PATRICK S. SULLIVAN, BCES, CPP, REPA

Education

BA – Harvard University, Biology/Ecology, 1989

Professional License/Certifications

Board Certified Environmental Scientist, No. 15-ES009, American Academy of Environmental Engineers & Scientists (AAEES)
South Coast Air Quality Management District (SCAQMD), Certified Permitting Professional (No. A-1716)
Registered Environmental Property Assessor, No. 519692, National Registry of Environmental Professionals (NREP)
Approved Lead Verifier under California Air Resources Board (CARB) AB 32 Greenhouse Gas (GHG) Program, Executive Order H-24-097
Approved Lead Verifier under Oregon GHG Program, Approval ID# GHGRPV-018
Approved Lead Verifier under Washington GHG Program (pending)

Professional Affiliations

Air and Waste Management Association (AWMA); Chairman, Mother Lode Chapter
Waste Industry Air Coalition (WIAC), Co-Chairman
California Biomass Collaborative; Executive Board
Solid Waste Industry for Climate Solutions (SWICS), Co-Chairman
Research Associate, Columbia University, Earth Engineering Center for Sustainable Waste Management
Solid Waste Association of North America (SWANA), Biogas Division, Previous Chairman
Technical Advisory Group; Cal Recycle, Landfill Gas (LFG) Rulemaking Committee
Technical Advisory Group, CARB, AB 32 Landfill Methane Rule Industry Committee
Rulemaking Advisory Committee (RAC) Oregon Department of Environmental Quality (ODEQ), LFG
Society for Risk Analysis
U.S. Composting Council

Professional Awards

Distinguished Individual Achievement Award, LFG/Biogas Division, SWANA, 2019
Certificate of Excellence, Publication of over 100 Articles and Presentation, SCS Engineers (SCS), 2015
Distinguished Service Award, National Solid Waste Management Association (NSWMA, now National Waste and Recycling Association, NWRA), 2009
Hall of Flame, SWANA, LFG/Biogas Division, 2007

Professional Experience

Mr. Sullivan has over 35 years of experience in the area of environmental engineering, specializing in solid waste management and related environmental issues. He is the Managing Director of SCS's

consulting and engineering operations within the Southwestern United States, which is SCS's largest consulting business unit. He also serves as the Practice Leader for SCS's Solid Waste Practice in the same region. Mr. Sullivan is the National Expert for SCS's company-wide Clean Air Act (CAA) programs and is one of the leaders for the company's strategic initiative for GHG, Sustainability, and CAA services. He is one of the national experts on air quality, GHG and climate change, sustainability, odor, and risk assessment and toxic exposure analyses for solid waste and industrial facilities. Mr. Sullivan is a company Senior Vice President and a Member of the Company's Management Advisory Committee.

Mr. Sullivan is the Principal-in-Charge of projects related to air quality permitting and compliance, GHG emissions and climate change, LFG engineering and compliance, facility investigation and risk assessment, and redevelopment of impacted properties at solid waste and other industrial facilities, as well as related engineering services. Mr. Sullivan has published and/or presented over 150 technical papers and/or presentations in industry journals, publications, conferences, seminars, and workshops. Because of this expertise, Mr. Sullivan has been involved with the following practices and projects:

Air Quality

Title V Permit Applications and Documentation. Mr. Sullivan has been involved with over 300 Title V permitting projects, including Title V compliance reporting for over 120 facilities, for solid waste and industrial facilities.

New Source Review (NSR)/Prevention of Significant Deterioration (PSD) Permit Applications and Documentation. Mr. Sullivan has been involved with over 200 NSR/PSD projects for various types of solid waste and industrial facilities. This includes permitting for over 45 landfill expansions, 25 composting projects, 85 LFG to energy projects, and various industrial facilities.

New Source Performance Standard (NSPS) Compliance Activities. Mr. Sullivan has overseen the completion of NSPS Tier 1 and 2 emission rate studies and reports, LFG collection and control system (GCCS) design plans, surface emission monitoring plans, and other documentation for over 200 landfills under the landfill NSPS program, including compliance reporting for over 95 landfill sites. In addition, Mr. Sullivan has worked on NSPS compliance activities for various other sources, including boilers, incinerators, engines, turbines, chemical manufacturing, hazardous waste facilities, and various others.

National Emission Standards for Hazardous Air Pollutants (NESHAPs) Compliance Activities. Mr. Sullivan has been involved with over 150 NESHAPs projects, including over 75 landfills, for various regulated sources, including development of Startup, Shutdown, and Malfunction (SSM) plans and various other compliance documents.

Development and Teaching of Training Courses for Air Quality Compliance at over 50 Seminars. Compliance and regulatory issues that have been taught included Title V, NSPS, NESHAPs/MACT, NSR/PSD, GHG reporting and permitting, and related state and local requirements.

Regulatory Advocacy for the Solid Waste Industry where landfills or other solid waste facilities are included as a regulated source. Mr. Sullivan has developed industry comments and negotiated with the agencies on behalf of the industry as it related to the NSPS/NESHAPs rules, Title V operating permit programs, GHG programs, LFG regulations, and other regulations, .

Preparation of Numerous Local Air District, State, and Federal Air Permitting Documents for the installation of air pollution control devices and industrial equipment, including engines, turbines, carbon adsorption systems, boilers, cooling towers, air strippers, wastewater treatment plants,

biogas collection systems and flares, biogas recovery plants, and various industrial systems. Mr. Sullivan has managed over 300 state or local air permitting projects for landfills and industrial facilities.

Permitting, Compliance, and Due Diligence Projects for Renewable Energy Projects throughout the United States. Mr. Sullivan has completed technical and financial due diligence for over 50 existing and proposed projects, as well as permitting and compliance activities for over 75 facilities. Some of these projects have also included registration of GHG credits, facilitation of trades for GHG credits, renewable energy credits, and development of methodologies for estimation of GHG reductions as well as all of the air quality permitting tasks. Mr. Sullivan has permitted over 50 biogas to energy plants across the country.

Air Quality Modeling and Risk Assessment for Permitting or Environmental Impact Reports (EIRs) for approximately 50 landfill expansions, new landfills, composting facilities, transfer stations, other solid waste facilities, and various commercial/industrial projects in California, including evaluations of health risks, ambient air quality, GHG, and/or odors. This has included the preparation of a variety of California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) documentation. He has completed air dispersion modeling and risk assessments for over 100 permitting projects or as part of state air toxic programs.

Air Sampling and Source Testing for Various Emitting Devices, including sampling for volatile organic compounds (VOCs), criteria pollutants, particulate heavy metals, and asbestos fibers. Completion of all air sampling associated with asbestos abatement. Mr. Sullivan has also provided oversight of source testing at over 100 landfill sites and development of a database of landfill source tests for use in the work of the WIAC.

Air Permitting. Mr. Sullivan has completed air permitting and compliance activities for the following types of industrial facilities:

- Solid waste incinerators.
- Biomass energy plants.
- Landfills.
- Recycling facilities and transfer stations.
- Composting facilities.
- LFG recovery plants.
- Cement and asphalt plants.
- Chemical manufacturing facilities.
- Aerospace facilities.
- Jewelry manufacturing facilities.
- Sand and gravel facilities.
- Electronics facilities.
- Site remediation projects.
- Paint and solvent manufacturing plants.
- Boat manufacturing plants.
- Used oil refineries.

Completed Landfill Air Quality Services in the Following States and Air Districts: SCAQMD, San Joaquin Valley Air Pollution Control District (SJVAPCD), Bay Area AQMD (BAAQMD), Sacramento Metropolitan AQMD, San Diego County APCD, Yolo-Solano AQMD, Feather River AQMD, Kern County APCD, Ventura County APCD, Santa Barbara County APCD, Shasta County APCD, Antelope Valley

APCD, Mojave Desert AQMD, Placer County APCD, North Coast Unified AQMD, Butte County APCD, Monterey Bay Unified APCD, Lake County AQMD, and El Dorado County APCD. States of Nevada, Oregon, Washington, Hawaii, Arizona, Idaho, Montana, New Mexico, Colorado, Utah, Texas, Ohio, Pennsylvania, Florida, Arkansas, Illinois, Kansas, Virginia, Oklahoma, Tennessee and several others. County or local agencies in Nevada, Arizona, and Washington.

Landfill Gas

Mr. Sullivan has been involved with over 200 LFG planning or engineering projects; several examples are provided below.

Principal in Charge for Design, Bidding Support, and Construction Oversight for LFG Collection and Control System, Highway 59 Landfill, Merced County, CA. The system was originally designed to prevent LFG migration and provide corrective action for groundwater impacts. The system successfully remediated LFG migration and brought the facility in compliance with Resource Conservation and Recovery Act (RCRA) Subtitle D requirements. The LFG system was subsequently upgraded to meet NSPS and California AB 32 requirements. Currently, Mr. Sullivan oversees the operations and maintenance (O&M) of the LFG system as well as all air, GHG, and LFG compliance and permitting services.

Principal in Charge, Completion of Various LFG Engineering and Construction Oversight and Groundwater Services, Various WM Landfills. Landfill sites included Bradley, Simi Valley, Columbia Ridge, DADS, Lancaster, Redwood, Lockwood, Antelope Valley, Rio Rancho, Butterfield, Riverbend, Hillsboro, Anderson, Northwest Regional, and El Sobrante. Engineering tasks have included design of wellfield expansions, new blower/flare stations, header upgrades and replacements, groundwater monitoring and reporting, groundwater corrective action plans, as well as a variety of air quality services. These projects are generally completed on a design-build basis.

Principal in Charge, Completion of LFG Planning and Engineering for Various Republic Services' (Republic's) Landfills. Landfill sites included Otay, Sycamore, Imperial, Vasco Road, West Contra Costa Sanitary, Forward, Chateau Fresno, Sonoma Central, Foothills, Tower Road, ECDC, Ox Mountain, Wasatch, Apex, and Sunshine Canyon Landfills. Engineering tasks have included design of wellfield expansions, new blower/flare stations, and header upgrades and replacements as well as CQA. Under SCS's direction, SCS upgraded Republic's LFG Master Plans and prepared LFG remediation plans to address LFG migration issues. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality tasks for the projects. SCS has completed design-build services for the LFG systems on several of these sites.

Principal in Charge, Completion of LFG Planning and Engineering for Various Waste Connections, Inc.'s (WCI's) Landfills. Landfills have included Chiquita Canyon, Fairmead, Potrero Hills, Cold Canyon, John Smith Road, LRI, and Avenal Landfills. Engineering tasks have included design of wellfield expansions, new blower/flare stations, and header upgrades and replacements, as well as CQA. SCS has upgraded WCI's LFG Master Plans and developed long-term cost estimates for LFG system expenditures. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality tasks for the project. SCS has completed design-build services for some of the LFG systems on these sites.

Principal in Charge, Various Other LFG Planning or Engineering Projects throughout California, Oregon, and Colorado, including Stanislaus County's Geer and Fink Road Landfills, Butte County's Neal Road Landfill, Sunnyvale Landfill, L&D Landfill, Sacramento County's Kiefer Landfill, Madera County's Fairmead Landfill, Yolo County's Central Landfill, Clovis Landfill, City of San Diego's Miramar Landfill, County of San Diego's Hillsborough and Bell Junior High School Landfills, as well as various

other smaller closed landfill sites. Many of these projects included planning, engineering design, bid support, CQA, and/or design-build of LFG system expansions.

CEQA/NEPA Analyses

Examples of Mr. Sullivan's project work on CEQA and EIR projects are detailed below.

CEQA Air Quality Analysis and Toxics Risk Assessment, Proposed Expansion to Fink Road Landfill, Stanislaus County, CA. As part of an EIR for a proposed expansion to the Fink Road Landfill in Stanislaus County, CA, SCS completed an air toxics risk assessment, which evaluated the potential human health impacts due to current and future exposures from the project. The risk assessment was part of a larger air quality analysis completed for the expansion EIR. The analysis included an evaluation of health risk due to diesel exhaust from heavy equipment and refuse hauling vehicles at the landfill. As part of this project, SCS also researched the conversion of refuse hauling fleets to alternative fuels in order to generate ERCs for CEQA mitigation measures.

CEQA Air Quality Analysis and Toxics Risk Assessment, Salinas Valley Solid Waste Authority Landfill Project, Monterey County, CA. SCS completed air quality and risk assessment sections of a large EIR being prepared for long-term refuse collection and disposal options for the Salinas Valley Solid Waste Authority's Regional Landfill Project. The project included three landfills and 10 transfer stations, which were combined into four different project scenarios. The project included emissions estimates, air dispersion modeling, and risk calculations. The analysis included an evaluation of health risk due to diesel exhaust from heavy equipment and refuse hauling vehicles at the landfills and transfer stations, which were part of the project.

CEQA Mitigation Measures Development and Implementation for El Sobrante Landfill, Corona, CA. SCS was enlisted to develop a series of mitigation measures for fugitive dust emissions from landfill construction and operations at the El Sobrante Landfill in Corona, CA. SCS also developed an implementation plan for the CEQA Mitigation Monitoring and Reporting Program (MMRP), which was required as part of the approval of the EIR. SCS has done ambient monitoring for particulate matter less than 10 microns (PM10) levels and worked with the SCAQMD to develop a long-term strategy to reduce dust emissions.

CEQA Air Quality Analysis and Toxics Risk Assessment Proposed Expansion to Newby Island Sanitary Landfill, Santa Clara County, CA. As part of an EIR for a proposed expansion to the Newby Island Sanitary Landfill in Santa Clara County, CA, SCS completed an air quality impact analysis that included a risk assessment evaluating the potential human health impacts due to current and future exposures to contaminants from the project. The risk assessment was part of a larger air quality analysis completed for the expansion EIR. The project included emissions estimates, air dispersion modeling, GHG evaluation, and risk calculations.

Risk Assessment

The following are examples of projects where Mr. Sullivan has worked on landfill investigation and/risk assessment projects.

Landfill Investigation, LFG Engineering, Human Health Risk Evaluation and Impact Assessment, Proposed Residential Developments, Adjacent to the Otay Landfill, Chula Vista, CA. Project activities at the site have included an evaluation of LFG migration, LFG engineering and testing, air quality permitting and compliance, soil and LFG sampling and analysis, human health risk assessment and nuisance/odor evaluation, CEQA assistance, operations and maintenance of the LFG collection and control system, and other landfill engineering and construction services. The risk

assessment and odor/nuisance analysis were completed to support residential development adjacent to the landfill.

Environmental Investigations and Risk Assessment at the Former BKK Main Street Landfill in Los Angeles County. This landfill is a closed site that may have received both hazardous and non-hazardous wastes; it is currently occupied by two golf courses and other commercial and residential developments and is being considered for additional redevelopment. Project work at this facility has included completion of soil vapor surveys, installation and monitoring of LFG migration probes, LFG sampling/analysis, oversight of cover and subsurface soil and groundwater sampling, completion of a human health risk assessment, CEQA assistance, and negotiations with regulatory agencies. The site is currently being considered for listing on the National Priorities List (NPL) as a potential Superfund site. Oversight of the landfill is provided by EPA Region IX, Department of Toxic Substance Control (DTSC), and the Los Angeles County landfill local enforcement agency (LEA).

Human Health Risk Evaluation and Impact Assessment, Proposed Commercial Developments, On and Adjacent to the BKK Landfill Site, West Covina, CA. The BKK site includes two landfills: one municipal solid waste landfill and one hazardous waste site, which are under the oversight of DTSC. Mr. Sullivan provided oversight for the completion of various investigations and data reviews/analyses of soil, surface water, groundwater, LFG, and air quality. The data were used for the completion of a human health risk assessment in support of the CEQA process for a proposed golf course and business park development on the Class III landfill.

Investigation, Risk Assessment, and Remediation Kaiser Ventures, Inc., Facilities, Fontana, CA. For the former Kaiser Steel plant in Fontana, Remedial Investigation (RIs)/Feasibility Studies (FSs), Remedial Action Plans (RAPs), and Remedial Designs were prepared for three on-site operable units under DTSC's oversight. Mr. Sullivan was responsible for a number of individual soil, groundwater, surface water, and waste investigations at the Kaiser site, including treatability studies, risk assessments, RAPs, and hydrogeological studies, storm water pollution prevention plans, and spill prevention, control, and countermeasure (SPCC) plans. These projects included investigations of two landfill sites, with both hazardous and non-hazardous wastes, including soil, waste materials, hazardous waste, groundwater, and surface water issues. The site has been redeveloped into the California Speedway, a NASCAR racetrack.

Investigation, Risk Assessment, and Remediation Feasibility Study, Mission Bay Landfill, San Diego, CA. For this site, Mr. Sullivan managed a significant forensic investigation and site assessment of the former landfill site, which is located next to a river, bay, and amusement park and is used heavily for recreational purposes. This work has included investigations of extent of refuse, cover thickness, LFG composition and migration, soil, surface water, groundwater, and other environmental media associated with Mission Bay. The field investigations will be followed by a risk assessment, and, given the highly visible and public nature of the landfill project, focus on risk communication will be of primary importance. Ultimately, several candidate risk-based remediation methods applicable to the site will be identified with typical costs associated with each method. This project included interface with the San Diego County APCD, RWQCB, LEA, and DTSC.

Landfill Engineering, LFG Migration Assistance, and Human Health Risk Assessment, Geer Road Landfill, Modesto, CA. Mr. Sullivan has managed and been involved with a variety of projects at the Geer Road site, including closure design and CQA services, cover repair, LFG engineering, air quality compliance, human health risk assessment, LFG system O&M, LFG and groundwater monitoring, as well as acted as an expert witness in defending the landfill against a citizen lawsuit. Project work was under the jurisdiction of the landfill LEA and RWQCB.

Odor Evaluations

Mr. Sullivan has been involved with a variety of odor-related projects as summarized below.

Republic Services, Odor Analysis, Santa Clara County, CA. Pat completed an odor analysis for an MSW landfill expansion composting facility, and wastewater treatment plant in Milpitas, CA.

Waste Connections, Odor Analysis, Kings County, CA. Pat completed an odor analysis for an MSW landfill expansion in Kings County, CA.

WM, Odor Analysis and Air Quality Services, Livermore and Novato, CA. Pat provided services that included an odor analyses and air quality services for landfills and composting facilities located in Livermore and Novato, CA.

Recology, Odor Analysis and Air Quality Services, Vacaville, CA. Pat provided services that included an odor analysis for a landfill and composting facility in Vacaville, CA.

Republic Services, Odor Analysis and Air Quality Services, Richmond, CA. Pat provided services that included an odor analysis for a landfill and composting facility in Richmond, CA.

Waste Connections, Odor Analysis and Air Quality Services, Avenal, CA. Pat provided services that included an odor analysis for a landfill in Avenal.

County of Mariposa, Air Quality and Odor Analysis, Mariposa, CA. Pat provided analysis services for a proposed municipal solid waste (MSW) composting operation in Mariposa County, CA.

Western Placer Waste Management Authority (WPWMA), Air Quality and Odor Analysis, Lincoln, CA. Pat was involved with services that included ambient air testing and air dispersion modeling for an odor study, for MSW landfill, composting facility, and materials recovery facility (MRF) in Placer County, CA.

WM Odor Analysis, San Bernardino, CA. Pat provided odor services for a proposed MRF in San Bernardino County, CA.

Confidential Client, Development of Expert Report and Review, Adelanto, CA. Pat provided analysis of the opposing experts' work on air quality and odor analyses of a composting facility in Adelanto, CA.

City of San Diego, Air Quality and Odor Analysis, San Diego, CA. Pat provided services that included ambient air testing and air dispersion modeling for an odor study, an MSW landfill, wastewater treatment plant, and composting facility in San Diego, CA.

Confidential Client, Compliance Review and Odor/Air Quality Impact Assessment, San Diego, CA. Pat provided services for an existing composting operation in San Diego, CA, which is adjacent to a proposed residential development.

Republic Services, Air Quality and Odor Analysis, Chula Vista, CA. Pat provided services that included air dispersion modeling and odor impact analysis for an MSW landfill in Chula Vista, CA.

Waste Connections, Odor Analysis and Air Quality Services, Castaic, CA. Pat provided services that included an odor analysis, air dispersion modeling, air transport studies, and meteorological data review for a landfill in Castaic.

Los Angeles County Sanitation Districts, Odor Analysis and Air Quality Services, Glendale, CA. Pat provided services that included an odor analysis, air dispersion modeling, air transport studies, and meteorological data review for a landfill in Glendale.

Feasibility Analysis, Best Available Control Technology (BACT) Cost-Effectiveness Analysis, and Hydrogen Sulfide Testing for the evaluation of sulfur removal technologies as odor control for LFG-derived odors for 15 landfill sites.

Odor analyses as part of the air quality sections of over 15 EIRs for landfill expansions.

Litigation Support

Mr. Sullivan has extensive litigation support and expert witness experience as summarized below.

Litigation Support and Preparation of Expert Report in Defense of a Landfill Company in Pittsburgh, PA, which was sued under the third-party provisions of the federal CAA. Project tasks including emissions estimation, regulatory applicability review, and preparation of an expert report. The case was settled in favor of our client.

Litigation Support as part of a CERCLA Cost Recovery Action Filed by a Group of PRPs against Various Municipalities and Public Agencies that Disposed Refuse at a Mixed Hazardous and Municipal Solid Waste Landfill in California. Project tasks included review of depositions, evaluation of industrial and hazardous waste disposed of in the landfill, and development of a draft report on the contribution of the various potentially responsible parties (PRPs) to contamination in the landfill. Our clients were successful in the litigation.

L**itigation Support and Expert Testimony as Part of a Toxic Tort Litigation Filed by a Local Residence Against a County-owned Closed Landfill in Modesto, CA.** Project tasks included a site investigation, risk assessment, groundwater evaluation, and expert testimony (deposition and trial). The case was settled with minimal damages for our client.

Litigation Support and Expert Testimony as Part of a Toxic Tort Litigation Filed by a Local Residence against a County-owned Active Landfill in Merced, CA. Project tasks included an LFG assessment, site investigation, risk assessment, groundwater evaluation, and expert testimony (deposition and trial). The case was ruled in favor of our client.

Litigation Support and Expert Testimony in Defense of a Nuisance Claim and a CERCLA Cost Recovery Action Filed against an Electronic Relay Manufacturing Facility in Los Angeles, CA. Project tasks included a remedial investigation, feasibility study, remedial design, remedial action, risk assessment, and expert testimony (deposition only). The first case was settled with insurance coverage; the second case was settled for deminimis contribution from our client.

Litigation Support in Defense of a CERCLA Cost Recovery Action Filed against an Electronic Relay Manufacturing Facility in Azusa, CA. Project tasks included a review of documents and preparation of a technical response to US EPA's proposed settlement offer.

Litigation Support and Expert Testimony as Part of a Toxic Tort Litigation Filed by a Plaintiff Group against a Large Aerospace Company in Burbank, CA. Project tasks included emissions estimation, air dispersion modeling, air toxics risk assessment, and expert testimony before arbitration judge. The case was settled in favor of our clients.

Litigation Support and Preparation of an Expert Report as Part of a Toxic Tort Litigation in Defense of a Metal Heat Treating Facility in Phoenix, AZ. Project tasks included emissions estimation, air dispersion modeling, and air toxics risk assessment. The case was settled in favor of our client.

Litigation Support and Expert Testimony as Part of a Nuisance Lawsuit Filed by the Current Owner of a Screw Manufacturing Facility against the Former Owner in Santa Fe Springs, CA. Project tasks included a site investigation, compliance audit, evaluation of on-site disposal of waste oil, and expert testimony before an arbitration judge.

Litigation Support as Part of an Insurance Claim Filed by an Aerospace Facility against Its Insurance Carrier in Natick, MA. Project tasks included review of soil vapor data, vadose zone modeling, determination of the vapor-phase plume, and preparation of exhibits to be used in court. Our client was successful in the litigation.

Litigation Support in Defense of a Nuisance Claim and a CERCLA Cost Recovery Action Filed against a Steel Mill in Fontana, CA. Project tasks included a remedial investigation, feasibility study, remedial design, remedial action, risk assessment, and assistance in the cross-examination of opposing experts. The case was settled in favor of our client.

Litigation Support in two Lawsuits Where Contractors Were Unwittingly Exposed to Asbestos during Building Demolition after the property owners claimed that the buildings did not have asbestos-containing materials.

Litigation Support as Part of a Property Damage Filed by the Property Owner against its Former Tenant at a Plastic and Rubber Manufacturing Plant in Ontario, CA. Project tasks included a site investigation, remediation, risk assessment, and expert testimony (deposition only).

Mr. Sullivan's litigation experience includes the following Proposition 65 cases in California. These cases include preparation of exposures and risk analyses and participation in settlement conferences:

- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to methylene chloride in a silk flower cleaner.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to dichlorobenzene and toluene in a bicycle tire repair kit.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to lead in PVC grips and handles for various tools and equipment.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to lead in cosmetics.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to chromated copper arsenate in treated wood used for children's playground equipment.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning the exposure to various pollutants emitted from landfills and other solid waste facilities in California (six total facilities).

Recent Expert Witness Experience

- *Crane, et al., v. County of Merced.* LFG migration and exposure/risk assessment case. Expert report, deposition, and trial testimony. Our client was successful in the litigation.
- *Brian Kahn v. The Dewey Group.* LFG exposure/risk assessment case. Expert report, deposition, and trial testimony. Our client was successful in the litigation.
- *Tommy McCarty, et al., v. Oklahoma City Landfill, LLC.* LFG emission and odor case. Expert report and deposition. Our client was successful in the litigation.

- *Peter Ng, et al., v. International Disposal Corporation of California.* LFG emission and odor case. Expert report and deposition. Our client was successful in the litigation.

- *Republic Services, Inc., v. Fortistar, Inc.* Dispute over LFG rights and the loss of royalties for undeveloped LFG resources. Expert report. Litigation settled in favor of our client.

- *Eklutna v. Municipality of Anchorage.* Dispute over LFG rights and the value of the LFG resource. Expert affidavit. The litigation was settled amicably for both parties.

- *Yeshayahu Michaely, et al., v. Browning Ferris Industries of California, Inc., et al.* LFG emission and odor case. Expert report and deposition. Our client was successful in the litigation.

- *Timberline Energy, LLC, v. Waste Connections of Kansas, Inc.* LFG carbon credits dispute. Expert report. Litigation settled favorably for our client.

- *Thomas and Marie Dickens, Sharon Kay, and Jim Howe, v. King County, Washington.* LFG emission and odor case. Expert report, deposition, and trial testimony. The court decision was very favorable to our clients.

- *Decatur County, Tennessee v.* Waste Industries of Decatur. LFG emissions and odor case. Expert report and deposition. The case was settled positively for our client.

- *Bituminous Resource (D/B/A: Hopkins County Regional Landfill) v. Commonwealth of Kentucky, Energy and Environmental Cabinet.* Air quality and regulatory compliance. Expert report and declaration. Our client was successful in the litigation.

- *Siara Andrews, et.* al., v. American River Ag, et. al. Odor and chemical exposure case. Expert report, declaration, and deposition. The case was settled favorably for our client.

- *Home Fed vs. Otay Landfill, Inc.* LFG migration and exposure/risk assessment case. Expert report, deposition, and trial testimony. The case is ongoing.

Mr. Sullivan has also worked on over 100 regulatory enforcement cases.

Greenhouse Gas

Mr. Sullivan has participated in the following GHG projects while at SCS.

CARB, Approved Lead Verifier or Internal Senior Reviewer

- Alameda Municipal Power[1]
- Biggs Municipal Utility[1]
- Cal Portland Company – Mojave Plant[2]
- Cal Portland Company – Colton Plant[2]
- California Steel Industries
- City of Lompoc[1]
- City of Roseville, CA[1]
- City of Ukiah, Electric Utilities Division[1]
- City of Victorville[1]
- Collins Pine Company
- Corn Products
- Georgia Pacific
- Gridley Electric Utility[1]
- Healdsburg Electric Department[1]
- Hilmar Cheese Company
- Imperial Irrigation District[1]
- Imperial Irrigation District – Coachella Gas Turbines
- Imperial Irrigation District – El Centro Generating Station
- Imperial Irrigation District – Niland Gas Turbines Plant
- Imperial Irrigation District – Rockwood Gas
- JP Morgan Chase Bank[1]
- Kinergy[1]
- Lodi Electric Utility[1]
- Metropolitan Water District[1]
- Orange County Sanitation District

- Pacific Ethanol[1]
- Port of Oakland[1]
- Port of Stockton, CA[1]
- Riverside Wastewater Treatment Plant
- San Francisco Hetch Hetchy Water & Power[1]
- Truckee Donner Public Utility District[1]
- Temple-Inland
- University of California at Davis
- University of California at Irvine
- University of California at Santa Cruz
- University of California at San Diego
- Western Area Power Authority[1]

[1] Verification includes electrical/fuel transactions.
[2] Verification included process emissions (landfill, wastewater treatment, geothermal, or other process emissions).
[3] Verification includes oil and gas emissions.

Climate Action Reserve GHG Project Reduction Services

Landfill and Organic Waste Composting Protocols

- Dalton-Whitfield Regional Solid Waste Management Authority
- L & D Landfill
- Larimer County Landfill Electric Generation Project
- Hay Road Landfill Feasibility Study
- Montana-Dakota Utilities Billings Landfill
- YSDI Landfill Feasibility Study Central Landfill, Citrus County, Florida
- Raleigh County Solid Waste Authority
- Pendleton County Landfill
- Eagle Point, Wolf Creek, and Stones Throw Landfills Project
- Organic Waste Composting Protocol
- American Organics OWC
- Grover Environmental Products
- Jepson Prairie Organics
- South Valley Organics

AB32 Mandatory Reporting. Completed State of California Mandatory GHG reporting under AB32 for the following general stationary combustion facilities:

- Altamont Landfill
- Bradley Landfill
- CalEnergy Geothermal Plants
- City of Fresno Wastewater Treatment Plant
- El Sobrante Landfill
- G2 Ostrom Road
- Kirby Canyon Landfill
- Mid-Valley Landfill
- Penrose Landfill Gas Conversion, LLC
- Redwood Landfill
- San Bernardino County Solid Waste Mgmt. - MVSL
- Simi Valley Landfill
- Sunnyvale WWTP
- Toyon Landfill Gas Conversion, LLC

GHG Compliance for Landfills. Completed GHG compliance services for over 100 landfills related to the AB32 mandatory reporting rule, AB32 landfill methane rule, and federal "Tailoring" rule for GHG.

U.S. EPA GHG Reporting Rule. Management and oversight for over 500 U.S. EPA GHG mandatory reporting rule projects for landfills and industrial facilities.

GHG Emissions Inventory and Verification of Creditable GHG Reductions. Performed GHG emissions inventory services, verification of creditable GHG reductions, and development of GHG management plan under CEQA for Kern County Waste Management Department, California.

GHG Consulting for Municipalities. Provided GHG consulting services for Sacramento County, Los Angeles County, City of Carlsbad, City of Alameda, and the City of Palo Alto.

GHG Emissions Inventory and Certification of Donated GHG Reductions (to make event GHG neutral), Super Bowl, Houston, TX and Winter Olympics, Salt Lake City, UT.

SWICS Group. Involvement with the leadership of the SWICS group. As part of this effort, Mr. Sullivan has developed protocols for landfill GHG emission estimates and led SWICS advocacy efforts on the proposed AB32 early action rule for landfills, cap and trade, as well as the AB32 and federal GHG mandatory reporting rules.

Private Waste Company GHG Consulting. Provided GHG consulting for all of the large private waste management companies.

Development of GHG Guidance Document. Developed the guidance document titled, "Technologies and Management Options for Reducing Greenhouse Gas Emissions from Landfills," under contract to the California Integrated Waste Management Board (CIWMB).

Environmental Services

In addition to the solid waste experience, Mr. Sullivan has been the Project Director and/or technical expert on a variety of projects related to hazardous substance site investigation and remediation, groundwater investigation and monitoring, hazardous waste management, air quality, risk assessment, storm water, and industrial wastewater, as well as other environmental issues. Specifically, he has participated in the following types of projects and studies, which document his extensive background:

- **Hazardous substance soil and groundwater investigations.** Mr. Sullivan has managed a variety of Phase II site investigations in an attempt to define the extent and magnitude of surface and subsurface contamination at these sites. Typical tasks completed on these projects included soil sampling/analysis, installation/sampling of groundwater wells, data interpretation, report preparation, including recommendations for remedial actions, and regulatory liaison.

- **Risk assessment.** Mr. Sullivan directs SCS's program for human health and ecological risk assessments in California and nationwide. The risk assessment projects have included exposure assessment and modeling, toxicity evaluation, risk quantification, uncertainty analysis, and calculation of risk-based remediation goals.

- **Remediation management.** Mr. Sullivan has provided design, permitting, and construction oversight for various remediation projects. These projects included vapor extraction, air sparging, groundwater pump-and-treat, soil excavation, and bio-remediation systems. Typical tasks completed on these projects included oversight of remediation contractors, project scheduling, regulatory interfacing, data interpretation, and closure report preparation.

- **Pre-conveyance environmental assessments of properties prior to real estate transfer.** These projects consist of evaluating past on-site operations, identifying potentially contaminated sites, record searches of files maintained by regulatory agencies both for the subject and adjacent properties, and evaluation of soil, air, and groundwater data, where applicable. The projects included over 100 Phase 1 environmental assessments, property condition assessments, site assessments, and other property evaluations.

- **Waste minimization and hazardous waste management.** Mr. Sullivan has completed waste minimization studies and source reduction evaluations, which included evaluations of the possible detrimental effects that these wastes could have upon the environment. He has developed waste minimization alternatives to reduce the quantities of hazardous waste generated, to create awareness as to the importance of proper treatment and disposal of these wastes, and to promote better health and safety practices. Mr. Sullivan is well versed in the federal and state regulations that pertain to hazardous waste management.

- **Regulatory compliance audits and permitting.** Mr. Sullivan has extensive experience working with clients to ensure compliance with all applicable environmental rules and regulations. This experience includes site inspections, regulatory reviews, facility permitting, and liaison with local, state, and/or federal regulatory agencies. He has participated in the preparation of Resource Conservation and Recovery Act (RCRA) Part B permit applications, closure plans, and closure certification reports for hazardous waste treatment, storage, and disposal (TSD) facilities.

- **Asbestos management.** Mr. Sullivan has experience in all phases of asbestos management, including sampling of potential asbestos-containing materials (ACMs), building inspections, analysis of laboratory data, preparation of specifications for asbestos abatement, abatement oversight and air sampling to ensure proper health and safety compliance, and preparation of operations and maintenance documents for asbestos management.

- **Water quality issues.** Mr. Sullivan has participated in a variety of projects related to wastewater investigations at industrial facilities, design of wastewater pretreatment systems, preparation of National Pollutant Discharge Elimination System (NPDES) permits for process and storm water discharges, preparation of Spill Prevention, Control and Countermeasure (SPCC) plans, groundwater investigations, as well as surface water assessments.

Selected projects and studies Mr. Sullivan has managed or otherwise participated in include the following:

- **Phase 1 and Phase 2 Environmental Assessments, Industrial Uniform Cleaning Facility, Sacramento, CA.** Mr. Sullivan was the project manager for a Phase 1 assessment of an inactive facility in Sacramento, which had former chemical use and industrial wastewater issues. As a follow-up to the Phase 1, Mr. Sullivan managed a Phase 2 site investigation to evaluate potential areas of concern identified in the Phase 1. The work culminated in the final report, which detailed the activities completed and facilitated the sale of the property.

- **Various Environmental Investigations and Remediation, Former Kaiser Steel Facility, Fontana, CA.** Mr. Sullivan managed a number of individual soil, groundwater, surface water, and waste investigations at the Kaiser site, including treatability studies, risk assessments, remedial action plans, and hydrogeological studies, Storm Water Pollution Prevention Plans (SWPPPs), and SPCC plans. These projects included investigations of two landfill sites, closure of multiple underground storage tanks (USTs), and various other operable units representing the portions of the former steel mill with both hazardous and non-hazardous wastes, including soil, waste materials, hazardous waste, groundwater, and surface water issues. The site was redeveloped into the California Motor Speedway.

- **Soil Investigation and Human Health/Ecological Risk Assessment under ASTM's Risk-Based Corrective Action (RBCA) Guidance for a Former Diesel Engine Repair Facility, Commerce, CA.** The investigation included a series of soil boring and surface soil samples to assess the extent of petroleum and heavy metal contamination due to engine repair operations and USTs. Contaminants at the site included fuel-related VOCs and several metals. The ecological risk assessment included terrestrial ecosystems. The site was redeveloped for residential use under the City of Commerce Redevelopment Agency.

- **Wastewater Studies, Site Investigation, and Health and Ecological Risk Assessment, Long Beach Naval Shipyard, Long Beach, CA.** Wastewater studies were conducted throughout the naval base to determine the source of elevated organic and metal concentrations in industrial wastewater discharges. The investigation included soil and groundwater sampling/analysis for a former hazardous waste storage area, which was undergoing corrective action under RCRA. Contaminants at the site included pesticides and PCBs. The ecological risk assessment included both terrestrial and aquatic ecosystems.

- **Soil and Groundwater Investigation, Baseline Human Health and Ecological Risk Assessment, and Other Environmental Services for an Active Chemical Manufacturing Facility in Santa Fe Springs, CA**, which was undergoing site mitigation under CERCLA. Contaminants at the site included chlorinated, aromatic, and oxygenated solvents. An extensive soil and groundwater investigation was conducted, including an assessment of releases from multiple USTs in a tank farm. The ecological risk assessment included terrestrial ecosystems. Other services included remediation design, treatability studies, air quality permitting, and preparation of a toxic release inventory for the site.

- **Soil and Groundwater Investigations, Remediation Design and Oversight, and Baseline Human Health and Ecological Risk Assessment for a Former Electronics Manufacturing Facility in Los Angeles, CA.** This project has also included expert testimony in support of risk assessment and other work completed on the project. An extensive soil and groundwater investigation was conducted. A soil vapor extraction system was designed, installed, and successfully operated to remediate soil contamination to the approval of the agency. Contaminants at the site included chlorinated solvents. The ecological risk assessment included terrestrial ecosystems.

- **Soil and Groundwater Investigation, Interim Remedial Measures, and Human Health and Ecological Risk Assessment for a Former Chemical Plant in Menlo Park, CA**, which is undergoing closure under RCRA. Soil and groundwater were evaluated for three separate operable units at the site. An extensive groundwater modeling evaluation was conducted. Contaminants at the site include PCBs, dioxins/dibenzofurans, VOCs, and several heavy metals. The ecological risk assessment included aquatic and terrestrial ecosystems.

Publications and Presentations

Sullivan, Patrick S., New Emission Inventory Requirements for Solid Waste Facilities in California, 2024 SWANA Western Regional, Palm Springs, California, May 2024.

Sullivan, Patrick S., Air Permitting for Composting Facilities, Presentation at Waste Expo 2024, Las Vegas, Nevada, May 2024.

Sullivan, Patrick S., Meeting Evolving Air Quality Regulations and Permit Requirements for Composting Facilities, Waste Advantage Magazine, Volume 14, Number 10, October 2023.

Sullivan, Patrick S., Air Quality Permitting Issues for LFG to Energy Projects, Presented at EUEC 2022 Conference, Tucson, Arizona, October 2022.

Sullivan, Patrick S., Gas Fingerprinting to Determine Source of Offsite Gases, Waste Advantage Magazine, September 2022.

Sullivan, Patrick S. and Huff, Raymond H., The Evolution of Methane Emissions Measurements at Landfills: Where are We Now?, Paper and Presentation at A&WMA's 115th Annual Conference & Exhibition, June 2022.

Sullivan, Patrick S., A Comparison of: Landfill Methane Rules in California and Oregon, Presented virtually at SWANA Mid-Atlantic Chapter's 2022 Conference, June 2022.

Sullivan, Patrick S., Weighing Waste Management Options, Waste 360, June 2022.

Sullivan, Patrick S., The Pros and Cons of Composting vs Anaerobic Digestion, Prepared for Waste Expo 2022, Las Vegas, Nevada, May 2022.

Sullivan, Patrick S., The Evolution of Emission Controls on Landfill Gas Engines and Turbines, Presented during the Virtual EUEC 2021 Conference, August 2021.

Sullivan, Patrick S., Comparison of Organic Waste Management Options in Terms of Air Quality and GHG Impacts, Presented at Waste Expo Together On-Line, August 2021.

Sullivan, Patrick S., Wading through the Confusion EPA Has Created with New NSPS/EG and NESHAPs Rules, SWANA Western Regional, On-Line Webinar, November 2020.

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Drotman, Cassandra; Huff, Raymond; and Sullivan, Patrick S., An Overview of the CARB Offset Program and Offset Protocols, Publication in the Proceedings for the A&WMA's 112th Annual Conference & Exhibition, Quebec, Canada, June 2019.

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Sullivan, Patrick S., Health Risk Assessment Issues for Landfills, SWANAPalooza, Boston, Massachusetts, February 2019.

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Sullivan, Patrick S., Regulatory Update: Alternatives to Daily Soil Cover from an Emissions Standpoint, Presentation at SWANA Western Regional Symposium, Palm Springs, California, May 2018.

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Sullivan, Patrick S., Cleaner Air Oregon Program, Panel Discussion, SWANA Northwest Regional Symposium, Troutdale, Oregon, April 2018.

Sullivan, Patrick S., Managing Odors at Composting and Other Organics Facilities, Presentation at Waste Expo 2018, Las Vegas, Nevada, April 2018.

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Sullivan, Patrick S., Federal and California Landfill Emissions Regulatory Updates, Presentation at Rural Counties ESJPA Technical Advisory Meeting, October 2016.

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Sullivan, Patrick S., The Impact of the NSPS Rule for Landfills, Panel Discussion at Waste Expo 2016, Las Vegas, Nevada, June 2016.

Sullivan, Patrick S., Best Available Control Technology (BACT) and Composting, Presentation at Waste Expo 2016, Las Vegas, Nevada, June 2016.

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Sullivan, Patrick S., et al., Lessons Learned from the First Two Years of Compliance with the Federal GHG Mandatory Reporting Rule, Paper and Presentation for 36th Annual SWANA Landfill Gas Symposium, Las Vegas, Nevada, March 2013.

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Sullivan, Patrick S., The Effects of New Air Modeling Standards on Landfill Gas Projects, SWANA E-Session, May 2012.

Sullivan, Patrick S., Air Quality Requirements for Composting Facilities are Changing—Are You Ready?, 41st Annual SWANA Western Regional Symposium, April 2012.

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