CPSS
CERTIFIED PROFESSIONAL SOIL SCIENTIST

Certified Professional Soil Scientist Recognised Competencies for Contaminated Site Assessment and Management

SOIL SCIENCE AUSTRALIA

Soil Science Australia was established in 1955 to work toward the advancement of soil science in the professional, academic and technical fields.

The objectives of the Society are to

- promote the field of soil science
- further the expertise in soil science of members
- provide a forum for discussion on soil science
- increase government and community awareness of the importance of soil science
- liaise and cooperate with other organisations in support of mutual interests
- encourage research and extension in soil science and
- promote wise management of the soil resource throughout Australia.

Members of Soil Science Australia can apply for and maintain professional accreditation within the field of soil science through the Certified Professional Soil Scientist (CPSS) accreditation scheme.

Further details on the Society can be found at www.soilscienceaustralia.org and on professional soil scientist accreditation at www.cpss.com.au.

Recognised competencies for contaminated site investigations, remediation and validation including specialties of health risk assessment and mine waste characterisation.*

This document presents the minimum standards and competencies expected for Contaminated Site Assessment and Management (CSAM) under the Certified Professional Soil Scientist (CPSS) accreditation program managed by Soil Science Australia.

Soil scientists accredited under these recognised competencies must already be accredited as Certified Professional Soil Scientists.

A CPSS CSAM is a professional soil scientist with specialist skills in the assessment and remediation of soil, groundwater and vapour. A specialist in site contamination with soil science knowledge provides specific, unique skills and insights into site contamination, especially in relation to sampling and the soil physical, chemical and biological processes of movement and likely spatial distribution of soil contaminants.

A CPSS CSAM has the expertise to undertake investigation, remediation design, validation and evaluation of contaminated land to determine it is fit for purpose and determine the requirements for further investigation.
All Certified Professional Soil Scientists are required to observe the Soil Science Australia and CPSS Code of Ethics, a public statement of principles, values and behaviours expected of members of the society, and the Rules of Conduct.

*These competencies will be reviewed by the CPSS Board bi-annually.

Soil Science Australia –Standards for Professionals in Soil Science with a recognised competency in Contaminated Site Assessment and Management.

The following Contaminated Site Assessment and Management (CSAM) standards identify the competencies that can be reasonably expected of a CPSS CSAM and are in addition to the minimum requirements for Certified Professional Soil Scientist accreditation, which can be found at www.cpss.com.au.

The term "Contaminated Site" means land or water where any chemical substance or waste has been added as a direct or indirect result of human activity at above background level and represents, or potentially represents, an adverse health or environmental impact (extracted from the 2013 NEPM amendment).

Section 1 - Core Knowledge for Contaminated Site Assessment and Management
(1 Skill set with 6 Competencies)

Competency	Minimum Standard
K-1	Demonstrates understanding of Government policy and regulatory requirements as they relate to contaminated sites; for example Federal (National Environment Protection (Assessment of Site Contamination) Measure); State legislation and regulations.
K-2	Understands sample selection for analysis to allow extrapolation and interpolation of field observations and measurements, as well as clarify the purpose of an investigation, develop a geophysical conceptual site mode (CSM), develop data quality objectives (DQOs) and identify significant data gaps.
K-3	Supervises and/or manages the planning, implementation, reporting, and evaluation of soil science aspects of contamination projects using recognised scientific principles.
K-4	Interprets behaviour of different contaminants in soil gas, soil and groundwater through an understanding and interactions with specialists in the fields of risk assessment, toxicology, receptor pathway analysis, groundwater flow and modelling and integrates contributions from experts in these fields into the analysis of a site.
K-5	Understands current remediation design and techniques commercially available in Australia and the applicability of these techniques to project factors such as timeframe, site size, contaminant/s and concentration.
K-6	Understands the process of a site-specific assessment; both the initial assessment of human health risks and ecological risks through comparing levels of contaminants on the site with appropriate investigation or screening levels or, if necessary, by undertaking a site specific risk assessment.

Section 2 - Practice of Contaminated Site Assessment & Management (3 Skill sets)

Skill set 1: Planning (6 Competencies)

Competency	Minimum Standard
P-1	Consults effectively with clients and regulators on requirements, obtains pre-existing site information and develops an investigation proposal including purpose, context, delivery schedule, cost, and appropriate occupational health and safety considerations.
P-2	Advises on the level of data needed to address the questions being posed during the assessment of a site for contamination and scopes the problem to ensure that sufficient background data is available prior to accurately designing each stage of an investigation.
P-3	Devises the site conceptual model as set out in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B2: Guideline on Site Characterisation (NEPM 2013 amendment). Available at: http://www.comlaw.gov.au/Details/F2013L00768
P-4	Interprets pre-existing landscape/soil/groundwater data and land suitability information to prepare a CSM that addresses the inferred extent of contamination and how contaminants migrate.
P-5	Demonstrates the necessary quality assurance and control required for sampling analysis planning including activities necessary to ensure precision, accuracy (data point QA/QC) and representativeness (data set QA/QC).
P-6	Understand limitations of various sampling methodologies in the context of soil science as related to the distribution and concentration of contaminants of soil throughout the soil profile.

Skill set 2: Investigation (8 Competencies)

Competency	Minimum Standard
I-1	Determines where grid-based and judgement based samples (e.g. from pits, boreholes) and validation samples should be located with regard to landscape features, pre-existing information (e.g. environmental site history, CSM) and relevant guidelines and regulations.
I-2	Recognises rock types and understand their relationships to soil formation and soil type and the impact on contamination migration.
I-3	Characterises the site appropriately, including description of topography, vegetation and infrastructure as well as soil and fill materials. Describes soil using nomenclature in the Australian Soil and Land Survey Field Handbook, 3rd edition (known as the "Yellow Book") and/or with the Unified Soil Classification scheme.
I-4	Accurately identifies the delineation between fill, disturbed natural and in-situ natural soil.
I-5	Samples the site in accordance with the Sampling and Analytical Quality Plan, including consideration of quality assurance and quality control requirements, relevant OH&S guidelines and technical guidelines.
I-6	Installs piezometers that meet the requirements of the Data Quality Objectives and collects vapour samples or groundwater samples from confined or unconfined aquifers.
I-7	Uses field equipment correctly and safely to measure and screen for soil, gas and water parameters, e.g. field screening using photoionisation detectors (PIDs), gas analysers (FID, GA2000, etc.) for volatile and semi-volatile components, and water quality meters.
I-8	Understands appropriate sample handling and preservation techniques for different analytes and sampling media, including an understanding of laboratory holding times.

Skill set 3: Interpretation (6 Competencies)

Competency	Minimum Standard
C-1	Basic knowledge of laboratory techniques (chemical, physical and administrative) for error, quality control and assurance.
C-2	Understands the nature and limitations of the analysis selected, including cation exchange capacity, ASS, total recoverable hydrocarbons and soil fertility analytes.
C-3	Interprets vertical and horizontal extent of contamination using observation and measurement, statistical analysis, modelling, or other valid methods.
C-4	Understands and applies recognised scientific principles to interpret field observations and laboratory analysis and selects appropriate investigation and/or screening levels for the purpose of assessing potential ecological and human health risk.
C-5	Presents field observations, photographs (soil profiles and site), bore or test pit logs and plans in a readily understood manner in reports.
C-6	Identifies data gaps remaining and recommends appropriate actions in accordance with NEPM Schedule