

CONTAMINATED SITES

Guidelines for Consultants Reporting on Contaminated Sites



Office of
Environment
& Heritage

© 2011 State of NSW and Office of Environment and Heritage

The State of NSW and Office of Environment and Heritage are pleased to allow this material to be reproduced in whole or in part for educational and non-commercial use, provided the meaning is unchanged and its source, publisher and authorship are acknowledged.

The Office of Environment and Heritage (OEH) has compiled these guidelines in good faith, exercising all due care and attention. No representation is made about the accuracy, completeness or suitability of the information in this publication for any particular purpose. OEH shall not be liable for any damage which may occur to any person or organisation taking action or not on the basis of this publication. Readers should seek appropriate advice when applying the information to their specific needs. This document may be subject to revision without notice and readers should ensure they are using the latest version.

Published by:

Office of Environment and Heritage

59 Goulburn Street, Sydney NSW 2000

PO Box A290, Sydney South NSW 1232

Phone: (02) 9995 5000 (switchboard)

Phone: 131 555 (environment information and publications requests)

Phone: 1300 361 967 (national parks, climate change and energy efficiency information, and publications requests)

Fax: (02) 9995 5999 TTY: (02) 9211 4723

Email: info@environment.nsw.gov.au

Website: www.environment.nsw.gov.au

Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or info@environment.nsw.gov.au

See also www.environment.nsw.gov.au

ISBN 0 7310 3892 4

OEH 2011/0650

First published 1997; Reprinted September 2000

Reprinted with updated agency details and references August 2011

Printed on environmentally sustainable paper

PREFACE

The Office of Environment and Heritage exercises responsibilities and powers in the name of the NSW Environment Protection Authority.

These guidelines have been prepared by the Contaminated Sites Section of the Office of Environment and Heritage (OEH). Their purpose is to assist consultants, site auditors, council staff and other interested parties in reporting on the investigation and remediation of contaminated sites. They replace the Draft Guidelines for Consultants Reporting on Contaminated Sites (dated August 1995).

OEH intends to monitor the use of these guidelines and to review and update them when necessary. Any comments are welcome.

Inquiries or comments may be directed to:

The Manager
Contaminated Sites Section
Office of Environment and Heritage
PO Box A290
Sydney South NSW 1232
Fax: (02) 9995 5999

Limitations

These guidelines apply only to consultants reporting on the investigation and remediation of contaminated land. They do not provide detailed guidance on contaminated site assessment and management. More detailed guidance may be found in documents listed in the References.

ACKNOWLEDGMENTS

The Office of Environment and Heritage acknowledges comments on the Draft Guidelines provided by the following organisations:

- Australian Maritime Safety Authority
- CH2M-Hill Australia Pty Ltd
- Dames & Moore
- Dubbo City Council
- Fairfield City Council
- Gosford City Council
- HLA Envirosiences Pty Limited
- Leichhardt Municipal Council
- Mosman Municipal Council
- NSW Agriculture
- Northern Territory Department of Lands, Planning and Environment
- Shoalhaven City Council
- South Australian Health Commission
- South Sydney City Council
- Strathfield Municipal Council
- Sutherland Shire Council
- The Shell Company
- Victoria Environment Protection Authority

CONTENTS

PREFACE	
ACKNOWLEDGMENTS	
1 INTRODUCTION	1
2 INVESTIGATION STAGES.....	1
2.1 Stage 1 – Preliminary site investigation.....	1
2.2 Stage 2 – Detailed site investigation	2
2.3 Stage 3 – Site remedial action plan (RAP).....	2
2.4 Stage 4 – Validation and site monitoring reports	2
3 REPORTING REQUIREMENTS	3
3.1 How to use the checklist	3
4 REFERENCES.....	12

1 INTRODUCTION

The purpose of these guidelines is to ensure that reports prepared by consultants on the investigation and remediation of contaminated land contain sufficient and appropriate information to enable efficient review by regulators, the Site Auditor and other interested parties.

Other reporting requirements may apply in certain cases. For sites subject to planning processes such as rezoning application, development application and/or building approval, the latest version of the Managing Contaminated Land: Planning Guidelines (NSW DUAP/EPA 1998) and the appropriate planning authority should be consulted. For sites subject to regulatory notices issued by the Office of Environment and Heritage (OEH), consult OEH.

2 INVESTIGATION STAGES

From a reporting perspective, contaminated sites management can be broadly classified into the following stages:

- 1 – Preliminary site investigation
- 2 – Detailed site investigation
- 3 – Site remedial action plan
- 4 – Site validation and ongoing monitoring.

Consultants' reports normally address these stages. Reports may be presented separately or combined in various ways. However, each report must stand alone, containing sufficient information to be readily understood. Where relevant information has been included in a previous, still available report, a summary of that information should suffice in subsequent reports.

The reporting requirements of each stage are discussed in the following sections and a checklist summary is included in Section 3.

2.1 Stage 1 – Preliminary site investigation

The preliminary site investigation report should:

- identify all past and present potentially contaminating activities
- identify potential contamination types
- discuss the site condition
- provide a preliminary assessment of site contamination
- assess the need for further investigations.

An appraisal of the site history is fundamental to the preliminary assessment and may be used to assess potential site contamination. It is important to review and assess all relevant information about the site, including information obtained during a site inspection.

Where a complete site history clearly demonstrates that site activities have been non-contaminating, there may be no need for further investigation or site sampling.

However, where contaminating activities are suspected or known to have occurred, or if the site history is incomplete, it may be necessary to undertake a preliminary sampling and analysis program to assess the need for a detailed investigation.

2.2 Stage 2 – Detailed site investigation

The detailed site investigation report should give comprehensive information on:

- issues raised in the preliminary investigation
- the type, extent and level of contamination

and assess:

- contaminant dispersal in air, surface water, groundwater, soil and dust
- the potential effects of contaminants on public health, the environment and building structures
- (where applicable) off-site impacts on soil, sediment and biota
- the adequacy and completeness of all information available to be used in making decisions on remediation.

Where it is preferred that site-specific clean-up levels be developed by applying risk assessment methods, the consultant must contact OEH to discuss appropriate procedures.

If the results of the detailed site investigation indicate that the site poses unacceptable risks to human health or the environment – on-site or off-site, and under either the present or the proposed land use – then a remedial action plan needs to be prepared and implemented.

2.3 Stage 3 – Site remedial action plan (RAP)

The RAP should:

- set remediation goals that ensure the remediated site will be suitable for the proposed use and will pose no unacceptable risk to human health or to the environment
- document in detail all procedures and plans to be implemented to reduce risks to acceptable levels for the proposed site use
- establish the environmental safeguards required to complete the remediation in an environmentally acceptable manner
- identify and include proof of the necessary approvals and licences required by regulatory authorities.

Once remedial work is complete, a report should be prepared detailing the site work conducted and regulatory decisions made.

2.4 Stage 4 – Validation and site monitoring reports

Reporting requirements are of two types: validation and, where appropriate, ongoing site monitoring.

Validation reporting

Where remedial action has been carried out, the site must be 'validated' to ensure that the objectives stated in the RAP have been achieved. A report detailing the results of the site validation is required.

The extent of validation required will depend on:

- the degree of contamination originally present
- the type of remediation processes that have been carried out
- the proposed land use.

Validation must confirm statistically that the remediated site complies with the clean-up criteria set for the site. For guidance, see Contaminated Sites Sampling Design Guidelines (NSW EPA 1995). Where applicable, the US EPA's Methods for Evaluating the Attainment of Cleanup Standards (1989) can also be used.

The validation report must assess the results of the post-remediation testing against the clean-up criteria stated in the RAP. Where targets have not been achieved, reasons must be stated and additional site work proposed to achieve the original RAP objectives.

The validation report should also include information confirming that all OEH and other regulatory authorities' licence conditions and approvals have been met. In particular, documentary evidence is needed to confirm that any disposal of soil off-site is done in accordance with the RAP.

Ongoing site monitoring reporting

Where full clean-up is not feasible, or on-site containment of contamination is proposed, the need for an ongoing monitoring program should be assessed. If a monitoring program is needed, it should detail the proposed monitoring strategy, parameters to be monitored, monitoring locations, frequency of monitoring, and reporting requirements.

3 REPORTING REQUIREMENTS

The following checklist has been prepared to help achieve a uniform approach to reporting on contaminated sites and ensure that environmental issues have been addressed to the satisfaction of OEH.

Where a consultant chooses to deviate from the requirements in this checklist, clear reasons should be given and any significant deviations listed.

3.1 How to use the checklist

Use the checklist on the following pages in conjunction with the objectives stated in the investigation stages (1-4).

The first column lists report headings to be included and subjects to be covered under each heading. The other columns refer to the principal reporting stages of contaminated site studies:

- preliminary site investigation report
- detailed site investigation report
- remedial action plan
- validation and monitoring report.

A tick in these columns indicates that the corresponding heading should be included in the report.

'(S)' denotes that a summary will be adequate if detailed information has been included in a previous report.

'(N)' denotes that the section should be included only if no further site investigation is to be undertaken.

'N/A' denotes that the report heading is not applicable and may be omitted.

Report sections and information to be included

Executive summary

- Background
- Objectives of the investigation
- Scope of works
- (Where appropriate) a summary of sampling results in tabulated format containing minimum, maximum, arithmetic average and 95% upper-confidence limit on arithmetic average for each analyte
- Summary of conclusions and recommendations.

Scope of work

- A clear statement of the scope of work.

Site identification

- Street number, street name and suburb
- Lot number and Deposited Plan number
- Geographic co-ordinates related to a nearby cadastral corner of a State survey Control Marker
- Locality map
- Current site plan with scale bar, showing north, local water drainage and other local environmentally significant features.

Site history

- Zoning – previous, present and proposed
- Land use – previous, present and proposed
- Summary of council rezoning, relevant development and building approvals records
- Chronological list of site uses, indicating information gaps and unoccupied periods
- Review of aerial photographs
- Site photographs (with date and location indicated on site maps)
- Inventory of chemicals and wastes associated with site use and their on-site storage location
- Possible contaminant sources and potential off-site effects
- Site layout plans showing present and past industrial processes
- Sewer and service plans

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓ (S)	✓ (S)	✓ (S)

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

Site history (continued)

- Description of manufacturing processes
- Details and locations of current and former underground and above ground storage tanks
- Product spill and loss history
- Discharges to land, water and air
- Disposal locations
- Relevant complaint history
- Local site knowledge of residents and staff – both present and former
- Summary of local literature about the site, including newspaper articles
- Details of building and related permits, licences, approvals and trade waste agreements
- Historical use of adjacent land
- Local usage of ground/surface waters, and location of bores/pumps
- Integrity assessment (assessment of the accuracy of information).

Site condition and surrounding environment

- Topography
- Conditions at site boundary such as type and condition of fencing, soil stability and erosion
- Visible signs of contamination such as discolouration or staining of soil, bare soil patches – both on-site and off-site adjacent to site boundary
- Visible signs of plant stress
- Presence of drums, wastes and fill material
- Odours
- Condition of buildings and roads
- Quality of surface water
- Flood potential
- Details of any relevant local sensitive environment – e.g. rivers, lakes, creeks, wetlands, local habitat areas, endangered flora and fauna.

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
✓	✓ (S)	✓ (S)	✓ (S)

✓	✓ (S)	✓ (S)	✓ (S)
---	-------	-------	-------

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

Geology and hydrogeology

- Soil stratigraphy using recognised classification methods, e.g. Australian Standard 1726, Unified Soil Classification Table
- Location and extent of imported and locally derived fill
- Site borehole logs or test pit logs showing stratigraphy
- Detailed description of the location, design and construction of on-site wells
- Description and location of springs and wells in the vicinity
- Depth to groundwater table
- Direction and rate of groundwater flow
- Direction of surface water run-off
- Background water quality
- Preferential water courses
- Summary of local meteorology

Sampling and analysis plan and sampling methodology

- Sampling, analysis and data quality objectives (DQOs)
- Rationale for the selection of:
 - Sampling pattern
 - Sampling density including an estimated size of the residual hot spots that may remain undetected
 - Sampling locations including locations shown on a site map
 - Sampling depths
 - Samples for analysis and samples not analysed
 - Analytical methods
 - Analytes for samples
- Detailed description of the sampling methods including:
 - Sample containers and type of seal used
 - Sampling devices and equipment e.g. auger type
 - Equipment contamination procedures
 - Sample handling procedures
 - Sample preservation methods and reference to recognised protocols, e.g. APHA or US EPA SW 846
- Detailed description of field screening protocols.

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
Include readily available information	✓	✓ (S)	✓ (S)

Include readily available information	✓	N/A	✓
---------------------------------------	---	-----	---

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

Field quality assurance and quality control (QA/QC)

- Details of sampling team
- Decontamination procedures carried out between sampling events
- Logs for each sample collected – including time, location, initials of sampler, duplicate locations, duplicate type, chemical analyses to be performed, site observations and weather conditions
- Chain of custody fully identifying – for each sample – the sampler, nature of the sample, collection date, analyses to be performed, sample preservation method, departure time from the site and dispatch courier(s)
- Sample splitting techniques
- Statement of duplicate frequency
- Field blank results
- Background sample results
- Rinsate sample results
- Laboratory-prepared trip spike results for volatile analytes
- Trip blank results
- Field instrument calibrations (when used).

Laboratory QA/QC

- A copy of signed chain-of-custody forms acknowledging receipt date and time, and identity of samples included in shipments
- Record of holding times and a comparison with method specifications
- Analytical methods used
- Laboratory accreditation for analytical methods used
- Laboratory performance in inter-laboratory trials for the analytical methods used, where available
- Description of surrogates and spikes used
- Per cent recoveries of spikes and surrogates
- Instrument detection limit
- Method detection limit
- Matrix or practical quantification limits
- Standard solution results
- Reference sample results
- Reference check sample results
- Daily check sample results
- Laboratory duplicate results
- Laboratory blank results
- Laboratory standard charts.

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
✓ (N)	✓	N/A	✓ (N)

✓ (N)	✓	N/A	✓
-------	---	-----	---

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

QA/QC data evaluation

- Evaluation of all QA/QC information listed above against the stated DQOs, including a discussion of:
 - Documentation completeness
 - Data completeness
 - Data comparability (see next point)
 - Data representativeness
 - Precision and accuracy for both sampling and analysis for each analyte in each environmental matrix informing data users of the reliability, unreliability, or qualitative value of the data
- Data comparability checks, which should include e.g. bias assessment – which may arise from various sources, including:
 - Collection and analysis of samples by different personnel
 - Use of different methodologies
 - Collection and analysis by the same personnel using the same methods but at different times
 - Spatial and temporal changes (because of the environmental dynamics)
- Relative per cent differences for intra- and inter-laboratory duplicates.

Basis for assessment criteria

- Table listing all selected assessment criteria and references
- Rationale for and appropriateness of the selection of criteria
- Assumptions and limitations of criteria

Results

- Summary of previous results, if appropriate
- Summary of all results, in a table that:
 - Shows all essential details such as sample numbers and sampling depth
 - Shows assessment criteria
 - Highlights all results exceeding the assessment criteria
- Site plan showing all sample locations, sample identification numbers and sampling depths
- Site plan showing the extent of soil and groundwater contamination exceeding selected assessment criteria for each sampling depth.

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
✓ (N)	✓	N/A	✓
✓	✓	✓	✓
✓	✓	✓	✓

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

Site characterisation

- Assessment of type of all environmental contamination, particularly soil and groundwater
- Assessment of extent of soil and groundwater contamination, including off-site effects
- Assessment of the chemical degradation products
- Assessment of possible exposure routes and exposed populations (human, ecological).

Remedial action plan

- Remediation goal
- Discussion of the extent of remediation required
- Discussion of possible remedial options and how risk can be reduced
- Rationale for the selection of recommended remedial option
- Proposed testing to validate the site after remediation
- Contingency plan if the selected remedial strategy fails
- Interim site management plan (before remediation), including e.g. fencing, erection of warning signs, stormwater diversion
- Site management plan (operation phase):
 - Site stormwater management plan
 - Soil management plan
 - Noise control plan
 - Dust control plan, including wheel wash (where applicable)
 - Odour control plan
 - Occupational health and safety plan
- Remediation schedule
- Hours of operation
- Contingency plans to respond to site incidents, to obviate potential effects on surrounding environment and community
- Identification of regulatory compliance requirements such as licences and approvals
- Names and phone numbers of appropriate personnel to contact during remediation
- Community relations plans, where applicable
- Staged progress reporting, where appropriate
- Long-term site management plan.

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
✓	✓	✓	✓
N/A	N/A	✓	✓ (S)

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

Report sections and information to be included

Validation

- Rationale and justification for the validation strategy including:
 - Clean-up criteria and statistically based decision-making methodology
 - Validation sampling and analysis plan
- Details of a statistical analysis of validation results and evaluation against the clean-up criteria
- Verification of compliance with regulatory requirements set by OEH, WorkCover and local government.

Ongoing site monitoring

- Ongoing site monitoring requirements (if any), including monitoring parameters and frequency
- Results of monitoring analyses including all relevant QA/QC reporting requirements stated above
- Ongoing site/equipment maintenance, e.g. containment cap integrity
- Details of party(ies) responsible for maintenance and monitoring program.

Conclusions and recommendations

- Brief summary of all findings
- Assumptions used in reaching the conclusions
- Extent of uncertainties in the results
- Where remedial action has been taken, a list summarising the activities and physical changes to the site
- A clear statement that the consultant considers the subject site to be suitable for the proposed use (where applicable)
- A statement detailing all limitations and constraints on the use of the site (where applicable)
- Recommendation for further work, if appropriate.

Guidelines for Consultants Reporting on Contaminated Sites

Preliminary site investigation	Detailed site investigation	Remedial action plan	Validation & ongoing site monitoring
N/A	N/A	N/A	✓
N/A	N/A	N/A	✓
✓	✓	✓	✓

-
- ✓ Include this section
 - (S) A summary is adequate if detailed information was included in an available referenced previous report
 - (N) Include only if there is to be no further site investigation
 - N/A Not applicable

4 REFERENCES

For the most up-to-date information refer to the list of guidelines made or approved under the CLM Act at:
www.environment.nsw.gov.au/clm/guidelines.htm.

NSW Environment Protection Authority documents

- NSW EPA (1994). Contaminated Sites: Guidelines for Assessing Service Station Sites, Environment Protection Authority, Sydney.
- NSW EPA (1995). Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Broad-Acre Agricultural Land, Environment Protection Authority, Sydney.
- NSW EPA (1995). Assessment of Orchard and Market Garden Contamination: Contaminated Sites Discussion Paper, Environment Protection Authority, Sydney.
- NSW EPA (1995). Contaminated Sites: Sampling Design Guidelines, Environment Protection Authority, Sydney.
- NSW DUAP/NSW EPA (1998). Managing Contaminated Land: Planning Guidelines. Department of Urban Affairs and Planning, Sydney.
- NSW EPA (1995). Provisional Water Quality Investigations Manual: Preferred Methods for Sampling and Analysis. Technical Report, Environment Protection Authority, Sydney.
- NSW Agriculture and CMPS&F Environmental (February 1996). Guidelines for the Assessment and Cleanup of Cattle Tick Dip Sites for Residential Purposes.
- NSW EPA (1997). Bananalands Contaminant Distribution Studies, Environment Protection Authority, Sydney.
- NSW EPA (1997). Guidelines for Assessing Banana Plantation Sites Environment Protection Authority, Sydney.

Australian and New Zealand Environment and Conservation Council (ANZECC), National Health and Medical Research Council and Natural Resource Management Ministerial Council documents

ANZECC / National Health & Medical Research Council (NHMRC) (January 1992). Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.

ANZECC & ARMCANZ (2000), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No. 4, October 2000.

ANZECC (April 1994). Financial Liability for Contaminated Site Remediation: A Position Paper.

NHMRC & NRMCMC (2004), Guidelines for Drinking Water Quality in Australia, National Health and Medical Research Council and Natural Resource Management Ministerial Council, Canberra.

National Environmental Health forum monographs

Imray, P. & Langley, A. (1996) Health-Based Soil Investigation Levels. National Environmental Health Forum Monographs, Soil Series No. 1, SA Health Commission, Adelaide.

Taylor, R. & Langley, A. (1996). Exposure Scenarios and Exposure Settings. National Environmental Health Forum Monographs, Soil Series No. 2, SA Health Commission, Adelaide.

Lock, W. H. Composite Sampling. National Environmental Health Forum Monographs, Soil Series No. 3, 1996, SA Health Commission, Adelaide.

South Australian Health Commission contaminated sites monograph series

- El Saadi, O. & Langley, A., eds (1991). *The Health Risk Assessment and Management of Contaminated Sites: Workshop Proceedings of the National Workshop on the Health Risk Assessment and Management of Contaminated Sites*, SA Health Commission, Adelaide.
- Langley, A. & Van Alphen, M., eds (1993). *The Health Risk Assessment and Management of Contaminated Sites: Proceedings of the Second National Workshop on the Health Risk Assessment and Management of Contaminated Sites*. Contaminated Sites Monograph Series No. 2, SA Health Commission, Adelaide.
- Edwards, J. W., Van Alphen, M. & Langley, A. (1994). *Identification and Assessment of Contaminated Land – Improving Site History Appraisal*. Contaminated Sites Monograph Series, No. 3, SA Health Commission, Adelaide.
- Olszowy, H., Torr, P. & Imray, P. *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia*, Contaminated Sites Monograph Series, No. 4, 1995, SA Health Commission, Adelaide.
- Langley, A., Markey, B. & Hill, H., eds (1996). *The Health Risk Assessment and Management of Contaminated Sites: Proceedings of the Third National Workshop on the Health Risk Assessment and Management of Contaminated Sites*. Contaminated Sites Monograph Series, No. 5, SA Health Commission, Adelaide.

Other reference documents

- APHA/AWWA/WEF (1995). *Standard Methods for the Examination of Water and Wastewater*. 19th edn. American Public Health Association, American Water Works Association, Water Environment Federation, Washington DC.
- BES (1992) *Guidelines for the Assessment of Contaminated Land in Queensland*. Chemical Hazards and Emergency Management Unit, Bureau of Emergency Services, Brisbane.
- NSW DWR, Technical Service Division (October 1992). *A Practical Guide for Groundwater Sampling*, 1st edn. NSW Department of Water Resources.

USEPA (1987). Data Quality Objectives for Remedial Response Activities. USEPA 540/G-87/003 Office of Emergency Response and Office of Waste Programs Enforcement.

USEPA (1998). Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, OSWER Directive 9355.3-0, October 1988. Office of Emergency and Remedial Response, US Environmental Protection Agency.

USEPA (1992). Guidance for Data Useability in Risk Assessment (Parts A and B). USEPA Publication 9285.7-09A&B, PB92-963356, April & May 1992, Office of Emergency and Remedial Response, Washington DC.

USEPA (1989). Methods for Evaluating the Attainment of Cleanup Standards Volume 1: Soils and Solid Media. (EPA 230/02-89-042) United States Environmental Protection Agency.

USEPA (1989). Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A). US Environmental Protection Agency, Washington DC.

USEPA (1991). Summary Report on Issues in Ecological Risk Assessment. United States Environmental Protection Agency, Washington DC.

USEPA (1992). Test Methods for Evaluating Solid Waste – Physical/ Chemical Methods SW-846, 3rd Edition. Office of Solid Waste and Emergency Response, US Environmental Protection Agency, Washington DC.

USEPA (1993). Reference Guidance for Planning for Data Collection in Support of Environmental Decision-Making Using the Data Quality Objectives Process USEPA EPA QA/G-4 Quality Assurance Management Staff.

