

Phil White

**Technical Director – Resource Efficiency and Waste Management
Ricardo Energy & Environment**



Qualification(s) *Chartered Waste Manager (MCIWM)*

*MSc (Eng) Water Resources Technology and Management,
University of Birmingham, 1994*

BSc (Hons) Geography, University of Leeds, 1993

Nationality *British*

Language(s) *English (Mother Tongue)*

Profile

Phil is a Chartered Waste Manager with over 23 years' experience in the environment sector, including over 19 years in waste regulation, policy and consultancy. He joined Ricardo Energy & Environment in January 2012 (then known as AEA Technology). As Business Area Manager, Phil leads on waste treatment technologies, technical, market and regulatory due diligence, and expert witness services in the waste sector with a team of senior specialists. He is an accomplished and experienced Project Director and Manager, having led numerous complex, high profile and broad ranging projects.

Phil has recently led projects including, for example, in relation to mechanical biological treatment (MBT) facility performance expert witness; expert witness in criminal proceedings; anaerobic digestion (AD) feasibility assessments, investor due diligence and Lender's Technical Advisor (LTA); advanced conversion technology (ACT) technical due diligence for investors, developers and technology owners and construction stage expert witness; end of waste submissions; MBT off-taker auditing for duty of care compliance; waste export procurement technical and regulatory advice; recycling infrastructure project monitoring; and energy from waste (EfW) technology fore-sighting. Phil's technical and commercial sector experience is founded in waste infrastructure procurement technical advice and project monitoring.

Expert witness – commercial disputes and insurance claims

Phil has been an expert witness since early 2011, supported by 8 years' investigation and enforcement experience as a regulator, in both commercial and criminal cases. From mid-2012 to 2017, Phil directed a significant waste infrastructure expert witness role involving a number of UK PFI MBT facilities that had not performed as expected. Phil directed four named Ricardo experts, reviewing and quality assuring all deliverables. Ricardo assessed the validity of insurance claims and provided advice in disputes. Ricardo now provides expert opinion in relation to insurance claims relating to two UK gasification facilities; Phil is the Project Director. Phil is also directing two named experts in arbitration proceedings in the International Court of Arbitration of the International Chamber of Commerce (ICC) on behalf of a major European waste to energy developer in a dispute relating to the rationale and validity of a contract termination decision.

Expert witness – criminal defence

Since 2014, Phil has acted in a number of criminal defence expert cases covering a range of issues. From late 2015 to 2017, Phil was expert witness in a case involving an alleged major packaging recovery note (PRN) fraud. At trial the Judge requested the prosecution withdraw its charges due to disclosure issues, supported by Phil's assessment of extensive documentation relating to the case and gaps in the record. In late 2017, Phil was appointed expert on behalf of one of the 'big 6' UK waste management companies in relation to alleged illegal shipment of waste for recycling, specifically that was alleged as being too contaminated to be classified as green list waste. In 2015, Phil acted as an expert witness on behalf of a waste broker alleged to have exported glass waste that was too contaminated to be classified as green list waste; the prosecution dropped the case in light of Phil's expert report.

Phil has acted as an expert witness in several other Environment Agency prosecutions relating to alleged illegal deposit of controlled waste, alleged duty of care offences relating to hazardous waste, and as an expert in a POCA case in relation to permit breaches. Several cases have involved analysis of prosecution evidence in relation to quantifying waste and the appropriateness of waste sampling methods, including whether the regulator had followed its own guidance.

Phil has also directed many cases led by other in-house experts, including a prosecution of the directors of a waste company following alleged permit breaches and major fires; the prosecution of two waste management companies alleged to have supplied contaminated anaerobic digestion (AD) feedstock; and a private case relating to the claimed and actual performance of biomass boiler systems.

Regulatory experience – investigations, enforcement and policy

Prior to Ricardo, Phil worked at RPS Group for 6 years, latterly as an Associate Director managing the technical waste team. Whilst at RPS, from 2007 to 2011 Phil was the Project Manager for RPS' 5-year Policy Support Framework with the Environment Agency, which resulted in over 60 individual contacts. He was seconded as part-time lead Technical Advisor to the joint Environment Agency and WRAP Waste Protocols Programme for several extended periods during this time, during which time he developed end of waste Quality Protocols (regulatory positions) for several waste materials and provided advice on complex technical and definition of waste issues. Phil also wrote a good practice guide, published by the regulator, to help local authorities and their contractors prevent recyclable waste being exported illegally

Phil previously worked for the Environment Agency for 8 years in waste policy, strategy and operations, developing an in depth working knowledge of waste policy and legislation, including through site inspections, audits and enforcement. This included through a complex and high profile 2-year joint Agency and HSE investigation into a nationally significant incident and operations at a hazardous waste treatment facility, culminating in a successful prosecution. This provided extensive experience in investigations, statement taking, evidential requirements and undertaking interviews under caution. Phil was also the lead prosecuting officer in several other cases in relation to breaches of e.g. the Environment Protection Act 1990 (EPA 1990) and received training in PACE procedures and cross-examination. Phil now applies his regulatory experience as an expert in commercial and criminal defence proceedings where his clear and pragmatic interpretation of legislation and guidance has supported a number of successful outcomes.

Key Skills

- + Expert witness in criminal cases, commercial and contract disputes; adjudication experience
- + Mechanical, biological, thermal and advanced thermal waste treatment technology performance
- + Technical, market and regulatory due diligence
- + Waste treatment infrastructure procurement and post-procurement and operational advice
- + Waste policy, regulation and strategy; definition of waste and end of waste Quality Protocols

Selection of Project Experience

2018-ongoing, Expert Opinion, Gasification Facility Fuel Quality (Confidential)

- Phil is Project Director for the provision of expert opinion to an SPV concerning refuse derived fuel (RDF) sampling, composition analysis and data interpretation and impact of RDF composition on mechanical pre-treatment and gasifier plant performance. The facility uses an Outotec gasifier.
- Ricardo experts are considering whether sampling and analysis followed the requirements of specifications and contracts, and the practical interpretation of these requirements, to support the client reaching a mutually acceptable position with the EPC contractor to allow hot commissioning.

2018-ongoing, Expert Opinion, Application of Digestate to Land (DAC Beachcroft Scotland LLP on behalf of AXA Insurance)

- Phil is Project Director for Ricardo's expert advice in an insurance claim relating to the application of digestate from an AD process to land that was allegedly contaminated with plastics that consequently caused significant contamination of the land.

2017-ongoing, Expert Opinion, Advanced Thermal Treatment Development Dispute (Dentons)

- Phil is directing the work of several lead experts providing opinion in relation to the causes of the failure to take up options to develop three advanced conversion technology (ACT) facilities.
- The scope of advice includes in relation to the performance and deliverability of the technology, planning and permitting status, viability of grid connections, ability to finance the developments and the delivery timescales, including in relation to deadlines on the land options and incentives.

2017-ongoing, Expert Witness, Alleged Illegal Export of Waste Paper (CMS Cameron McKenna Nabarro Olswang LLP)

- Phil is providing expert opinion in relation to an intended export of waste paper that is alleged to have been too contaminated and/or contaminated with prohibited materials to be shipped legally.
- The defendant is one of the UK's major waste management companies with the intended export load arising from one of the UK's largest materials recovery facilities (MRFs). Phil is commenting

on the technical capability of the plant and on the UK and international law and guidance, including relating to levels of allowable non-target material that prevailed at the time.

- Phil attended Crown Court for a Preliminary Hearing; trial was subsequently delayed.

2018-ongoing, Expert Opinion, Waste Treatment Contract Dispute (Ellis Jones Solicitors LLP)

- Phil is providing expert opinion on whether the rationale to cancel a long-term contract to accept and treat residual municipal solid waste was reasonable. Phil is commenting on the regulatory framework (including waste classification and duty of care); contentions being advanced by both parties in the statements of the case; and the adequacy of installed waste treatment equipment.

2016-ongoing, Expert Opinion, Gasification Facilities (Confidential)

- Ricardo is providing expert opinion on multiple issues at two large UK gasification plants where aspects of the development have not performed as expected. The client is the legal representative of the insurer and Ricardo also works closely with the EPC Contractor. Phil is Project Director.
- Ricardo's team is providing expert opinion on the cause of failures in the performance of the odour control system and gasification technology in terms of delivery to schedule and system design.

2018, Acquisition Due Diligence, Energy from Waste, MRF and Transfer Assets and Development Opportunity (Confidential Investors)

- Ricardo undertook independent technical due diligence in relation to the potential acquisition of Cory Riverside. Assets include conventional thermal treatment, materials recovery and transfer infrastructure and proposed development facilities. Phil was Project Director.
- Ricardo undertook a Red Flag review and participated in a multi-advisor workshop focussing on the potential principal risks and the exploitation of opportunities associated with the acquisition.

2017-ongoing, Expert Witness, Review of Environmental Impact Assessment (EIA) for Proposed Waste to Energy Facility (Darrois Villey Maillot Brochier)

- Phil is directing a team of in-house experts to provide opinion in relation to arbitration proceedings in the International Court of Arbitration of the International Chamber of Commerce (ICC). The dispute relates to the validity of a Government's rationale to terminate a waste disposal contract.
- Ricardo is providing opinion on whether the EIA prepared for a proposed EfW in the Middle East Region was complete and met the requirements of the procuring client, local legislation and international guidelines, and if the proposed EfW technology represented BAT (Best Available Techniques) and met the requirements of other European Regulations.

2017, Expert Witness, Definition of Waste Treatment for Landfill, MBT Contract Dispute (CMS Cameron McKenna Nabarro Olswang LLP)

- Phil was one of two Ricardo experts providing expert opinion on the definition of waste treatment where this relates to a contractual dispute concerning an alleged misapplication of the contractual Payment Mechanism. Project relates to a large UK MBT facility.

2017, Expert Witness, Alleged Breach of EPR 2010 (Preston Redman LLP)

- Phil provided expert opinion in relation to an alleged breach of the Environmental Permitting Regulations (EPR 2010) relating to an alleged illegal waste operation.
- Phil assessed if the waste operations were within the terms of the registered exemptions, if the prosecution's (Environment Agency) assessment of waste quantity and quality was appropriate, and whether the activities posed any risk to the environment or human health. The prosecution ultimately accepted a 'reactive' Civil Sanction (£10K Enforcement Undertaking).

2017-18, AD Acquisition Technical Due Diligence (Welsh Water Infrastructure Limited)

- Phil directed this independent technical due diligence assessment of a (confidential) food waste AD facility and a co-located open air windrow composting facility that WWIL is looking to acquire.
- The AD facility is receiving waste and undergoing commissioning. Ricardo provided impartial expert opinion to the board on the suitability of the assets. Ricardo visited the facilities, reviewed extensive data room documentation, and assessed the performance of reference plant employing the same AD pre-treatment and treatment technology.

2017-18, Environmental Permit Application (Rock Solid B.V.)

- Ricardo has supported to Rock Solid B.V. of the Netherlands in submitting an Environment Permit application. The complex permit allowed for the storage and processing of incinerator bottom ash (IBA) on a former landfill site. Phil was Project Director.
- Ricardo also provided technical input into the planning application and Environmental Statement, involving the team regularly meeting the Local Planning Authority and Environment Agency.

2017-18, Expert Witness, Sentencing Hearing (Slater and Gordon (UK) LLP)

- Phil directed this role where an in-house expert witness is reviewing the sentencing bundle and Sentencing Guidelines to provide opinion on whether the assessed category of harm is appropriate based on culpability and harm. Relates to a guilty plea for offences under EPA 1990. Outcome was a reduction in the alleged category of harm under the Sentencing Guidelines.

2017, Problematic Waste Stream Submission (New Earth Solutions/ Panda Group)

- Following a fire at a permitted waste treatment facility, Phil applied for and successfully achieved a problematic waste stream (PWS) position from the Environment Agency on behalf of the client.
- Phil assessed waste involved in the fire, previously non-hazardous waste that was contaminated to the extent that it was now hazardous. Phil liaised with the regulator, successfully negotiating a position between the regulator and a third party landfill operator that the waste was suitable for hazardous landfill disposal under a PWS as a one-off solution for waste that did not meet the permit waste acceptance criteria. Ricardo was retained to provide waste sampling guidance.

2012-2018, Technical Advisor for MBT-AD Expert Witness Services (Confidential Client)

- Ricardo Energy & Environment was commissioned in 2012 to provide expert witness services in relation to the design and performance of a number of recently constructed MBT facilities where the expected performance has not been achieved. Verification of insurance claims by assessing the causes of performance issues as either design, construction or operations.
- As Project Director, Phil provides technical support and quality assurance to a team of 4 Ricardo Energy & Environment expert witnesses appointed by the insurer's legal advisor to provide opinion in relation to specific technical issues relating to claims and in mediation and potential disputes.

2016-ongoing, Expert Witness, AD Feedstock Quality Dispute (Holman Fenwick Willan LLP)

- Phil is directing this ongoing role relating to alleged offences by two waste management companies relating to the alleged supply of contaminated anaerobic digestion (AD) feedstock that is claimed to have caused AD processing issues, including damage to gas engines.

2016-17, Commercial Due Diligence, Acquisition of Plastic Recycling Company (IRI Investments BV/ IKEA)

- Phil was Project Manager for a due diligence assessment of the assets of the target company in an acquisition which proceeded. The company handles primarily post-industrial dense and film plastic and sells secondary raw materials for the manufacturing of plastic products by third parties.
- Ricardo visited the operating sites in four European countries and reviewed data room documents and outcomes of staff interviews. Ricardo reviewed commercial aspects, with related consideration of processing to inform the assessment, including security of markets, cost of sale, stock control and measurement of flows, capacity, order scheduling, supplier and customer relationships etc.

2016, Advanced Thermal Treatment Process Due Diligence (Confidential Developer, Brazil)

- Phil directed this technical due diligence for a Brazilian technology developer with a novel advanced conversion technology (ACT) process, targeting medical and hazardous waste streams.
- The review examined the appropriateness of the technology in the European and US markets; provided a list of competitor processes; assessed potential competitive gate fees in Europe and the US; and examined the 'disruptive' technology characteristics and a routes to market.

2016, Expert Witness, Alleged Permit Breaches (Kennedys Solicitors)

- Phil directed expert witness support to the Directors of a waste management company (2 entities at 2 sites) to defend Environment Agency charges following two major fires and other offences.
- Offences involved permit breaches relating to the use of exemptions, site security, infrastructure, and site management, in addition to offences relating to the personal involvement of the Directors.
- Ricardo reviewed extensive prosecution evidence and gave advice on the validity of the charges. Our opinion contributed to charges being reduced at the start of the trial and an early guilty plea.

2016, Regulatory Due Diligence for Agricultural Landlord (Burgess Salmon LLP)

- Ricardo provided advice to an agricultural landlord in relation to the activities of the tenant farmer. Advice included reviewing all current operations, infrastructure and permissions to identify any potentially non-authorized activities and potential legacy environmental and regulatory implications.

2016-2018, Lender's Technical Advisor (LTA), AD Facility Portfolio Monitoring (RBS Plc)

- Phil directed this role to regularly monitor the management and operations of a portfolio of AD assets and report the findings to RBS as the Lender over the duration of a 7-year finance facility. Ricardo's role ceased upon the sale of the assets.
- The facilities process organic wastes from municipal and commercial & industrial (C&I) sources, including source separated food; C&I food, including packaged; and agricultural waste.

- Ricardo's monitoring includes: annual operating budget and costs for each SPV; performance and operation against key financial model assumptions (e.g. equipment availability, power generation); material operational and maintenance issues (e.g. unscheduled maintenance, major outages); safety or environmental incidents and remedies; environmental breaches and remedies; material insurance claims or disputes; feedstock supply to verify gas yield potential; status of the digestate offtake contractual arrangements; and actual revenues generated against anticipated.

2015-ongoing, Post-commissioning Technical Advice, MBT Performance (Essex County Council)

- Ricardo has supported Essex CC as its waste infrastructure procurement technical advisor for over 13 years, including for its 417,000 tonne MBT facility and biowaste treatment infrastructure. Ricardo subsequently advised on MBT performance during commissioning and in the lead-up to and during Acceptance Tests. Advice included analysis of performance and potential process improvements.
- Ricardo now provides technical advice on Dispute Resolution Procedure issues, including input waste composition monitoring and assessment of results against contractual thresholds.
- Ricardo also reviewed potential markets and the business case for services to manage 200,000 tonnes per annum solid recovered fuel (SRF) from the MBT. Business case options included using existing EfW facilities in the UK and Europe or developing a new EfW facility in Essex.

2015-2016, Expert Witness, Alleged Breach of EPA 1990 s34 Duty of Care (DWF LLP on behalf of QBE Insurance Limited)

- Phil provided expert opinion in relation to an alleged failure by a waste broker to discharge its duty of care. The case relates to a long term arrangement whereby the broker acted for a producer of a sludge waste stream that was ultimately spread to land.
- Phil commented on the relationship between the parties, the primary responsibility for describing the waste and assessing its suitability for land spreading, and the Environment Agency's advice. Includes review of waste classification and potential to cause harm or pollution.

2016, Expert Witness, Alleged Illegal Deposit of Waste (O'Garra's Solicitors)

- Phil was expert witness relating to a landowner charged with offences of illegally depositing waste under the Environmental Permitting (England and Wales) Regulations 2010 (EPR) and EPA 1990.
- Review assessed evidence of the quantity and composition (description) of waste deposited and the roles of other defendants including the waste producer in consideration of their Duty of Care responsibilities and the approach of the prosecution (Environment Agency) to those parties.
- Phil's analysis also enabled a clear understanding of the timeline of events and the need to separately consider waste sourced off-site and materials sourced elsewhere on the holding for land improvements. The solicitor reported the value of Phil's report to negotiate the final outcome. Phil was later instructed to advise in relation to POCA claims.

2016, Expert Witness, Biomass Boiler Performance Dispute (Blackstone Solicitors)

- Phil directed expert opinion by an in-house specialist in relation to a contract dispute regarding the design and actual performance of two biomass pellet boilers and a heat network.
- The expert will audit the installation to diagnose faults and review the remedial measure proposed by third parties, providing opinion in a detailed report in compliance with the Civil Procedure Rules.

2015-2017, Expert Witness, Alleged PRN Fraud (Andrew Jay & Co Solicitors)

- Phil provided expert opinion in relation to two alternative fraud offences, one a conspiracy charge and the other the substantive offence, in relation to allegations against a company that was accredited to issue Packaging Recovery Notes (PRNs) as a waste glass reprocessor but that is no longer operating. Includes review of quantity and quality of glass in a significant stockpile.
- The Environment Agency alleged that the tonnage of waste packaging glass received and the level of reprocessing claimed to have taken place, upon which the trade in the PRNs is dependent, was not taking place and further this fraud caused distortion of the market over multiple scheme years.
- Phil also led the process to complete a joint statement with the prosecution witnesses on the Court's instructions. The prosecution withdrew the PRN fraud charges at the commencement of the trial.

2015, Expert Witness, Contractual dispute on Biomass Boiler Performance (DWF LLP)

- Phil directed expert opinion by an in-house specialist in relation to a contract dispute regarding the design and actual performance of a biomass boiler eligible for the renewable heat incentive.
- The case required review of the installation against best practice and whether the installer of the system misled the client in relation to the potential system performance.

2015, Expert Witness, Export of Glass Waste (Stephensons Solicitors LLP)

- Phil provided expert opinion in relation to alleged offences relating to the export of glass waste in breach of the transfrontier shipment of waste Regulations 2007 (TFS) and a further offence under the Producer Responsibility Obligations (Packaging Waste) Regulations 2007.
- Counsel (St Pauls Chambers, Leeds) commented that Phil's expert report led to the prosecution withdrawing its case in relation to the substantial TFS charges.

2015-ongoing, End of Waste Submission for Waste Wood (Arden Wood Shavings Limited)

- Phil was commissioned to peer review a draft case for an end of waste submission for animal bedding manufactured from Grade A waste wood and to provide recommendations.
- Phil was subsequently retained to prepare a full submission, including reviewing and auditing waste wood suppliers; reviewing the recovery process against best practice; sampling and characterising fully processed waste wood in line with best practice; reviewing blue chip customer product specifications and the markets for the animal bedding product; and reviewing product performance, including in relation to animal health against non-waste comparators.

2015, Technical Due Diligence, CHP Engine Upgrade on Food Waste Plant (Investec Bank Plc)

- Phil was Project Director for this review of the existing technical status of the East London food waste treatment plant from a performance and operating costs perspective.
- Ricardo advised on the procurement of the proposed engine upgrade programme, in terms of technical robustness, Capex, Opex, timetable and deliverability within expected timescales.

2015, Expert Witness, Assessing Prosecution Evidence in Relation to Costs of Waste Disposal (Rahman Ravelli Solicitors Ltd)

- The case involved a defendant previously convicted under EPA 1990 and Environmental Permitting Regulations. Phil managed provision of expert opinion relating to assessing prosecution evidence considering quantities and types of waste on site at the time of the relevant convictions and on which a POCA claim was based. The expert evidence was used to reduce the POCA claim.

2015-2018, Waste Crime Interventions and Evaluation Project (Environment Agency)

- Phil is Project Director for this study to undertake a full impact evaluation of £5m additional funding to reduce waste crime, including in the priority areas of reducing the risk from illegal waste sites, reducing mis-description of waste and reducing illegal export of waste.
- Ricardo is assessing the potential for significant economic benefits for UK Government and the waste industry that may arise from this additional investment to tackle priority waste crimes.

2015-ongoing, Review of Recovery Markets for Waste and Potential End of Waste Submission (DSM Nutritional Products (UK) Ltd)

- DSM produces a calcium sulphate rich (gypsum) filter cake waste and is seeking markets to move the management of the waste stream up the waste hierarchy into a sustainable recovery market. Phil is Project Manager reviewing beneficial use of the waste in the land restoration, agriculture and construction products sectors. Support includes assessing waste composition analysis, identifying potential off-takers and facilitating further testing and discussions with regulators.
- DSM ultimately wishes to investigate the feasibility of an end of waste submission. DSM has also commissioned Ricardo to review potential uses and markets for a precursor acid waste stream.

2015, MBT Duty of Care Compliance Audits (Cumbria County Council)

- Phil was Project Director of this audit of duty of care compliance with respect to CCC's activities and those of its contractor, Shanks Cumbria Ltd, including primarily in relation to 2 MBTs.
- Phil directed a team of IEMA auditors and former regulators undertaking desk and site based audits, reporting outcomes and training CCC staff to plan and carry out its own auditing.

2015-ongoing, Incentive Accreditation Applications for AD facilities (Grissan Renewables)

- Phil is Project Director for Ricardo's technical advisor role. Support includes preparing submissions of Renewable Heat Incentive (RHI) Accreditation for two AD facilities, one with power export only and one with power export and biogas injection to the grid, and for one biogas combustion boiler.
- Support also includes submission of Feed in Tariffs (FiTs) Preliminary Accreditation for two AD facilities and liaison with Ofgem on post-accreditation queries.
- Phil also provided expert support on the eligibility of specific materials for incentives, using his expertise in waste classification and the definition of waste, with a successful outcome with Ofgem.

2015, Technical Due Diligence for AD Facility Investments (Confidential Investor)

- Phil is Project Director for two due diligence assessments of operational AD facilities on behalf of an investor, leading a team of in-house specialists.

- The first review related to the commercial arrangements and operating performance of a 30,000 tonne capacity AD facility receiving primarily packaged and unpackaged commercial food waste; the second related to the performance and maintenance issues at a farm waste AD facility. In one case the investment progressed and in the other the investor withdrew on our advice.
- 2014, Expert Opinion (POCA), Waste Clearance in Criminal Case (Grech Gooden Solicitors)**
- Phil provided expert opinion through a solicitor supporting a waste transfer station operator that had been prosecuted by the Environment Agency and convicted for offences contrary to the Environmental Protection Act 1990 and various Environmental Permitting Regulations.
 - Opinion included a quantitative and qualitative assessment of various waste stockpiles; review of potential markets; review of the potential costs of managing the waste; and a review of landfill tax criteria and relevant regulations at the current time and time of the indictment.
- 2014, Market Due Diligence for Investment, Glass Recycling Sector (Finance Wales)**
- Phil was Project Manager delivering a market due diligence for a proposed investment in a glass recycling company. Scope included assessing feedstock and recycle markets, contracts and competitors and reviewing equipment specifications and performance guarantees. A specific issue was due diligence in relation to the potential to recycle glass in a significant on-site stockpile.
- 2014, AD Operational and Permitting Advice, (Tamar Energy Limited, TEL)**
- Ricardo-AEA provided support to vary an AD installation permit to add a water treatment facility to concentrate liquid digestate for fertiliser use and discharge the 'clean' water fraction. Ricardo-AEA prepared the application and supporting documents, updating the original documents including the operational techniques, odour management plan and site condition report.
 - For the same facility, Ricardo-AEA developed an operational mass balance, involving reviewing the design mass balance, piping and instrumentation diagrams (P&IDs) and current sampling and monitoring regime, and four two-day sampling cycles to collect empirical data to determine the annual operational mass balance. Data helped TEL determine performance against the design mass balance and where it could be optimised. A more thorough regime was then implemented.
 - Ricardo-AEA reviewed a DSEAR assessment to identify where TEL needed to update equipment to comply with ATEX. This involved reviewing plant components and installation location, alongside technical specifications and ATEX certificates. Items requiring updating were identified.
- 2014-2015, Market Due Diligence for ACT Investment, (Confidential Investor, Spain)**
- Phil is Project Director for a market due diligence for a Spanish company looking to enter the UK waste treatment market as investor and EPC contractor with a gasification technology partner.
 - Original scope included assessing UK MSW and C&I waste arisings; demand for new waste infrastructure; EfW gate fees and export costs; changes in incentives and landfill tax rates; waste composition trends for waste to EfW; generators eligible for CfDs; and changes in technologies and trends in the EfW market over the next ten years such as developments in syngas use.
 - The developer was subsequently successful in the first CfD round and retained Ricardo to provide technical support to financial close, including reviewing waste supply contracts.
- 2014, Feasibility Study and Business Case for AD (Cheshire East Council)**
- Phil was Project Manager delivering a feasibility assessment, outline business case and outline design for a dry anaerobic digestion facility at the authority's reference site. Included a review of dry AD technology providers, outline facility designs, and a detailed economic assessment
- 2014, Pyrolysis Plant Due Diligence Assessment (Confidential Investor)**
- Phil is Project Director of this initial red flag review of a recently completed pyrolysis plant treating hazardous waste, which a UK investor is considering purchasing. The review included review of an existing technical report and a site visit to raise issues with the operator. Ricardo-AEA's report enabled the investor to specify a number of conditions precedent for the purchase of the plant.
 - Based on the red flag review the investor decided to proceed and subsequently commissioned Ricardo-AEA to undertake a full due diligence on this 4MWe plant.
- 2014-2015, MBT Expert Advisor (Beale & Company Solicitors LLP and BAM Nuttall Limited)**
- Following his MBT expert witness role relating to the same facility (2010-14), Phil led preparation of expert evidence in relation to the successful claims brought against professional indemnity and general liability insurers following settlement in relation to the failure to achieve reliability testing.
 - Support covered all aspects of mechanical pre-treatment, aerobic composting and air treatment.
- 2013, Specialist Advisory & Consultancy Panel (Green Investment Bank)**
- Phil was integral to the Ricardo-led consortium appointed by GIB to provide technical and other specialist due diligence advice to assist GIB in a range of specialist financing transactions.

- The consortium was appointed to all four framework lots applied for (technical, environmental and market due diligence and regulatory advice) across all GIB priority and non-priority sectors. Phil is nominated Team Leader, Waste Recycling & Energy from Waste. Commissions have included a review of heat use for datacentre cooling and development of a green impacts assessment model.

2013-Ongoing, Beneficial Use of IBA and Export Strategy Technical Advice (States of Jersey)

- Phil is Project Manager and technical lead supporting the Department for Infrastructure, being EfW operator, to develop beneficial uses of IBA to divert it from landfill. This follows a review of the Department's ash management strategy in 2012 for the States' Environmental Scrutiny Panel.
- Commercial and regulatory review of IBA aggregate use in the UK and Europe, potential IBAA uses in Jersey; assess market size and barriers; assess potential export markets; CAPEX analysis.
- Technical advisor for IBA export procurement, including managing IBA testing programme in-line with best practice for a robust waste and transport classification, and providing regulatory advice on waste shipments and transportation.

2012-2014, Expert Witness and Technical Advisor (Sheridan Gold LLP and BAM Nuttall Limited)

- Phil was commissioned in late 2010 whilst at RPS Group to prepare expert evidence on MBT process performance and linkage with waste composition, specifically in relation to the aerobic composting process. Phil provided support until March 2014.
- Support on design and performance of an MBT composting facility to review reasons for failure to pass reliability tests. Initial focus on effect of composition change, includes review of process design; regulatory guidance; review of process simulation models and design concept; and review potential process modifications to address Scott Schedule items.
- Phil managed robust, best practice waste sampling and composition analysis.
- Support on sub-contractor claims following settlement resulting in a successful adjudication.
- Commended by Counsel (Keating Chambers) in relation to quality of written submissions.

2012-2015, ARID Large Scale Grant Project Monitors (WRAP)

- Phil project managed this 3-year programme to monitor and verify compliance of recipients of Accelerating Reprocessing Infrastructure Development (ARID) grant against their Agreements.
- Phil successfully placed 3 project monitors for both build and operational phase monitoring. Phil was also the technical advisor to the project monitors for composting facilities.
- Phil managed extended support to a significant number of small scale grant recipients.

Selected Experience with RPS Group (2006-2011)

2007-2011, Policy Support Framework, Waste Management and LCA (Environment Agency)

- Phil managed a 5-year framework including over 60 contacts and provided extensive support to joint Agency and WRAP end of waste Quality Protocols Project including as seconded senior Technical Advisor developing QPs and supporting documents (risk assessments, technical reports, consultation documents etc.) including for waste wood, IBA, steel slag, rubber crumb and biodiesel.
- Support on complex technical and definition of waste issues across all QP materials. Managed consultations with industry and Defra and represented the Agency at public consultations.

2010-2011, Essex Residual Waste Treatment Contract, Technical Advisor (Skanska-Cory)

- Managed and led technical advice to Skanska-Cory and its Engineering, Procurement and Construction (EPC) contractor to the consortium during ISOS and ISDS competitive dialogue.
- Waste flow and WRATE modelling; composition risk assessment; advice on end of waste and market availability including for contaminated paper and compost like output (CLO) including regulatory assessment of options to recover CLO at completed landfill sites and closed quarries.
- Undertook technical due diligence of proposed mechanical biological treatment (MBT) with anaerobic digestion (AD) solution and identified performance and commercial risks.

2011, Commercial and Industrial (C&I) Waste Feasibility Study and Good Practice Guide for Waste Exports (Pathway to Zero Waste partnership, PTZW)

- Phil directed 2 projects for the PTZW partnership (SEEDA, Environment Agency and WRAP).
- Undertake a feasibility study for accepting C&I waste at local authority facilities in East Sussex, including estimating demand and end markets, site issues, preferred contractual arrangements and developing an outline business case (OBC).
- Phil wrote a good practice guide to help local authorities and contractors prevent recyclable waste being exported illegally, included stakeholder survey; collate baseline export data; legislative review; and best practice case studies. The guide was published and received excellent feedback.

2010, Fairer and Better Environmental Enforcement (FBEE) Project (Environment Agency/Defra)

- Phil directed this analysis relating to the potential introduction of civil sanctions for regulations enforced by Environment Agency as a result of the RES Act.
- Advice included a review of methodologies to value environmental damage; facilitating an Agency consultation; assessing the impact of civil sanctions on the work of the Agency; and analysing the offences for which civil sanctions could potentially be beneficial.
- Support followed earlier advice that Phil provided to the Agency's Waste Crime National Service and Waste Crime Policy Team, including in relation to prioritising illegal waste sites.

2009-2011, In-Vessel Composting and Anaerobic Digestion Project Monitors (WRAP)

- Managed the contract to monitor compliance of IVC and AD projects against Environmental Transformation Fund or Capital Grant Support Agreements.
- Monitored compliance of Agrivert (South Mimms) IVC project including verifying achievement of milestones through inspecting infrastructure, plant, equipment and documentation to enable release of funding in construction and operational phase.

2007-2009, Support to Compost Producers in PAS100 Application Phase (WRAP)

- As Association for Organics Recycling (now REA ORG), approved consultant provided support to 24 compost producers for BSI PAS100 and Quality Protocol certification.
- Advised on implementation of PAS100 systems; technical advice on process issues; planning and tracking compost applications to land; ABPR compliance; and wrote quality policies, operating procedures and hazard analysis and critical control point (HACCP) documents.
- Covered all composting technologies, requiring detailed technical understanding of ABPR compliant in-vessel and enclosed windrow processes and open air windrow and continuous block processes. Clients included Viridor, Veolia ES and New Earth Solutions.

Career History**Jan 2012 - Present, Technical Director, Ricardo Energy & Environment and AEA Technology plc****Apr 2006 - Dec 2011, Associate Director, RPS Group**

- Responsible for project direction and management, business development and technical delivery across waste technical, strategy, policy and sustainable waste management contracts.
- Major roles: technical and competitive dialogue support to bidders for residual waste treatment procurement contracts; managed 5-year Environment Agency policy framework contract.

Jan 1998 - Mar 2006, Environment Agency

- **Waste Strategy Policy Advisor.** Verified local authority LATS returns and undertook compliance monitoring of local authority performance against BMW diversion targets; project managed UK input to a two-year EC-funded project delivering web-based life cycle assessment (LCA) data, tools and guidance for European SMEs.
- **Enforcement Officer** investigating a high profile incident and serious offences at a licensed hazardous waste treatment and transfer facility including site and plant investigations, extensive statement taking, assessment of waste acceptance records and historical documentation and PACE interviews as part of a 2-year investigation culminating in a successful prosecution.
- **Environmental Protection Officer** investigated potential permit breaches and illegal activity; lead officer in several successful prosecutions; managed remediation; undertook site inspections and audits of licensed waste management facilities; pollution prevention advice to industry, including for ISO 14001 compliance. Formal training in statement taking and cross-examination.
- Waste Regulation Policy Business Planner, providing strategic support to the Head of Waste.

Apr 1994 - Dec 1997, Environmental Scientist, WS Atkins

- 12-month secondment to the National Rivers Authority delivering hydro-geological and pollution risk assessment modelling; 18-month secondment to Environment Agency as Environmental Protection Directorate Research Officer managing national water quality research programme.