consequential damages. This could include services along the dam crest, or toe, or between the dams in a cascade. It may include other dams, critical infrastructure³, access routes, etc.

³ Under no circumstances should any details related to critical national infrastructure, other than location where this is already in the public domain, be incorporated. This information should be cross-referenced if necessary.

3.4 Access to reservoir

The on-site plan should provide enough detail for someone unfamiliar with the reservoir (for example an Inspecting Engineer, contractor's or undertaker's staff) to make his/her way safely from the nearest motorway (or A road) to the reservoir, without any help, in the middle of the night. This should include the following:

- a) Key holders and security
 - Schedule of gates, padlocks and keys;
 - Level of security, for example any compliance to Loss Prevention Certification board Standard LPS1175 (BRE, 2005) and, if so, the security level of the building components;
 - any alarms or other intruder detection systems.

- b) Alternative routes to dam and other features that may be necessary in an emergency
 - how normal access routes might be affected by flooding;
 - alternative access routes if serious flooding in the valley downstream of the dam blocks the main access;
 - weight/width/height restrictions on site and adjacent roads, vehicle size constraints;
 - nearest locations suitable for helicopter landing.

- c) Access around dam site and access to structures, specifically:
 - access to key parts of the dams such as the abutments, all structures, along the dam crest and downstream face
 - any access routes which maybe blocked for any other reason, for example flooding, fallen trees etc.

The plans should preferably be in black and white and a maximum of A3 size to make copying easier. Where possible, the Environment Agency limits of extreme flooding should be included.

3.5 Communications at the reservoir site

The on-site plan should provide details of mobile phone coverage, including which mobile phone networks work at the site and the nearest fixed landlines (a minimum of two is recommended, both outside the outline breach inundation map outline.

3.6 Welfare facilities

The on-site plan should note whether any of the following are available at, or close to, the site:

- toilets;
- kitchen or other facilities to make hot drinks, eat meals;
- any room with tables, power, etc, which could be used as an office;
- any room where clothing can be dried or people can rest.

3.7 Normal operation

The on-site plan should contain details of normal operation, including:

- Responsibilities for different functions, such as dam safety management, maintenance, operation. The on-site plan should note the functions involved in normal reservoir operation and therefore those likely to be affected by an emergency (rather than managing the emergency). This may simply mean referring to the distribution list for the document, but may need to list other functions such as maintenance or works contractors, or other organisations that use or have an interest in the reservoir.
- Frequency of surveillance (this affects how quickly any structural problem would be detected, and the time available to prevent failure). The plan should also state the normal surveillance system, as this will be relevant to the time any structural problem has had to develop before it is noticed, and therefore how much time may remain before the dam failed, if no action were taken. This should include how frequently instruments are read, as well as visual inspections.

4. ON-SITE ACTIONS BY UNDERTAKER

4.1 Assessing the situation

4.1.1 General

This section covers assessing the incident on site. The plan should include details of who would carry out the on-site assessment and the health, safety and environmental issues in implementing the on-site plan.

Assessing the potential ways in which the dam could fail, and therefore considering the measures to reduce the risk of failure, should normally be carried out:

- routinely as part of the safety management system, for example as part of the regular safety review for the reservoir (i.e, Reservoirs Act 1975, Section 10 Report);
- when preparing or reviewing the on-site part of a reservoir flood plan, as part of contingency planning;
- where appropriate, as part of the feedback from exercising an on-site plan;
- whenever an incident occurs, as part of the initial on-site assessment.

Clearly any one incident may mean having to carry out a number of different mitigation measures at the same time. An example of this is where an elevated reservoir level, due to a flood or spillway blockage, triggers an internal erosion incident, or where internal erosion leads to settlement and thus overtopping.

4.1.2 Serious incident at reservoir higher up cascade

Where a reservoir is in cascade with other dams upstream which could fail, the on-site emergency plan should include the scenario where the owner of one of the upstream reservoirs notifies the undertaker of the downstream reservoir that it is at risk of failure.

4.1.3 Health and Safety

A health and safety assessment of the risks to people involved in trying to avoid or delay the reservoir's failure should be carried out. Hazards may include working alone, working near water, confined spaces, leptospirosis, working at heights, slipping on steep slopes/wet areas, adverse weather and darkness.

Safety legislation (for example the CDM Regulations 2007) should also be assessed to see how relevant it is and what action would need to be taken in the event of an emergency to comply. It needs to be clear who has overall responsibility for site operations, and it may be necessary to appoint a principal contractor and/or Project Manager. Staff and/or the company safety representative should also be consulted when developing these plans.

4.1.4 Environmental

Method statements for any releases from reservoirs should be prepared.

4.2 Undertaker's resources relevant to on-site activities

The on-site plan should provide details of the resources which would normally be available to use for on-site mitigation measures. This should include:

- a) Equipment on site;
- b) Communications equipment;
- c) Other resources available (labour, materials, including sand bags, plastic sheeting, bulk filling materials, plant including pumping equipment), including location and 24 hour contact details.

4.3 Reservoir drawdown

4.3.1 General

One effective way of preventing the reservoir from failing may be to lower the reservoir water level to therefore reduce the load on the dam and also the amount of water released in an uncontrolled manner. During an incident, or potential incident, the Panel Engineer will provide advice on how to safely and effectively draw down the reservoir.

The following should be included, or referred to if in another document, in the on-site plan:

- a) Curves of drawdown of the reservoir versus time for full opening of the bottom outlet for a range of inflow conditions.

It is recommended that the required drawdown capacity is specified as a percentage of dam height per day, so that the drawdown capacity is linked directly to the load on the dam. Key points to include are the point at which:

- the load is halved (generally equivalent to a water depth of 70 per cent of the initial reservoir level); and,

- the water level is 1m below the spillway overflow level (recognising that some internal erosion incidents are located in the upper part of the core).
- b) Alternative means of lowering, if the structural problem relates to the outlet to be used for emergency drawdown.

Practical issues that should be considered in estimating the draw-down capacity include:

- any ability to decant to other reservoirs or water treatment works;
 - washouts on supply lines may be used to increase the draw-down capacity in an emergency;
 - other ways of increasing discharge capacity and the effect it will have downstream.
- c) Consequent risks that may be created, for example, rapid draw-down slope failure of the embankment.
 - d) Maximum releases from the reservoir for no downstream property damage.

5. MEASURES AT OTHER INSTALLATIONS

Liaison with other reservoir undertakers in the cascade (where present) should include:

- a) communication between the different undertakers;
- b) precautionary actions that could be taken if there is a serious incident at an upstream reservoir;
- c) actions to reduce the effect of the dambreak flood wave, for example lowering a downstream reservoir to absorb the flood wave.

Where there are other installations not covered by the on-site plan (for example reservoirs in the cascade owned by a different company), then the on-site plan should identify whether changing how these or other installations operate could be used to prevent the subject dam from failing. This might include temporarily diverting or storing inflows, or lowering downstream reservoirs to store any dam break flood. Consideration should be given to how and where stream courses are culverted and whether work could be carried out to store water behind embankments which are not reservoir embankments (i.e. motorways and railways) in extreme cases.

6. MAINTAINING THE ON-SITE PLAN

6.1 Training Staff

The on-site plan should set out the training programme for those responsible for managing and implementing the on-site plan.

Training courses set up, or facilitated by both Category 1 responders and owners of several reservoirs could, where practicable, be extended to owners of single reservoirs in the same area.

6.2 Testing Equipment

The routine testing of site equipment should form part of the statutory inspection process at a reservoir. Where necessary, additional testing should be included in the on-site plan so that the following testing is undertaken:

- the bottom outlet and other draw-down equipment - this would normally include full opening of the bottom outlet at least once a year;
- any communication equipment at the site;
- any other equipment which would be used when the on-site plan is activated, including equipment which would be brought to site.

There should be advance warning of any equipment testing and potential environmental impact. Method statements should be included for any releases from reservoirs. It is advised that when valves are tested, they are opened to 100 per cent of travel, with water released from the bottom outlet against full reservoir head into the downstream watercourse, sustained long enough for the water to run clear and achieve steady flow conditions (a minimum of five minutes). This is only if it is safe to do so, and would not cause any damage downstream. Where the emergency draw-down forms part of the operational supply from the system, and testing by releasing water would affect the ability to supply water, then it may be sufficient for the valves to be opened fully in sequence, without releasing water.

6.3 Exercising

Frequent exercising is an essential element of any contingency plan. It ensures that all participants with a role in an emergency response are aware of their responsibilities. It is also an opportunity to review the accuracy and completeness of the plan. All reservoir on-site plans should be reviewed annually.

The on-site plan should show the level, type and frequency of exercise where the emphasis is on internal and external coordinated communications and actions. For example table top, full scale field, component/equipment testing and the staff involved. The type of exercising should reflect the owner's organisational structure. The exercising should be separate to those required under the Guidance on Reservoir Emergencies Off-site Plans.

Every exercise should include a formal debriefing and lessons learnt report, with changes to the on-site plan, where appropriate, as part of continuous improvement.

It is recommended that, where practicable, owners of single reservoirs should be invited to take part in or witness exercises set up, or facilitated, by both Category 1 responders and owners of several reservoirs in their area.

The table below outlines the expected frequency and type of exercises, and what this means for small and large organisations.

Type of Organisation	Annual Review	Exercise Level 1	Exercise Level 2
<p>Private Members Club / Small owner operators (e.g. agriculture, fishery)</p> <p>Responsible for <5 reservoirs.</p>	<p>Annual review of plan confirming details are correct and all equipment / information referenced in the plan is available.</p> <p>Review to include all organisations members with a role in the plan.</p> <p>May coincide with Supervising / Inspecting Engineers' inspection.</p>	<p>When required, participate in exercise of off-site plan for reservoir (which will be lead by a Cat 1 organisation) and any on or off-site plan exercise involving a reservoir which is part of a cascade which includes your reservoir.</p>	<p>One full exercise every 10 years for each reservoir. May coincide with S10 inspection.</p> <p>Exercise to involve all personnel in the organisation with a role in responding to a major reservoir incident, and should include:</p> <ul style="list-style-type: none"> • deployment of staff as per plan requirements. • contacting of equipment/materials suppliers to confirm availability during emergency. • involvement of Supervising or Inspecting Engineer. • operation of valves and drawdown facilities. • participation of organisations managing reservoirs in cascade. • relevant Cat 1s should be invited as observers.
<p>Large Organisation</p> <p>Responsible for =>5 reservoirs.</p>	<p>Annual review of every plan by its author. Revised plan approved according to organisations arrangements. Ideally the review should include all front-line personnel who operate the reservoir.</p>	<p>As above for individual reservoirs.</p>	<p>One full exercise per year per organisation.</p> <p>Exercise to involve all personnel in the organisation with a role in responding to a major reservoir incident, and should include:</p> <ul style="list-style-type: none"> • deployment of staff and emergency equipment (if organisation owned) as per plan requirements. • involvement of Supervising or Inspecting Engineer. • operation of valves and drawdown facilities. • participation of organisations managing reservoirs in cascade. • relevant Cat 1s should be invited as observers.

6.4 Reviewing and Updating the Plan

The on-site plan should state how often contact details are checked and updated.

The plan should state when the next review is due. It is recommended that review and updates of the on-site plan are carried out as follows:

- on a reservoir by reservoir basis, as part of a Section 10 Inspection; and
- following every exercise of the on-site plan.

7. OTHER ISSUES

The on-site plan may cover other issues not essential in a reservoir flood plan. When preparing the on-site plan, other issues may be identified which need to be considered, but which may not be appropriate to include in the on-site plan, for example because of commercial confidentiality. These could include:

- a) the process and issues relating to refilling the reservoir after an emergency drawdown (for reservoirs on small catchments it would be prudent to estimate how long it would take to refill the reservoir using only natural inflows; in some cases this can take a significant period of time.
- b) business continuity issues, if the reservoir is held down for some time (for example if the reservoir is a commercial fishing lake) is the loss covered by insurance?