Draft

Draft Guidelines for Consultants Reporting on Contaminated Sites

EPA
NSW

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LIMITATIONS

These guidelines apply only to consultants reporting on the investigation and remediation of contaminated land. General guidance on the planning and execution of site investigations is given in the *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* (ANZECC/NHMRC 1992).

DISCLAIMER

The EPA has prepared this document in good faith, exercising all due care and attention, but no representation or warranty, expressed or implied, is made as to the relevance, completeness or fitness for purpose of this document in respect of any particular user's circumstances. Users of this document should satisfy themselves concerning its application to their situation, and where necessary seek expert advice.

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PREFACE

This document has been prepared by the Contaminated Sites Section of the NSW Environment Protection Authority (EPA) to assist environmental consultants, council staff and other interested parties in reporting on investigation into, and remediation of, contaminated sites.

Inquiries may be directed to the Manager, Contaminated Sites Section (see below).

These guidelines are scheduled for review in late 1995 and comments are welcome. Send written comments to the EPA by 10 November 1995 addressed to:

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1 INTRODUCTION

These guidelines have been prepared to introduce a uniform approach to reporting on investigations of contaminated sites. They should assist in the preparation of reports that systematically address the investigation of environmental management issues to the satisfaction of the NSW EPA.

2 INVESTIGATION STAGES

Contaminated sites management is broadly classified into the following stages:

- Stage 1—Preliminary site investigation
- Stage 2—Detailed site investigation
- Stage 3—Site remedial action plan
- Stage 4—Site validation and monitoring

Consultants' reports on the investigation of land contamination normally address these stages but are not necessarily limited to them. Individual reports may be presented separately or combined in various ways. It is essential, however, that each individual report stand alone and contain sufficient information to be readily understood. Where relevant information has been included in a previous report, a summary should be included in the latest report.

The objectives of these stages are discussed in the following sections. A summary of reporting requirements for each stage is included in Section 3.

2.1 Stage 1—Preliminary site investigation

The objectives of the preliminary site investigation are:

- to identify all past and present potentially contaminating activities
- to report on the site condition
- to provide a preliminary assessment of site contamination
- to recommend on further investigations.

The most fundamental step of the preliminary assessment is a site history appraisal, including a visual site inspection and assessment. It is important to review and to assess all relevant information about the site. The site history appraisal may be used to assess the potential for sitecontamination. A history of non-contaminating activities at a site may negate the need for further investigation.

Limited sampling and analysis may be included in the Stage 1 assessment. Through the assessment of sampling results, a 'snap shot' of contamination can be established.

Where the results of a preliminary sampling program demonstrate the potential for or the existence of contamination, a detailed investigation should be undertaken.

2.2 Stage 2—Detailed site investigation

The objectives of a detailed site investigation are:

- to address issues raised in the preliminary investigation
- to define the extent and degree of contamination
- to assess the possible routes for movement of contaminants, including air, surface water and ground water
- to assess potential effects posed by contaminants to human health and the ecosystem
- to obtain sufficient information to allow decisions on remediation options that will ensure that the remediated site is suitable for the proposed land use.

If the results of the detailed assessment indicate that the site poses unacceptable risks for human health or the environment, on-site or off-site, and with either the present or the proposed land use, then a remedial action plan should be prepared.

2.3 Stage 3—Site remedial action plan (RAP)

The objectives of a site RAP are:

- to set remediation goals that ensure that the remediated site will be suitable for the proposed use and will pose no unacceptable risk to human health or to the environment
- to determine the most appropriate remedial strategy
- to identify and obtain necessary approvals or licences from regulatory authorities.

The RAP should be based on the information contained in previous investigations and on the proposed land use. The RAP should demonstrate how the consultant proposes to reduce risks to acceptable levels and achieve the objectives for the site. The objectives of the remediation strategy and the clean-up criteria recommended should be clearly stated in the RAP. If an environmental impact statement or an approval from a government department is likely to be required, this should be detailed.

2.4 Stage 4—Validation and monitoring

Where remedial action has been carried out it is essential to validate that it has achieved the objectives stated in the RAP.

The degree of validation required will depend on:

- the degree of contamination originally present on the site
- 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. The NSW EPA's *Sampling Design Guidelines for Contaminated Sites* should be followed when validating the site. Where applicable, the US EPA's *Methods for Evaluating the Attainment of Cleanup Standards* 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 the targets have not been achieved, reasons for such failure must be stated and additional site work should be proposed that will achieve the original objectives.

The validation report should also include information confirming that all EPA licence conditions and approvals have been complied with. In particular, documentary evidence should be provided to confirm that any contaminated soil that has been disposed of off site has been placed in the landfill specified in the approval.

In situations where full clean-up is not feasible, or on-site containment of contamination is proposed, the need for a continuing monitoring program should be assessed. If required, this monitoring program should include the proposed monitoring strategy, parameters to be monitored, monitoring locations, frequency of monitoring and reporting.

3 REPORTING REQUIREMENTS

The following checklist has been prepared to assist in the implementation of a uniform approach to reporting on contaminated sites and to ensure that environmental issues have been addressed to the satisfaction of the EPA.

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

3.1 How to use the checklist

The first column lists report headings to be included and subjects to be addressed under each heading.

The rest refer to principal reporting stages of contaminated sites studies: the preliminary site investigation report, the detailed site investigation report, the remedial action plan, and the 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	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
Executive summary • Background • Objectives of the investigation • Scope of work • Summary of sampling results in a 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 and Deposited Plan Number • Geographic coordinates related to a nearby cadastral corner of a State Survey Control Mark • Locality map • Site plan with scale bar or dimensions and with north shown	✓	✓	✓	✓
Site history • Previous, present and proposed zoning • Previous, present and proposed land use • A chronological list of site uses including information gaps and unoccupied periods • Previous council rezoning, relevant development and building approvals • Review of aerial photographs • Historical use of adjacent land • Possible contaminant sources and potential off-site effects • Inventory of chemicals and wastes associated with site use • Site layout plan showing present and past industrial processes • Site photographs	✓	✓(S)	✓(S)	✓(S)

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
• Description of manufacturing processes • Relevant complaint history • Local knowledge of residents and staff—both present and former • Local literature including newspapers • Technical literature including building and related permits, licences, approvals • Disposal locations • Discharges to land, water and air • Product spill and loss history • Sewer and service plans • Identification of underground storage tanks and locations				
Site condition and surrounding environment • Topography • Site boundary condition such as fencing, soil stability and erosion conditions • Visible signs of contamination such as discolouration or staining of soil, bare soil patches • Visible signs of plant stress or discolouration both on-site and in the surrounding environment • Presence of drums, wastes and fill materials • Odours • Condition of buildings and roads • Quality of surface water • Site and community use of ground water • Flood potential • Identification of any relevant local sensitive environment, for example rivers, lakes, creeks, wetlands, local habitat areas, endangered flora and fauna	✓	✓(S)	✓(S)	✓(S)
Geology and hydrogeology • Local soil type • Soil stratigraphy • Location and extent of imported fill • A detailed description of well design and construction	Include readily available information	✓	✓(S)	✓(S)

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
• Site borehole or test pit logs showing stratigraphy • Depth to ground water table • Direction and rate of ground water flow • Direction of surface water run-off • Background water quality • Preferential water courses • Springs and wells in the vicinity • Local meteorology				
Sampling plan and sampling methodology • Sampling objectives • Rationale for the selection of: —sampling locations —sampling pattern —sampling density —sampling depths • Site map detailing sampling locations • Size of residual hot spots that may remain undetected with an estimated or known probability, if systematic sampling is undertaken • A detailed description of the sampling method including: —sample containers and type of seal used —sampling devices and equipment, for example auger type —method of equipment decontamination —method of sample preservation consistent with recognised protocols, for example APHA or US EPA SW 846	✓ (N)	✓	N/A	✓
Field quality assurance and quality control (QA/QC) • Implemented decontamination procedures • Sampling team identification • Logs for each sample collected, including time, location, initials of sampler, duplicate locations and type, chemical analyses to be performed, site observations and weather conditions	✓ (N)	✓	N/A	✓

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
• Chain of custody fully identifying, for each sample, the sampler, sample identification, date collected, analyses to be performed, sample preservation, and departure time from the site • Sample identifications including the description of labels, tape, waterproof marking pen and packaging material used • Intra- and inter-laboratory duplicate samples • Statement of duplicate frequency • Field blanks or background sample results • Appropriate rinsate sample results • Laboratory-prepared trip spike results • Trip blank results • Field instrument calibrations, where appropriate				
Laboratory QA/QC • A copy of signed chain of custody forms acknowledging receipt of samples included in shipments • Analytical methods used • Holding times conforming with method specifications • Laboratory accreditation for analyses required • Laboratory performance in inter-laboratory trials • Standard solution results and reference sample results, where applicable • Description of surrogates and spikes used • Per cent recoveries of spikes and surrogates • Laboratory duplicate analyses • Laboratory blank analyses • Laboratory check sample analyses • Laboratory standard charts • Instrument detection limit • Method detection limits • Matrix or practical quantitation limits • Sample quantitation limits	✓ (N)	✓	N/A	✓

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
QA/QC data evaluation	✓ (N)	✓	N/A	✓
• Evaluation of all QA/QC information listed above, including an assessment 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 that the data are reliable, unreliable or of qualitative value only • Data comparability checks should include, for example, bias assessment, which may arise from various sources: —the collection and analysis of samples by different personnel —the use of different methodologies —the collection and analysis by the same personnel using the same methods but at different times —spatial and temporal changes because of the system dynamics • Relative per cent differences for intra- and inter-laboratory duplicates				
Basis for assessment criteria	✓	✓	✓	✓
• A table listing all selected assessment criteria • Rationale for and appropriateness of the selection of criteria • Assumptions applied in the assessment • Limitations of the assessment criteria				
Site characterisation	✓	✓	✓	✓
• Assessment of type of soil and ground water contamination • Assessment of extent of soil and ground water contamination, including off-site migration potential • Assessment of the migration and degradation paths of the chemicals in question • Possible exposure routes • Potential off-site migration of contaminants				

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
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				
• A site plan showing all sample locations, sample identification numbers and sampling depths				
• Inferred extent of soil and ground water contamination exceeding selected assessment criteria shown on site plans for each sampling depth				
• Interpretation of results				
Remedial action plan	N/A	N/A	✓	(S)
• Remediation goal				
• 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, for example, fencing and erection of warning signs				
• Site management plan (operation phase):				
—site stormwater management plan				
—soil management plan				
—noise control plan				
—dust control plan				
—odour control plan				
—occupational health and safety plan				
• Duration of remediation				
• Suggested hours of operation				
• Contingency plans to minimise nuisance to and effects on surrounding environment and community				
• Long-term site management plan				

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

Report sections and information to be included	Preliminary investigation	Detailed investigation	Remediation action plan	Validation & monitoring
• Evidence of compliance with relevant regulatory authorities such as approval for disposal, copies of licences or environmental impact statement (EIS), statement of environmental effects (SEE). (Approval to dispose of contaminated materials must be obtained from the EPA or local council before the start of the operation.) • Communication strategy and points of contact during remediation stage. • Staged progress reporting if appropriate • Certificate of clearance, for example for asbestos removal				
Validation and monitoring	N/A	N/A	N/A	✓
• Validation strategy including: —clean-up criteria and statistically based decision-making methodology —validation sampling plan • Rationale and justification for the selected validation strategy • Details of a statistical analysis of results and a comparison with the clean up criteria • Evaluation of the results of pre- and post-remediation contaminant concentrations against the selected site assessment criteria • Compliance with appropriate licences and conditions by relevant regulatory authorities such as the EPA, WorkCover, local government				
Conclusions and recommendations	✓	✓	✓	✓
• Brief summary of all findings • Assumptions used in reaching the conclusions • Extent of uncertainties in the results • A clear statement that the consultant considers that the subject site is suitable for the proposed use • All limitations and constraints for the use of the site should be stated • Is further investigation required?				

✓—Include this section (S)—A summary is adequate if detailed information was included in a previous report.
(N)—Include only if there is to be no further site investigation. N/A—The report heading is not applicable and may be omitted.

4 REFERENCES

The following references may be useful in reporting contaminated site investigations.

ANZECC/NHMRC (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*. Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council, Canberra.

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