



Statement of Qualifications

site investigation and remediation

Geosyntec 
consultants

About Geosyntec

Geosyntec Consultants is a specialised consulting and engineering firm that works with private and public sector clients to address complex problems involving the environment, natural resources and sustainability for both their new ventures and their existing facilities. Geosyntec has engineers, geologists, environmental scientists, and other technical and project staff based in offices in North America, Australia, Ireland, Southeast Asia, and the United Kingdom.

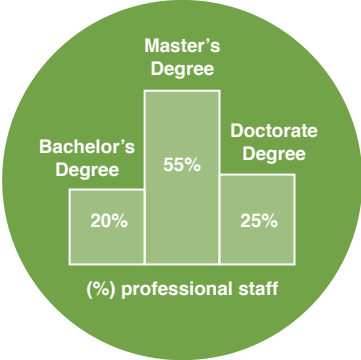
Our private sector clients come from a variety of industries including food and agriculture, oil and gas, chemical, aerospace, pharmaceutical, diversified manufacturing, advanced technology, power and utilities, defence and environmental management. Clients also include regional and national developers, large commercial property owners, and law firms. Our public sector clients are departments and agencies of municipal, state/provincial, regional, and national governments.

Since our founding in 1983, we have grown based on the application of sustainability principles to projects involving environmental contamination studies and remediation; natural resources assessment and restoration; compliance management for air emissions, wastewater discharges, and waste disposal; and engineering and design environmental restoration, water resources, and civil infrastructure projects. We also provide construction management and quality assurance services in support of these practices.

Our university liaisons, internally- and externally-funded applied research, and “first-to-field” deployment of emerging technologies provide us with a differentiated set of tools to use in creating innovative, high-value solutions to challenges involving the environment, natural resources, and geotechnical infrastructure.

Our goal is to provide the best possible service and value to our clients, to advance technology in our primary practice areas, and to provide a stimulating, progressive, and friendly work environment that will enable us to continue to recruit and retain great staff. At Geosyntec, our vision of success builds on our internal culture of technical excellence, the outstanding qualities of our staff and their common commitment to our core values, and our long-held belief that exceptional client service coupled with exceptional project solutions will result in long-term, mutually rewarding business solutions. We bring our clients the dedicated, personal service of a small, local firm, backed by the knowledge and experience of a larger, established firm.

We are known for
our technology
leadership, broad
experience, and
exceptional client
service.



Geosyntec attracts some of the brightest, most creative scientists and engineers in the consulting and engineering business. Our professionals have exceptional technical and problem-solving skills and are great team players who care about their clients. **More than 80% of our technical staff have advanced degrees in engineering, scientific, and business management disciplines.** We have an exceptionally high staff retention rate - our staff stay with Geosyntec because of our interesting clients, projects, and technology development initiatives. We have created a supportive work environment that manifests itself in the quality of our work products, our trust-based relationships with academic and regulatory agency colleagues, and the value and problem solving which our clients tell us we bring to every assignment.

We currently have offices located world-wide, with 55 offices in the United States, 3 offices in Canada, 3 in Australia, 1 in Ireland, 3 in Southeast Asia (Malaysia, Thailand), and 6 offices in the United Kingdom.





Services We Offer



Environmental Studies and Remediation

- Site Investigation and Conceptual Site Model Development
- Remediation Strategy, Design and Implementation
- Life Cycle Assessments for Sustainability Evaluations
- Sediment Assessment and Remediation
- Specialized In Situ and Ex Situ Treatment Technologies
- Risk Communication and Community Consultation
- Subsurface Vapour Intrusion to Indoor Air
- Design and Implementation of Vapour Mitigation Systems
- Data Management, Visualization, and Analysis
- Contaminated Site Auditing Services (WA, NSW, ACT)



Infrastructure Assessment, Engineering, and Design

- Wastewater Treatment Planning and Design
- Waste Containment Facility Planning and Design
- Brownfields Redevelopment Planning and Design
- Geohazard/Earthquake Characterisation and Mitigation
- Geotechnical Infrastructure/Foundation Engineering



Natural Resources Assessment and Restoration

- Watershed and Stormwater Management
- Water and Natural Resources Conservation and Management
- Surface Water/Groundwater Supply Studies and Development
- Erosion and Sediment Control
- Natural Resources Damage Assessment

Within these service areas, the Geosyntec Australia team has extensive experience working in the following fields:



Site Characterisation Services:

- Vapour intrusion
- Soil/sediment/groundwater sampling
- Characterisation of recalcitrant compounds (DNAPLs / LNAPLs, chlorinated organics, energetics, heavy metals, petroleum hydrocarbons, PCBs, etc.)

Remediation Services:

- Development of remedial strategy/ cost benefit analyses

- Engineering design and build
- Vapour mitigation systems
- Innovative in situ and ex situ technologies
- Remediation of challenging environments (bedrock/clay)

Other Services:

- Health/ecological risk assessment
- Risk communication to stakeholders
- Sustainability life cycle analyses

The following table provides a general overview of the types of projects a selection of our Australian-experienced staff have worked on for remediation, oil and gas, mining, and development industry clients. Given their range of experience, these key individuals have a solid technical background and an exceptional understanding of the issues facing your facility.

Practitioner	Years of Experience	Strategy, Design and Implementation	Site Assessment	Risk Assessment	Risk and Stakeholder Communication	Sustainable Remediation	Site Auditing	Due Diligence	Air Quality	Litigation Support Work	Vapour Mitigation Design /Vapour Intrusion Assessment
Garry Smith PhD, MPlan	30	•	•	•	•	•			•		
Dave Reynolds, PhD	22	•	•		•	•	•	•		•	
Julie Konzuk, PhD	21	•	•			•				•	
Lange Jorstad PhD, RPGeo	17	•	•	•	•	•	•	•		•	
Todd McAlary, PhD	25	•	•			•			•	•	•

Our staff have an excellent understanding of both the business and regulatory environments our clients face.



Solutions for Remediation and Site Characterization

Remediation of Complex Contamination Chemistry and Impacts (Dr. Julie Konzuk - Lead)

Geosyntec has developed specialist capabilities for remediation of complex groundwater, sediment, surface water, and soil problems and is undertaking several innovative projects in Australia. Particular skills include:

- Development of smart, sustainable remedial strategies, incorporating low-cost treatability testing, cost-benefit evaluations and life-cycle analyses
- Design and deployment of innovative in-situ technologies including bioremediation, chemical oxidation, chemical reduction (ZVI), and smouldering combustion (STAR)
- Remediation of a wide range of recalcitrant compounds, including chlorinated organic compounds, metals (arsenic, heavy metals), non-aqueous phase liquids (NAPLs), energetics, PCBs, PAHs, emerging contaminants, etc.
- Design and implementation of remedial programs in complex hydrogeological environments (e.g., low permeability/fractured clays/bedrock)

Geosyntec is widely recognized for its work in pioneering and developing innovative technologies that provide sustainable, lower-cost remedial solutions to some of the most complex environmental problems. Nearly 10% of Geosyntec's annual revenue supports applied research programs geared towards technology development and commercialisation.

Some of the specialist capabilities which our remediation scientists and engineers have developed and are offered in Australia by Geosyntec include:

- Bioremediation of chlorinated compounds in groundwater through biostimulation or bioaugmentation with the KB-1[®] mixture of *Dehalococcoides* (Dhc), *Dehalobacter* (Dhb) and *Dehalogenimonas* (Dhg) bacteria;
- Remediation of coal tars, creosotes, petroleum hydrocarbons (tank bottoms, sludges, crude oil) diesel range organics, oils & greases, mineral oil, and solvent/oil mixtures using smouldering combustion in a self-sustaining manner without external energy input; and
- Electrokinetically enhanced rapid penetration and distribution of biological and chemical amendments into low permeability soils and rock to treat long term sources of contamination to aquifers.

Few independent environmental consulting firms can match the varied remediation experience of Geosyntec's personnel.



Sustainable Resource Conservation (Dr. Garry Smith - Lead)



Sustainability and efficiency have long been goals for efficient and effective remediation proposals and designs. At Geosyntec, we look at sustainability as both a project approach and a project goal rather than just the project outcome.

Projects that identify and embrace sustainable approaches benefit from positive messaging that helps build positive relationships with stakeholders from regulators to the surrounding community. Additionally, successful projects with true cost savings and resource conservation achievements result in more sustainable and profitable operations for our clients.

Sustainably designed site remediation contributes to urban renewal through social, environmental and economic achievements. Effective project planning derives benefits in securing regulatory approval, winning stakeholder support for project initiation, and minimising disruptions during project implementation



Energy and utility costs also represent a substantial portion of total variable costs for our clients. The Geosyntec team offers expertise in optimising resource consumption, by examining the demands of your process. We consider a remediation site's proposed consumption of electrical power, heating fuel, process or cooling water, and waste generation profile to provide a comprehensive understanding of consumption patterns for cost-effective remediation plan decision making. Assessing the plant's energy "footprint" is an important first step in uncovering opportunities for energy reduction, waste minimisation, and hence, cost savings.

Geosyntec staff evaluates the following when identifying high priority opportunities for cost savings:

- Cost of water consumption and wastewater discharge over time
- Energy costs and CO₂-equivalent footprints
- Energy costs associated with water use (heating, pumping, water treatment, etc.)
- Regulatory costs (permits, compliance assessment, etc.)
- Costs for water management measures (staff time and resources, equipment and materials)
- Site constraints
- Energy reduction incentives
- Relationships with stakeholders (suppliers, financial institutions, employees, regulators, customers, shareholders, neighbours and local communities)

Resource conservation can also take the form of recovering or minimising waste streams from all sources within a manufacturing facility. Our team has worked with sustainability and recycling aspects of remediation sites worldwide, and has been successful for our clients from both a technical and community relations viewpoint reflecting a balanced and positive commitment to local communities.

Pollution Prevention (P2) or Energy Efficiency (E2) programs are a strong additional step towards resource conservation, but Geosyntec also brings the ability to execute these plans. From identification of opportunities, cost analysis and treatability, through preliminary and detailed engineering, Geosyntec is able to successfully and sustainably help your facility conserve resources.

Due Diligence, Litigation Support and Auditing Services (Dr. David Reynolds - Lead)



Geosyntec has two accredited contaminated site Auditors on its staff, offering services in New South Wales, Western Australia, and the ACT. Our Auditors have extensive local project experience with the property development, industrial, oil and gas, mining, and Government sectors. Geosyntec approaches contaminated site auditing in a competent, professional, responsive and timely manner and leverages its long established relationships with local regulatory authorities for the ultimate benefit of our clients. Our Auditors work proactively with the client, consultant and regulators to ensure that the audit objectives and information requirements are clearly communicated, resulting in an efficient audit delivery process.

Geosyntec also has extensive experience in environmental and social due diligence projects for the real estate, mining, oil and gas, and commercial sectors. Geosyntec focuses on realistic assessment of potential liabilities and feasible and practical remediation solutions as well as hazards, risks, and the many intangibles involved in complex land transactions and developments.



As an outgrowth of the technical expertise and reputation of our senior practitioners, Geosyntec has become a trusted technical resource to leading law firms in Australia. We provide the specialised expertise necessary for lawyers to counsel their clients and advocate for client interests on a wide range of matters related to environmental management, compliance, enforcement, toxic tort, and other litigation and business transactions.

Geosyntec offers impressive qualifications and capabilities to address the most challenging problems in our principal areas of practice. Our senior practitioners are adept at quickly grasping the scope and nuances of key issues and in developing sound, defensible technical advice for our clients. Our senior staff includes engineers and scientists who are recognised authorities in their fields. Many of these senior practitioners have participated in key research developments and pioneered technical approaches that form the underpinning for their practices. We continue to be on the cutting edge of technological and regulatory advances, such as those related to vapour intrusion, sustainability, innovative waste management approaches, and remediation of emerging contaminants and contamination in difficult to treat locations.

Geosyntec has a strong internal culture of quality coupled with exceptional client service. We provide the legal community with high quality, reliable consulting services and results that can be used with confidence.

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projects for the real estate, mining, oil and gas,
and commercial sectors.

Subsurface Vapour Intrusion to Indoor Air (Dr. Todd McAlary - Lead)



Geosyntec has an international reputation as one of the preeminent consultants for assessing and managing subsurface vapour intrusion to indoor air. We have built our vapour intrusion practice on two decades of applied research and practical experience in this area. Our professionals co-developed the most widely used mathematical model for vapour intrusion to indoor air (Johnson and Ettinger, 1991), pioneered soil gas sampling and analysis methods to assess vapourisation of volatile chemicals from groundwater (Kerfoot, 1988), and conducted pioneering basic research into vapour diffusion through unsaturated soil (McAlary, 1988). Since then, we have conducted vapour intrusion assessments internationally, developed a wide variety of innovative and cost-effective assessment methods, and established a reputation for resolving vapour intrusion issues to the satisfaction of multiple stakeholders quickly and effectively.



Geosyntec professionals have developed several innovative methods to evaluate the mechanisms of subsurface vapour transport. We pioneered the use of High Purge Volume Sampling to characterise the pneumatic conductivity of unsaturated soil and bedrock using gas phase pumping tests, which can be used to demonstrate the presence of geologic barriers to vapour intrusion, assess concentrations between and beyond probe locations, and develop remedial design data, all in a test of less than 10 minutes. We have also developed methods to demonstrate aerobic degradation of hydrocarbons, including stable isotope analysis of soil vapour samples, to demonstrate intrinsic aerobic degradation beneath a building, and demonstrate influences of infiltration and clean water lenses on off-gassing from the water table.

Geosyntec performed applied research over a 3-year period to develop the Waterloo Membrane Sampler, and commercialise it for use in vapour intrusion assessments. Passive samplers have several benefits over conventional sampling, including that they are easier to use, less expensive, smaller and more discrete, easier to ship, and they provide long-term average concentrations, which are more relevant for assessing human health risks. Geosyntec continues to work with the University of Waterloo to expand the applicability and find new uses for passive samplers.



Geosyntec has a long history of gas and soil vapour mitigation system design, construction, operation, trouble-shooting and repair for both passive and active systems. We have provided engineering support for all elements of the systems including passive barriers, air filtration, sub-slab depressurisation systems, and combinations of these elements. We have also utilised both manual and automated monitoring and alarm systems along with remote sensing systems to evaluate the effectiveness of the individual systems and corresponding upgrades, if needed. Geosyntec has provided the engineering design and managed the construction and operation of these systems for a large retailer at several Brownfield sites including sites overlying inactive landfills.

Geosyntec professionals have developed several innovative methods to evaluate the mechanisms of subsurface vapour transport.

Contaminated Site Investigation and Characterisation (Dr. Lange Jorstad - Lead)



The ability to effectively characterise and manage risks to public health and the environment from contaminated land requires an expert understanding of the contaminant distribution and potential exposure pathways. Geosyntec's senior practitioners include internationally-renown pioneers in specialist and emerging fields of environmental assessment and remediation, whose expertise has been applied to some of the most challenging contaminated sites in Australia.

Geosyntec scientists and engineers combine advanced academic training and broad experience with modern and innovative site investigation techniques to deliver robust site assessments. A hallmark of our service is efficient site characterisation, even at sites that exhibit complex geological and hydrogeological settings. Our site investigation services include:

- Critical evaluation of historical site operations to identify and prioritise potential contamination risks
- Design of focused and statistically-based investigation programs for soil, soil vapour, surface water, groundwater and sediment
- Hydrogeological analysis including aquifer characterisation, flow field definition, hydraulic testing and evaluation of surface water/groundwater connectivity
- Experience with high-resolution investigation techniques including membrane interface probes, optical screening tools, and discrete-depth groundwater profiling to provide rapid and cost-effective subsurface characterisation
- Evaluation of NAPL thickness, distribution, mobility and recoverability
- Soil vapour characterisation and vapour intrusion assessment using passive and active sampling methods
- Microbiological characterisation

Geosyntec has particular expertise in the analysis and interpretation of site data to identify and quantify contaminant exposure pathways, support quantitative risk assessments, estimate environmental liabilities, and form the basis of regulatory compliance assessment and site management decisions. Key services include:

- Development and refinement of robust conceptual site models to describe contamination exposure risks and prioritise management efforts
- Evaluation of groundwater chemistry and microbiology to assess natural and enhanced contaminant attenuation potential
- Analytical and numerical modelling of contaminant transport in groundwater and soil vapour
- Mass flux and mass discharge assessment
- Advanced data management and spatial analysis using GIS and 3-D visualisation software applications to aid in site characterisation and management decisions

JULIE KONZUK, PH.D.
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Career Summary

Dr. Konzuk has over two decades of environmental consulting and research experience in Australia and North America. During this time, she has implemented remediation programs targeting cleanup of soil and groundwater contaminated with chlorinated solvents (chlorinated ethenes, ethanes and methanes), non-aqueous phase liquids (NAPLs), unexploded ordnance and munitions constituents (e.g., perchlorate and nitroaromatics), heavy metals, nitrated and chlorinated benzenes, and chlorofluorinated compounds (Freon). Julie has directed, managed, or provided specialist technical support for multiple projects ranging from overall strategy development and site investigation to laboratory treatability studies, and design/implementation of innovative in situ remediation technologies. Julie also has experience with litigation support (insurance recovery and expert witness testimony in the New South Wales Land and Environment Court), third-party independent peer reviews and has multiple publications (including guidance documents and journal articles).

Specialties:

- ✓ Remedial investigation/design and implementation
- ✓ Remediation strategy
- ✓ Treatability studies
- ✓ Technical peer review
- ✓ Fractured bedrock remediation
- ✓ Litigation support

Selected Australian Project Experience

Chemical Manufacturing Facility, Botany Bay, NSW. Dr. Konzuk provided design and technical support during implementation of four enhanced in situ bioremediation (EISB) pilot trials for treatment of a plume containing 1,000s mg/L chlorinated solvent concentrations. The trials successfully demonstrated the ability to overcome inhibition related to high concentrations of ethylene dichloride (EDC) and low pH groundwater with engineering controls. The trials achieved biodegradation of >1,000 mg/L EDC and other chlorinated ethenes, methanes and ethanes to innocuous end products, with a total mass degraded exceeding 3,000 kg over the 18-month pilot trial duration.

Dry Cleaners Facility, Sydney, NSW. Dr. Konzuk provided treatability study, remedial design, and technical support for pilot and full-scale implementation of EISB treatment of tetrachloroethene (PCE) dense, non-aqueous phase liquids (DNAPL) source area and plume. Pilot testing indicated successful stimulation of biodegradation of PCE DNAPL with enhancement of the dissolution of the DNAPL between 2-4 times and clean-up of the downgradient and off-site plume to below cleanup criteria. The full-scale system successfully met the interim remedial goals specified by the NSW Land and Environment Court and, in some areas of the plume, met the final remedial goals within the first 8 months of operation. Dr. Konzuk also provided expert witness support in the landowner's successful appeal in the NSW Land and Environment Court.

Chemical Manufacturing Facilities, Melbourne, VIC. Dr. Konzuk provided treatability study (in partnership with a local laboratory) and desktop feasibility study evaluations of EISB for two fractured bedrock sites impacted with chlorinated/nitrated benzenes and aniline DNAPL. The evaluations illustrated that only a portion of the contaminants were likely to be effectively treated with EISB and that high concentrations within the DNAPL source zones were inhibitory to biological activity. Within the plume, the lower concentrations were demonstrated to be treatable with EISB. A cost-benefit analysis indicated that the cost effectiveness of an EISB remedy within the plume was highly dependent on the contaminant mass flux and that EISB may not be a cost-effective approach.. A feasibility evaluation of EISB treatment of a separate PCE source area is currently underway.

GARRY SMITH, B.SC., PH.D., MPLAN

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Career Summary

Dr Garry Smith has over 30 years experience in contamination remediation, human health and environmental risk assessment, risk communication, and environmental management. He was formerly Director of the Institute of Environmental Studies at University of NSW a Professorial Visiting Fellow in the School of Risk and Safety Sciences, University of NSW, Principal Environmental Scientist Sutherland Shire Council, Sydney, and is currently an Honorary Associate of the Institute for Sustainable Futures at the University of Technology, Sydney. Garry practices and teaches risk assessment, risk communication, and environmental management for Australian and international projects and is active in applying remediation science and planning to urban renewal and the sustainable growth of cities. He is a former Research Fellow of the Royal Society of London, studying cell biology and toxicology, a former dual Fulbright Fellow, studying environmental risk management applications with the USEPA, and is currently Chairman of the Sustainable Remediation Forum of Australia and New Zealand.

Specialties:

- ✓ Risk assessment
- ✓ Risk communication
- ✓ Sustainable remediation

Selected Australian Project Experience

Independent Expert to Stakeholders during Contaminated Site Remediation, Sydney. Local government-selected expert responding to community questions regarding remediation site technologies and impacts.

Risk Assessment and Risk Management for Occupational Health and Environment, Olympic Games 2000 Site, Sydney. Analysis of occupational health risks and management processes on former municipal and chemical manufacturing industry landfill disposal site and ongoing communication of risks and protective management information to workers.

Planning Inquiry Panel on Hexachlorobenzene Destruction, Sydney. NSW Government-appointed specialist for consideration and advice to government on stored chemical manufacturing industry byproducts.

OH&S Risk Assessment for Workers in Chlorinated Hydrocarbons Waste Cleanup Management, Sydney. Analysis of dioxins-related occupational health risks and management processes on a former chemical manufacturing site and briefing of management and workers re risks and protective management.

Old Chemical Weapons Cleanup Project Health and Environmental Risk Communication, Queensland. Assessment of public health risks from retrieval and destruction of old chemical weapons landfill and ongoing communication of risks and protective management information to local farmers and residents.

Risk Communication of Aqueous Fire Fighting Foam Constituents. Analysis of occupational health risks and management processes on fire fighting foam application sites and briefing re risks and protective management information to workers and management.

Strategic Planning Advice for Government Large Urban Renewal Site Project, Analysis. Design and reporting to identify brownfield development - based benefits for urban housing; jobs; infrastructure; social inclusion; and climate change mitigation in cities, including adaptation to water and land-based public transport infrastructure.

DAVID REYNOLDS, PH.D.

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Career Summary

Dr. David Reynolds, Associate, has extensive experience in the development and implementation of effective remediation and management strategies for complex and challenging contaminated sites. Dave excels at provision of strategic advice to clients for management of stakeholders, interactions with regulators, environmental liabilities for potential acquisitions, technical arguments for litigation, and management of site investigation and remediation. Dave also specializes in fundamental conceptual model development through novel, critical and effective field investigation leading to cost effective and technically sound remediation strategies. He has over 20 years of practical and academic experience, and has been central to the training of existing practitioners and the next generation of contaminant specialists in Australia and SE Asia over the past decade. He is an expert modeler of single and multiphase flow and transport in both porous and fractured media, is a member of the National Research Council Committee on Fractured Rock, and is recognized as one of Australia's leading NAPL related contamination experts. Dave has acted as Project or Technical Director for numerous contaminated sites, encompassing DNAPLs, LNAPLs, inorganics, and pesticides.

Specialties:

- ✓ **Litigation support and due diligence**
- ✓ **Accredited Auditor, WA**
- ✓ **Site investigation and remediation**
- ✓ **Applied research**
- ✓ **Fractured bedrock remediation**

Selected Australian Project Experience

Corporate Acquisition, W.A., Victoria, NSW. Directed multi-site due diligence project for potential acquisition by overseas entity of two chemical usage services with widely scattered offices, terminals, and storage facilities.

Mineral Refining Laboratory, Belmont, W.A. Project Director. Historical waste disposal practices resulted in a small-scale DNAPL source zone within a locally stratified aquifer in the midst of an industrial subdivision, with the resulting plume discharging to a local drain connected to a sensitive water body. The site has become a focus for research into site investigation and remediation sustainability within Western Australia, with intensive source zone investigation, PITTs, passive flux bag installations (the first in Australia), and extensive laboratory work on the possibilities for low-impact, sustainable remediation.

Former Waste Transfer Facility, Perth, W.A. Principal Engineer and reviewer for a detailed site investigation, numerical modeling program, and remediation of a former waste transfer facility contaminated with chlorinated solvents, hydrocarbons, metals and pesticides. Technical director and designer for world's first sequenced nZVI permeable reactive barrier. Project Director for remediation of two source zones at the site using enhanced in-situ bioremediation and base-activated persulfate delivered via soil mixing.

Active Dry Cleaning Facility, Sydney, NSW. Expert witness (Defendant) for litigation involving historical releases of dry cleaning fluid and associated impacts on adjacent commercial and residential properties.

Agricultural Land, Confidential Location. Currently acting as expert witness (Defendant) on stable isotope hydrogeology and inorganic fate and transport for two litigation matters involving alleged oil and gas exploration and production activities impacts on agricultural land. Scope involved preparation of expert reports, depositions, and testimony.

Former Dry Cleaning Facility, Confidential Location. Expert witness (Plaintiff) on contaminant fate and transport and remediation approaches for litigation matter involving presence of dry cleaning fluid in soil and fractured rock.

Former Service Station, Confidential Location. Expert witness (Defendant) for conceptual site model development and contaminant fate and transport of petroleum hydrocarbons in fractured rock.

TODD MCALARY, PH.D.
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Career Summary

Todd McAlary is the Practice Leader for Vapour Intrusion Services at Geosyntec Consultants. He has degrees in geological engineering and hydrogeology and a Ph.D. in chemistry. He has over 28 years of consulting experience focused on the evaluation of contaminant fate and transport in groundwater and the vadose zone. Dr. McAlary specialises in assessing and mitigating the migration of volatile organic compound (VOC) vapours from the sub-surface into buildings and the associated human health risks. He has been a member of the U.S. EPA Expert Panel on Vapour intrusion since 2000 and has authored or co-authored several guidance documents on the topic (including RCRA, OSWER, ITRC, US. Navy, UK Energy Institute, NJDEP, Atlantic PIRI, EPRI, CCME and Ontario MOE). He has provided technical consultation in support of litigation involving several vapour intrusion issues and regularly serves as a technical specialist in regulatory negotiations involving groundwater contamination and vapour intrusion issues where his expertise and communication skills have been critical to stakeholder understanding of the complex nature of the topics. He has conducted pioneering research in vapour transport modeling, passive sampling, building pressure/ventilation testing, high volume sampling and compound-specific isotope analysis.

Specialties:

- ☒ Innovative technology development
- ☒ Chemical fate and transport modeling
- ☒ Groundwater investigation and remediation
- ☒ Subsurface vapour transport and inhalation exposure
- ☒ Expert consultation

Selected Australian Project Experience

Former Manufacturing Facility, Botany Bay, NSW. Dr. McAlary provided contaminant fate and transport modeling and interpretation in support of a remedial design for a feasibility study of several remedial technologies for ethylene dibromide (EDB) in a dissolved groundwater plume.

Self-Storage Facility, Adelaide, SA. Dr. McAlary provided design services for a sub-floor venting system to mitigate the potential for trichloroethene (TCE) vapour intrusion at a large, multi-story self-storage facility. The design incorporated a geotextile (drainage mat) layer below the floor slab with a series of perforated pipes laid horizontally below the floor to provide efficient flushing of the air-filled pores below the slab with minimum long-term energy draw.

Australian Contaminated Land Consulting Association. Dr. McAlary was the primary instructor for a full-day course on assessment and management of subsurface vapour intrusion to indoor air in Sydney and Melbourne, which was attended by over 100 professionals.

Former Paint Manufacturing Facility, Confidential Location. Dr. McAlary provided peer technical review of a remedy re-evaluation for chlorinated solvents and petroleum hydrocarbons in groundwater at a site with complicated geologic conditions and divergent groundwater flow directions, including scoping and interpreting additional data collection for source evaluation, working in cooperation with a local consulting firm.

Former Manufacturing Facility, Confidential Location. Dr. McAlary provided independent third party review of a soil and groundwater remedy consisting of excavation, treatment and replacement of soil containing chlorinated solvents, including developing a characterisation program using the Waterloo Membrane Sampler, and providing review and interpretation of the data in support of management strategies.

LANGE JORSTAD, PH.D.

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Career Summary

Dr. Jorstad has 17 years' experience in the management of both contaminated land and hydrogeological investigations, and specialist hydrogeological support for multi-disciplinary projects in Australia, Asia Pacific and the US. He has directed, managed and been a technical contributor to numerous environmental assessment and remediation projects, specializing in risk-based site characterization to guide management decisions for contaminated land, conceptual model development to evaluate contaminant transport and exposure pathways, and geochemical analysis and modelling for water quality assessment. Dr. Jorstad has applied these services to a broad range of client sectors including manufacturing, land development, oil and gas, mining, waste management, transportation, defence and local government. His experience also includes statutory auditing of contaminated site assessment and remediation in NSW and ACT, and technical representation of clients in regulatory negotiations and litigation. Dr. Jorstad also has considerable experience with groundwater impact assessment services for oil and gas developments in Australia, including a particular emphasis on hydraulic fracturing risk assessments.

Specialties:

- ✓ Contaminated site assessment
- ✓ Statutory contaminated land auditing (NSW, ACT)
- ✓ Hydrogeological and geochemical assessment
- ✓ Regulatory negotiation and litigation support

Selected Australian Project Experience

Former Manufacturing Facility, Sydney, NSW. Dr. Jorstad managed a soil, soil vapour, surface water and groundwater investigation at a former manufacturing facility and adjacent parkland with chlorinated solvents impacts, which was subject to a Management Order issued by the NSW EPA. Services included detailed site investigations, development of a conceptual site model of contaminant transport between the site and a nearby creek, supervision of quantitative risk assessment and contaminant fate and transport modelling, managing regulatory negotiations, and providing technical advice to support litigation.

Former Manufactured Gas Plant, Armidale, NSW. Dr. Jorstad provided detailed technical review and analysis of post-remediation monitoring data (groundwater, surface water, sediment and soil vapour) to assess the performance of remediation measures in reducing contaminant flux to an adjacent creek. Dr. Jorstad represented the local Council in negotiations with the Site Auditor regarding the remaining requirements to facilitate issue of a Section A Site Audit Statement.

Hydrogeological Assessment for Landfill Expansion, Wollongong, NSW. Dr. Jorstad prepared a hydrogeological assessment to support a critical expansion to a landfill near Wollongong, NSW. Services involved data review and gaps analysis, specification of additional investigation and monitoring, development of a conceptual hydrogeological model, and assessment of groundwater-related risks from the proposed development. The study contributed to an EA that passed the Department of Planning test of adequacy on the first assessment.

Hydraulic Fracturing Risk Assessments, Surat, Bowen, Cooper and Eromanga Basins, Queensland. Dr. Jorstad was Project Director and technical contributor for several major stimulation risk assessments for unconventional (coal seam gas, shale gas, tight sands gas) and conventional oil and gas operations in Queensland. He supervised large, multi-disciplinary project teams to deliver detailed hydrogeological and toxicological assessments of the hydraulic stimulation process, and provided technical representation of clients at meetings with the regulator.

We are
engineers, scientists
and innovators.



Geosyntec is a specialised consulting and engineering firm that works with private and public sector clients to address their new ventures and complex problems involving the environment, our natural resources, and our civil infrastructure. Geosyntec has a staff of over 800 engineers, scientists, and related technical and project support staff located in more than 50 offices throughout Australia, South-east Asia, the U.S., Canada, and the United Kingdom.

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engineers | scientists | innovators

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