1

INTRODUCTION AND INSTRUCTIONS FOR USE

About these guidelines

These guidelines have been designed to help those involved in the assessment of emergency water sources to collect relevant information in a systematic way, to use this information to select a source or sources and to determine the appropriate level of treatment required to make the water suitable for drinking.

The guidelines, however, are not limited to the selection and treatment of water sources. The information collected will also be useful for:

- the design and costing of the water supply system;
- the ordering of material and equipment;
- the organization of human resources; and
- the implementation of the project.

A thorough assessment at an early stage will save valuable time later on.

Specifically, the guidelines will:

- act as an *aide-mémoire* to assessors;
- help to fill any knowledge gaps; and
- assist in the training of future assessors to undertake this occasional task, allowing them to learn from past experiences.

The selection tools and guidelines are not a replacement for experience. They should be used with engineering judgement and intuition gained from experience of emergency responses. They are not intended to make the assessor a specialist in all the skill areas but to support a basic understanding. Reference has been made where specialist help may be required (e.g. from a hydrogeologist or to interpret industrial pollution laboratory results). The assessor will need to study these documents and preferably have training in their use prior to using them in the field. A training pack has been developed to support this document and may be obtained from the authors.

What is an 'emergency'?

Perceptions of what constitutes an 'emergency' varies between personnel and between organizations. Organizations that concentrate on the initial stages of an emergency understandably consider their problems to be paramount whereas those that support affected populations for many years after the initial event consider the problems of the longer term to be equally important. These guidelines have been developed to cater for the requirements of both parties and those holding intermediate views.

Using definitions given in Davis and Lambert, (1995: p1) 'disasters' can be either natural or induced by humans. They can be slow or sudden onset and they 'result in a serious disruption of society, cause widespread human suffering and physical loss or damage, and stretch the community's normal coping mechanisms to breaking point'. '*The term 'emergency' is used to describe the crisis that arises when a community has great difficulty in coping with a disaster. External assistance is needed, sometimes lasting for many months, perhaps years'*.

Assessors may have to work in a wide variety of scenarios, which include:

- responses required immediately after the event or some years after;
- natural or man-made disasters (e.g. flooding, war or chemical disasters);
- sudden-onset or slow-onset disasters (e.g. earthquake or drought);
- operational local and national authorities or none;
- plentiful supply of surface water or an area dependant on groundwater and rainwater;
- high security risks (especially in conflict areas) or no security problem;
- serious logistical and resource problems or easy access to resources; and
- affected populations are displaced or there is limited displacement.

Each of these scenarios will require a different response and will have different constraints. The guidelines will therefore have to be adapted accordingly.

The term 'affected population' has been used to describe refugees, internally displaced persons, returnees who may be accommodated in temporary camps, and populations whose lives have been modified by the emergency but who have not been displaced. However, the documents also refer to 'local populations', which infers that the local and affected populations are different. This differentiation aims to ensure that local communities are not forgotten when there is a displacement into an area. The terms will require adaptation to suit a non-displacement situation where the affected populations and the local populations are one and the same.

Socio-political, legal, cultural and security issues

Often in emergency situations, the factors which dictate what can be undertaken to provide basic services are linked to socio-political, legal, cultural or security issues. The guidelines therefore emphasize these issues. A case study section has been included to describe some of the complex scenarios under which assessors have worked and some responses which were used.

Approach

Water source selection in an emergency situation needs a phased or upgrading approach. However, it is important to recognize that there are constraints to future upgrading, such as:

- a lack of commitment from the implementing organizations, local and affected populations;
- a lack of finances (funds are often more widely available in the acute stages of an emergency than later on); and
- political restrictions.

Therefore, decisions made in the initial phases of the emergency are likely to affect longer term options.

These guidelines use the terms 'survival' supply (the immediate response to an emergency) and 'longer term' supply (subsequent responses including improvements to survival supply and for the longer term). The survival supply requires quick assessment and decision-making and the longer term supply requires a more thorough assessment and a more holistic approach. Below are two alternative descriptions of the stages of an 'emergency' and the corresponding terminology used in these guidelines. Every emergency is different and the generalizations noted here will not fit every situation. Specific situations, for example conflicts, may require a significantly longer period at the survival level of supply, and in other emergencies survival responses may have to be re-introduced at a later date.

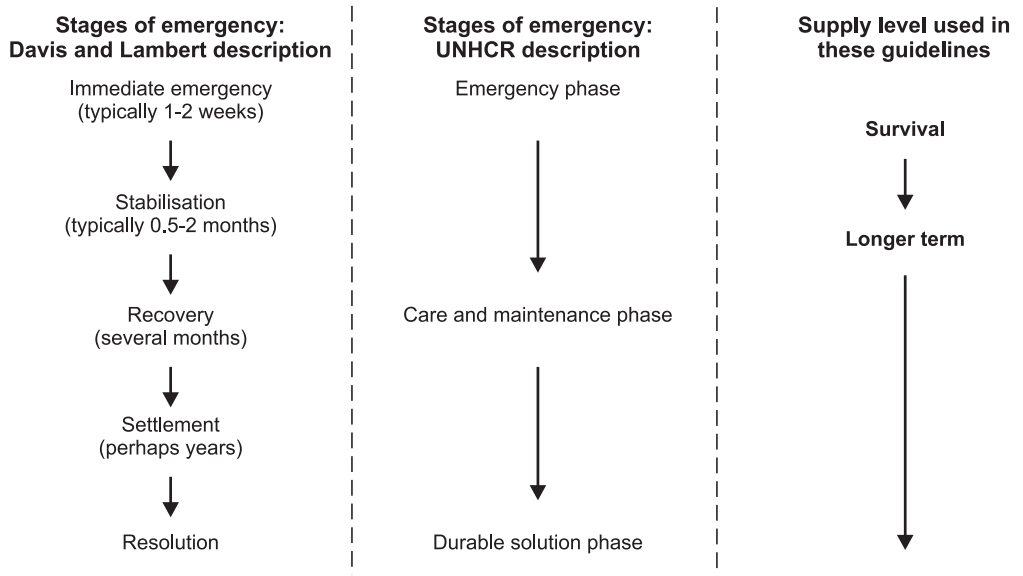

Figure 1.1 — Stages of 'emergency' and supply levels used in these guidelines

Application

In most emergencies there will be more than one potential water source. The options could include surface or groundwater near to the site, or tankered or bottled water brought from a distance. The guideline procedures will encourage the assessor to look at as many source options as possible, not just the most obvious ones. It may be, however, that there is only one viable option and in this case the procedures set out in these guidelines will still be useful. They will help the assessor to identify the requirements to develop the source and to highlight key considerations. Some assumptions will have to be made during the assessments, particularly in the initial stages of an emergency, but the number of assumptions should be limited by efficient and logical information gathering. Any assumptions that are made should be verified as soon as possible.

Guideline user group

The guidelines may be useful to a range of personnel involved in the selection of emergency water sources and treatment processes. These could include:

- national or local government personnel from the affected country;
- field staff from local or international organizations who may have limited previous experience in this task (field staff would have a basic technical understanding but this may not specifically be engineering or water related); and
- senior staff who have significant experience in the assessment process in a range of different scenarios.

Assessors will usually work within a team comprised of either all nationals or a mixture of national and international personnel. The effective use of team members for information gathering can save time. The areas which require investigation are multi-disciplinary and cross over several fields e.g. health, social and technical. Use should be made of personnel from these disciplines where they are available.

Although assessments may be undertaken by national or international personnel, reference has been made in information gathering to the ‘host country’ and the ‘donor country’ to differentiate when this is the case. The terms will therefore have to be adapted to suit a situation where the host country and the donor country are one and the same.

Relationship between source selection with other activities

Water source and site selection are interdependent. Which is considered first will depend on the situation, particularly the political constraints. Ideally the site should be chosen on the basis of the suitability of the water source but in many cases the water source will have to be chosen in relation to a particular site.

This work focuses on the selection of water sources in relation to a particular site, but obviously the same procedures can be followed for several sites. The urgency of the decision will be a restricting factor to the thoroughness of the assessment.

Source selection for drinking water is also affected by, and related to, sanitation, hygiene practice, drainage, irrigation and similar activities. The guidelines point to the need to consider supplementary or ancillary activities where necessary.

In many cases the person evaluating the source and treatment requirements will be also producing the whole water supply project proposal. Attempts have been made in the guidelines to acknowledge this and to point out to additional information which may be required for this activity.

Completeness of surveys

It is accepted that every emergency situation will be different and the skill level and experience of the assessor will also vary. Hence, the guidelines are subdivided into sections which can be used or omitted as appropriate. Not all of the survey information will be collected on each occasion, but by highlighting its relevance the assessor can at least consider its appropriateness to his / her situation. Using information from a range of sources allows confirmation or otherwise of initial findings or assumptions.

The assessment steps as highlighted by the flowcharts S1 and L1 show only one of the many possible routes to assessment. The procedures have been represented in this way to try and make the assessor think of how logical and methodical his/her information gathering and decision-making are and as a guide to possible improvement. The procedures will have to be used with common sense and adapted to suit specific situations.

Record keeping

Good records should be kept of all gathered information and they should be stored in such a way that others can access them. Information gathering takes time and hence the assessor (or those following the assessor) should not have to repeat work because of inefficient record keeping.
The survey sheets included in this document are designed to help with efficient record-keeping. They may be enlarged from A5 to A4 and further blank sheets attached where space for completion is inadequate.

Photographs and sketches

Photographs and sketches of water sources and supplies are very useful for decision-making especially for anyone referring to the survey who was not involved in the initial assessment.

Time targets for assessments

Estimated time to undertake the assessment procedure (including general orientation) starting from arrival in-country or in-field is:

- survival supply: 1 – 3 working days
- longer term supply: 3 – 7 working days

These time periods will not be possible for every scenario but are general targets.

Instructions for use

Section 2 identifies procedures and provides tools for the selection of water sources for survival supply (usually most appropriate in the initial stages of an emergency). Section 3 identifies procedures and provides tools for the selection of a water source for longer term supply (anything other than survival supply). Within these sections are procedural flowcharts, selection tools, checklists for information gathering and survey sheets.

Section 4 contains supporting information on specific issues or assessment procedures.

Section 5 contains a glossary, useful addresses, details of field equipment and a bibliography.

It is suggested that the assessor should read through and become familiar with the contents of Sections 2 and 3 and only use Sections 4 and 5 when there is a specific query. Not all assessors will want to use the total contents of Sections 2 and 3. However, specific items, for example the checklists, may be useful even to experienced assessors, and reading through these sections may still be a good revision exercise.

To use Sections 2 and 3 follow these five steps:

1. Study the flowchart which highlights the steps that need to be taken to assess water sources. It identifies how the procedure described in that section fits into the overall programme for installing an emergency water supply.

2. Study the selection tools to understand what must be considered when selecting a treatment process and water source.

3. Work through the checklists collecting as much information as possible which is appropriate to the particular scenario. Record the information on the survey sheets or in another accessible form.

4. When as much information as possible has been collected, return to the selection tools and use them as required. If some of the necessary information is not available at the time then assumptions will have to be made.

5. If additional information later becomes available, the selection should be re-assessed to see if it needs to be modified.

Acknowledgements

Thanks go to all individuals and organizations who have been involved in the study or have given permission to reproduce extracts from existing documents. It is hoped that the wide range of organizations and individuals who have contributed to the work will ensure that it is likewise useful to a wide user group and in a range of emergency situations.

All contributions are gratefully acknowledged. It should be noted, however, that the opinions in this document are solely those of the authors.

The following individuals have contributed in detail to the research either in their role as peer reviewers, or by testing the work in the field, or by providing information for specific sections of the work.

Annick Barros	*IFRC (Bukavu, Zaire)*
Barend Leuwenberg	*MSF-H (Head Office)*
Bob Elson	*WEDC, Loughborough University (UK)*
Bobby Lambert	*REDR (Head Office – peer reviewer)*
Brendan Doyle	*UNICEF (Head Office – peer reviewer)*
Daniel Mora-Castro	*UNHCR (Head Office – peer reviewer)*
Denis Heidebroek	*MSF-H (Head Office – peer reviewer)*
Dixon Chanda	*MSF-H (Head Office)*
Gary Campbell	*Independant Consultant representing UNHCR (Addis Ababa, Ethiopia)*
Koos Messelink and Bonane Cikola Rugendabanga	*MSF-H (Uvira, Zaire)*
Lila Pieters and Kalubi Misombo	*UNICEF (Bukavu, Zaire)*
Paul Larcher	*CEU, Loughborough University (UK)*
Riccardo Conti	*ICRC (Head Office – peer reviewer)*
Richard Luff	*OXFAM (Head Office – peer reviewer)*
Stuart Dale, Nina Ladner and Geoff Russell	*Public Health Laboratories, Loughborough University (UK)*
Tom de Veer	*De Veer Consultancy (The Netherlands)*
Uli Jaspers	*IFRC (Head Office – peer reviewer)*
Vincent Chordi and Antenneh Tesfaye	*UNHCR (Regional Liason Office, Addis Ababa, Ethiopia)*
Yves Chartier and Gilles Isard	*MSF-F (Head Office – peer reviewer)*

The following individuals have also contributed to the study by being involved in interviews or discussions on sub-sections of the work or providing information in the field or from head office.

Abdi Awil Hersai	*UNHCR (Jijiga, Ethiopia)*
Abebe Chekole	*Fundika Town Committee (Dimma, Ethiopia)*
Ahmed Hussein	*Water Resources Bureau (Jijiga, Ethiopia)*
Amaha Altaye	*UNHCR (Regional Liason Office, Addis Ababa, Ethiopia)*
Angelo de Bernardo	*MSF-H*
Aregawi Hagos	*OXFAM (Addis Ababa, Ethiopia)*

Antos Szkudlarek	*MSF-H*
Bedlu Wagari	*MSF-F*
Brian Skinner	*WEDC, Loughborough University (UK)*
Chris Buckley	*University of Natal (South Africa)*
Chris Preston	*OXFAM (UK)*
David Byakweli	*CARE (Chimanga near Bukavu, Zaire)*
David Lashley	*David Lashley and Partners Inc. (Barbados)*
David Parrums	*UNHCR (Uvira, Zaire)*
Dr Berhanu Dibaba	*Administration of Refugee and Returnee Affairs (Addis Ababa, Ethiopia)*
Dr Elias Mitsale Mo	*Administration of Refugee and Returnee Affairs (Teferi Ber, Ethiopia)*
Dr F. Bassani	*World Health Organization (Switzerland)*
Dr H. Galal-Gorchev	*World Health Organization (Switzerland)*
Dr John Tabayi	*UNHCR (Regional Liason Office, Addis Ababa, Ethiopia)*
Dr Sandy Cairncross	*London School of Hygiene and Tropical Medicine (UK)*
Dr S. Ben Yahmed	*World Health Organization (Switzerland)*
Dr Timothy Ama	*Administration of Refugee and Returnee Affairs (Dimma, Ethiopia)*
Erimias Goitom	*Administration of Refugee and Returnee Affairs (Dimma, Ethiopia)*
Eshetu Abate	OXFAM (Addis Ababa, Ethiopia)
Fouad Hikmat	*MSF-H*
Francis Mulemba	*MSF-F*
Ghidey Glegliabher	*Water Resources Bureau (Jijiga, Ethiopia)*
Gino Henry	*REDR (UK)*
Giselle Rouquie	*MSF-H (Uvira, Zaire) / MSF-F*
Habtamu Tekleab	*CARE (Teferi Ber, Ethiopia)*
Hailu Kebede	*ARRA (Dimma, Ethiopia)*
James W. Borton	*UNDP / Emergencies Unit of Ethiopia (Addis Ababa, Ethiopia)*
Jean Luc Bruno	*MSF-B (Bujumbura, Burundi)*
Jim Howard	*Independent Consultant, Water and Environmental Engineer (UK)*
John Adams	*OXFAM (Head Office)*
John Fawell	*National Centre for Environmental Toxicology, WRc (UK)*
K.S. Nair	*CARE (Jijiga, Ethiopia)*
Kim Waterhouse	*REDR (UK)*
Kristof Bosteon	*MSF-B*
Lori D. Barg	*Step by Step (USA)*
Major T. Duggleby	*British Army Water Development Team*
Manuel Jagour	*MSF-F (Bujumbura, Burundi)*
Margaret Ince	*WEDC, Loughborough University (UK)*
Mark D. Bidder	*UNDP / Emergencies Unit of Ethiopia (Addis Ababa, Ethiopia)*
Mark Graham	*Umgeni Water (South Africa)*
Mesfin Lema	*UNICEF (Addis Ababa, Ethiopia)*
Michael Smith	*WEDC, Loughborough University (UK)*
Mohammed Rafi Aziz	*MSF-B*
Mohammed Said	*Water Resources Bureau (Jijiga, Ethiopia)*
Mohammed Zaheoil Islam	*MSF-H*
Moltot Haile	*Water Resources Bureau (Jijiga, Ethiopia)*
Mr Guy	*British Army Water Development Team*
Nick Wilson	*REDR (UK)*
Paul Andre Monette	*MSF-B*

Paul Keating *REDR (UK)*
Paul Kremers *MSF-H (Uvira, Zaire)*
Paul Steadman *Environmental Engineering Group, University of Newcastle upon Tyne (UK)*
Paul van Haperen *MSF-H (Uvira, Zaire)*
Peter Stern *Author and Civil Engineer (UK)*
Pole Kore *Dimma Refugee Representative Committee (Dimma, Ethiopia)*
Professor H.H. Dieter *Umweltbundesamt Institute for Water, Soil and Air Hygiene (Germany)*
Richard Jabot *MSF-F*
Sahid Ibrahim *Water Resources Bureau (Jijiga, Ethiopia)*
Selemani Balongelwa *MSF-H (Uvira, Zaire)*
Shimeles Makonnen *OXFAM (Addis Ababa, Ethiopia)*
Sobhi M. Abdel-Hai *UNICEF (Addis Ababa, Ethiopia)*
Tim Forster *Merlin (UK)*
Timothy David Boucher *MSF-B*
Tudor T. Davies *United States Environmental Protection Agency (USA)*
Waldu Muhray *OXFAM (Head Office)*
Wies Van Bemmel *UNHCR (Regional Liaison Office, Addis Ababa, Ethiopia)*
Yirku Adere *Administration of Refugee and Returnee Affairs (Addis Ababa, Ethiopia)*
Yohannes Gebremedhin *Water Supply and Sewerage Department (Addis Ababa, Ethiopia)*

Permission was given to reproduce extracts from the following publications:

- Brassington, R. (1988) *Field Hydrogeology*, John Wiley & Sons, UK.
- Cairncross, S. & Feachem, R. (1978) *Small water supplies*, Bulletin No.10, Ross Institute, London.
- Carrol, R.F. (1991) *Disposal of domestic effluents to the ground*, Overseas Building Note 195, Building Research Establishment.
- Davis, J. & Lambert, R. (1995) *Engineering in Emergencies: A practical guide for relief workers*, Intermediate Technology Publications, London.
- de Lange, E. (1994) *Manual for Simple Water Quality Analysis*, IWT Foundation, The Netherlands.
- Foerster, J. (1996) *Uvira Water Supply Project*, Internal Report, ICRC /ARC, Melbourne, Australia.
- ICRC (1994) *Water and War: Symposium on Water in Armed Conflicts*, Montreux, 21 – 23 November 1994, ICRC,
- Jordan, T.D. Jnr (1984) *A Handbook of Gravity Flow Water Systems*, Intermediate Technology Publications, London.
- Lashley, D. (1997) *Vulnerability Assessment of the Drinking Water Supply Infrastrucutre of Montserrat*, Pan American Health Organization.
- MSF (1994) *Public Health Engineering in Emergency Situations*, MSF Paris, France.
- Pacey, A. & Cullis, A. (1986) *Rainwater Harvesting: The collection of rainfall and run-off in rural areas*, Intermediate Technology Publications, London.

· Stern, P. (ed) from an original work by F. Longland (1983) *Field Engineering: An introduction to development work and construction in rural areas*, Intermediate Technology Publications, London.

· Stulz, R. & Mukerji, K. (1993) *Appropriate Building Materials: A catalogue of potential solutions*, 3rd Edn, SKAT & IT Publications,

· Viking Optical Ltd, *Suunto Clinometer Instruction Leaflet*.

· WHO (1993) *Guidelines for Drinking-Water Quality Vol.1: Recommendations*, 2nd edn, WHO, Geneva.