



Australian Government

Department of Education, Employment and Workplace Relations

MSS025014A Perform sampling and testing of contaminated sites

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to collect samples and conduct field tests/measurements while working safely in a (potentially) hazardous environment. Personnel work under the close supervision of environmental scientists or engineers and use established site health and safety plans and sampling/field testing procedures. They are required to continually monitor levels of risk and use prescribed safe working procedures and safety equipment. The specific details of sampling and field testing for groundwater and soils are covered in other relevant units. Details for other samples, such as surface water, air and radiation are covered in the units listed in the *Context of Assessment*.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water and soil)
- environmental compliance, auditing and inspection
- management of pollution and contaminated sites
- site remediation or rehabilitation.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024008A Recognise common geological landforms and samples

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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| 1 | Assist with preliminary site study | 1.1 | Locate and review relevant legislative, regulatory and/or planning requirements and register for contaminated sites |
| | | 1.2 | Confirm the site location, scope and purpose of the investigation and assigned tasks with supervisor |
| | | 1.3 | Source and review available site data, including site history, geology, hydrogeology and meteorological data |
| | | 1.4 | Summarise information to assist with preparation of a site chronology and identification of gaps or inadequacies in data, potential contaminants and areas of possible contamination |
| 2 | Prepare for site activities | 2.1 | Confirm the scope and purpose of sampling, testing and/or monitoring activities and data requirements with supervisor |
| | | 2.2 | Liaise with site controller to access site, identify locations of services and arrange for induction, clearances and/or permits, as necessary |
| | | 2.3 | Review risks posed by site contaminants and review the health and safety plan and safe work procedures specified for planned activities |
| | | 2.4 | Confirm the sampling/test methods, sampling/test points, numbers and types of samples and/or measurements with supervisor |
| | | 2.5 | Review specified sampling/test methods with close attention to the sequence of steps and details for each |
| | | 2.6 | Check the operation/calibration of required sampling equipment, test and/or monitoring instruments in accordance with relevant methods, |

- standards and manufacturer instructions
- 2.7 Check the operation/calibration of required sampling equipment, test and/or monitoring instruments in accordance with relevant methods, standards and manufacturer instructions
- 2.8 Ensure all required reagents, solutions and/or calibration standards are obtained and ready for field use
- 2.9 Assemble and safely stow all sampling equipment, test instruments, materials, containers, safety equipment and personal protective equipment
Arrange suitable transport to, from and around site as required
- 3 Assist with site inspection
- 3.1 Sketch, map and/or photograph the site features
- 3.2 Conduct a visual inspection to identify site features that may inform the need for and design of subsequent investigations
- 3.3 Collect preliminary samples, as directed, to help characterise possible contamination hazards prior to detailed investigations
- 4 Conduct sampling as directed
- 4.1 Locate sampling/test points and any services at the site
- 4.2 Work effectively with other site personnel during drilling excavation and/or survey operations to collect reliable samples, logs and measurements, as necessary
- 4.3 Follow specified procedures to minimise hazards and/or contamination of samples, self/others, equipment and environment
- 4.4 Collect and preserve required samples in accordance with sampling plan, relevant methods and/or standards
- 4.5 Record all information and label samples in accordance with traceability requirements

- 4.6 Record environmental conditions and/or atypical observations made during sampling that may impact on validity or integrity of samples
 - 4.7 Store and transport all samples back to base in accordance with specified method, chain of custody requirements and relevant codes
- 5 Conduct field tests and/or monitoring as directed
 - 5.1 Obtain sample or sub-sample for designated field test
 - 5.2 Check that all equipment, instruments, reagents and calibration standards are fit for purpose
 - 5.3 Set up and calibrate instruments as necessary to ensure safe operation and valid results
 - 5.4 Operate equipment/instruments in accordance with test method requirements
 - 5.5 Follow specified procedures to minimise hazards and/or contamination of samples, self/others, equipment and environment
 - 5.6 Perform required measurements and tests on all samples and standards, if appropriate, in accordance with specified methods
 - 5.7 Keep accurate, complete and traceable records of all field observations and test results
- 6 Clean, decontaminate and/or dispose of contaminated equipment and materials
 - 6.1 Inspect equipment to assess the degree of contamination
 - 6.2 Use specified procedures to remove material from the exposed outer surfaces of sampling/test equipment and personal protective equipment
 - 6.3 Use specified procedures and reagents to neutralise, wash and/or rinse exposed surfaces
 - 6.4 Collect rinsate blanks for analysis and preserve/store in accordance with specified procedure or standard

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| | | 6.5 | Stow items for transport only when thoroughly dry |
| | | 6.6 | Safely collect all debris and sillage from decontamination in accordance with relevant regulations and codes |
| 7 | Finalise site activities | 7.1 | Arrange for the safe disposal of all hazardous wastes in accordance with relevant regulations and codes |
| | | 7.2 | Ensure all site observations, sampling/test data and results are accurately transferred to the enterprise information management system |
| | | 7.3 | Store samples in accordance with method, chain of custody requirements and relevant codes, as necessary |
| | | 7.4 | Ensure samples are dispatched for analytical testing within recommended holding times |
| 8 | Process and interpret data | 8.1 | Review test/monitoring data noting atypical observations |
| | | 8.2 | Calculate required quantities using relevant test method and ensure values are consistent with expectations |
| | | 8.3 | Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required |
| | | 8.4 | Record processed results in accordance with enterprise procedures |
| | | 8.5 | Interpret trends in data and/or results and report atypical results promptly to appropriate personnel |
| | | 8.6 | Determine if obvious procedure or equipment problems have led to atypical data or results |
| | | 8.7 | Compare results with established threshold levels or environmental quality concentration limits, if relevant |

- 8.8 Finalise reporting of results in accordance with enterprise requirement
- 9 Maintain a safe work environment
 - 9.1 Clean all equipment, containers, work area and vehicles according to enterprise procedures
 - 9.2 Check serviceability of all equipment before storage
 - 9.3 Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
 - 9.4 Minimise the generation of wastes and environment impacts

Required Skills and Knowledge

Required skills

Required skills include:

- planning and preparing for working on contaminated sites
- communicating effectively with other site personnel, and negotiating access and support
- recognising hazards and assessing risks, using risk cards and following 'step back' procedures
- interpreting and consistently applying health and safety plans and safe work methods, using safety equipment and personal protective equipment
- 'reading the landscape', site observational and descriptive skills
- collecting samples in accordance with sampling plan/procedures, standards or instructions
- using appropriate techniques to preserve the integrity of samples and transport them safely
- demonstrating correct and safe use of sampling/field test equipment and/or analysers, including set-up, pre-use checks, calibration and performance checks
- using field test equipment/portable analysers to obtain reliable, quantitative results
- identifying and rectifying basic instrument faults
- identifying atypical data and samples and taking appropriate action
- solving technical problems and responding effectively to changed/unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- completing accurate records of site observations, sampling, test data and results
- writing/compiling concise and accurate reports
- maintaining, cleaning and decontaminating equipment and personal protective equipment
- following requirements for the safe collection and disposal of (hazardous) waste and preservation of the environment

Required knowledge

Required knowledge includes:

- specific legislation, regulations, standards and codes of practice related to contaminated sites
- common terminology used in sampling/testing of air, water and soil at contaminated sites
- common site hazard and risks, risk assessment techniques and use of risk cards
- properties and health risks associated with groups of contaminants, such as:
 - asbestos
 - heavy metals, such as lead, chromium and arsenic
 - chemical manufacture and industry wastes, such as acids/alkalis, resins, dyes, paints, solvents, fuels, oils, fertilisers, insecticides, herbicides, fungicides, aromatic hydrocarbons, phenols, chlorinated phenols, chlorinated benzenes and organochlorines

- safe work methods and equipment, personal protective equipment, and health, safety and environment requirements relevant to site activities undertaken
- overview of sampling plan design for contaminated sites, including preliminary sampling, non-targeted/grid sampling, targeted/judgemental sampling, and different sampling strategies for gas, water and soil
- sampling/test methods/standards relevant to site activities undertaken
- function of key components, operating principles of common sampling/test equipment relevant to site activities undertaken
- common procedure/equipment problems leading to atypical data/results
- labelling, chain of custody/traceability of samples and management of large volumes of data
- recording and reporting procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative, regulatory and planning requirements for contaminated sites • using accurate terminology to describe common contaminants and sampling/test/safety equipment • interpreting and applying site sampling/monitoring plans, sampling/test methods and standards, health and safety plans, and safe work method statements • observing site features accurately and recognising hazards • operating, maintaining and/or calibrating sampling and test equipment to obtain reliable samples and produce consistently valid and accurate results • interpreting gross features of data, identifying atypical results and making relevant conclusions • calculating results using appropriate units/precision • providing accurate, complete records of sampling and test observations, data and results • working safely for the protection of self and others

	following relevant legislative/regulatory requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: <i>MSS024006A Perform sampling and testing of water</i> <i>MSS025006A Collect and evaluate groundwater data</i> <i>MSS025007A Perform sampling and testing of soils</i> <i>MSS025009A Perform sampling and testing of air</i> <i>PSPRAD707A Monitor radiation.</i> The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: - vehicles - safety procedures, safe work methods, sampling and test methods, standards and equipment manuals - appropriate sampling containers sampling/test equipment, analysers, reagents and gases - specified safety equipment, decontamination equipment and reagents - digital camera - global positioning system (GPS), logbooks and data loggers, and computers.
Method of assessment	The following assessment methods are suggested: - inspection of samples collected by the candidate - review of measurements, test results, calculations and observations produced by the candidate - review of sampling/test records and reports completed by the candidate - feedback from supervisor about the candidate's ability to consistently apply enterprise procedures and work safely - oral and written questioning to check the candidate's understanding of the principles of sampling/testing of contaminated sites, operation of sampling equipment, test instruments/analysers and processing of data - observation of the candidate performing a range of sampling and testing tasks.

	In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental Management Basic Set • AS 4482.1:2005 Guide to the investigation and sampling of sites with potentially contaminated soil - non-volatile and semi-volatile compounds • AS 4482.2:1999 Guide to the investigation and sampling of sites with potentially contaminated soil –

	volatile substances • guidelines such as: • National Environment Protection Measure Assessment of Site Contamination - Schedule B (2) Guideline on data collection, sample design and reporting • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Site information and sources	Site information may include: • location of site, property details, and current and proposed use • site history details, such as: • site plans, zoning and adjacent land use • current and previous present owners, occupiers, users and contaminating uses/activities • current and previous buildings and structures • site industrial processes, raw materials, products, wastes/discharges and waste disposal locations • product spills/losses, incidents and accidents • sewer and other utilities/services, plans and previous power sources • chemical storage and transfer areas • earth moving activities • interviews, consultations and complaints Sources of information may include: • government departments, such as: • environment, environmental protection, conservation, primary industry, water resources, lands and survey, and planning • agencies, such as: • Bureau of Meteorology • Geoscience Australia • libraries and environmental data sets • companies and employees, community representatives and historical societies

Visual inspection of the site	A visual inspection of the site may include: • current uses of site • disturbed, coloured or stained soil, and bare soil patches • disturbed or distressed vegetation • unusual odour • quality of surface water and surface water drainage • condition of buildings, floors and roads • presence of chemical containers and holding tanks • presence of fill, containment areas, sumps, drains, landfill, and obvious surface hazards, such as asbestos • underground structures that may be associated with sub-surface contamination • condition of materials storage/handling facilities, and solid/liquid waste disposal areas • evidence of off-site migration, on-site spillage of dangerous goods, and staining/sheens on surface water
Scope and purpose of sampling, field tests and/or monitoring	Scope and purpose of sampling, field tests and/or monitoring may include: • determining nature of contamination • determining concentration and distribution of contamination • identifying types and concentrations of contaminants for assessing potential exposure levels/risks • monitoring site conditions to check licence compliance or determine need for remedial action • rapid analysis of samples that may change between collection and analysis • rapid sample analysis during remediation activities • determining if clean-up has been achieved • screening of samples in the field
Samples	Samples may include: • air, soil gases and dust • soils • surface water and groundwater • radiation • replicates, field and trip (transport) blanks, rinsate blanks and background samples
Field tests and monitoring	Field tests and monitoring may include:

	• soil profile measurements and depth of fill • measurement of bores and water depth • screening of gas/vapours, soil and water samples using: • colour and texture • bioluminescence/toxicity test kits • colorimetric methods and dye shake tests • pH, electrical conductivity, redox potential, temperature, dissolved oxygen and ammonia concentration • photoionisation detectors (PID) • flame ionisation detectors (FID) • gas detectors • portable infrared analysers for methane and carbon monoxide (CO) • portable X-ray fluorescence spectrum analyses • field gas chromatography • measurement of radiation
Hazards/risks	Hazards/risks may include: • solar radiation, dust and noise • exposure to contaminants, such as chemicals, biohazards and radiation • working on uneven surfaces and in confined spaces • manual handling of heavy objects • crushing, entanglement and cuts associated with moving machinery and hand tools • heavy vehicle traffic on site
Safety procedures and equipment	Safety procedures may include: • preparation/approval of site health and safety plan for sampling/testing, and safe work permits/approvals • use of safe work method statements, site safety induction, risk cards, 'step back' and safety checks • use of (disposable) personal protective equipment • ensuring two persons are present • monitoring of atmosphere for hazardous gases • working upwind of known contaminants • prohibition of eating, drinking and smoking • decontamination facilities, procedures and materials for plant, equipment and personnel • safe collection and disposal of hazardous waste • careful handling of glass containers • separation of heavy equipment into smaller

	units/cases for transport • reporting procedures for safety problems • emergency procedures, access for emergency vehicles • regular medical checks Safety equipment may include: • personal protective equipment, such as boots, helmets, gloves, eye and ear protection, overalls, face masks and filters, respirators, encapsulated suits, safety harness and safety torches • gas monitors, gas detectors, personal monitors, environmental monitors and radiation dosimeters • communication equipment (e.g. two-way radio and mobile phone) • materials safety data sheets (MSDS) • first aid equipment
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and consumables, and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.