JEFFREY D. MARSHALL, PE

Education

B.S. - Chemical Engineering, Virginia Polytechnic Institute and State University, 1982

Professional Licenses

Professional Engineer - Virginia, Maryland, West Virginia, North Carolina and South Carolina

Professional Affiliations

American Institute of Chemical Engineers

Professional Experience

Mr. Marshall is a Vice President and SCS' National Partner for Innovative Technologies and Emerging Contaminants. He has a diversified background in project engineering and management, with emphasis on the environmental chemistry and human health aspects of hazardous materials/waste management, site investigations, waste treatment, risk-based remediation and redevelopment, and environmental compliance/permitting issues.

Clients have included numerous state and local governments throughout the US (e.g., Fairfax County, VA; Loudoun County, VA; Arlington County, VA; Prince William County, VA; Town of Herndon, VA; Norfolk, VA; City of Chesapeake, VA; City of Suffolk, VA; Virginia Beach, VA; Campbell County, VA; Shenandoah County, VA; Page County, VA; Montgomery County, MD; Howard County, MD; Baltimore County, MD; City of Baltimore, MD; Harford County, MD; Prince Georges' County, MD; Newberry County, NC; Kansas City, MO; etc.), municipal maintenance facilities, active and closed landfills (MSW, hazardous waste, incinerator ash, coal combustion residual, industrial waste, pre-regulation, construction and demolition debris, open dumps, farm dumps, WWTP sludge, etc.), waste-to-energy plants (landfill gas and biogas), wind turbines, recycling facilities, airports, R&D facilities, electronics manufacturers, coal-fired and dual-fueled electric power plants and cogeneration plants, potable water treatment facilities and distribution systems, printing plants, pulp and paper, plating shops, airbag actuator manufacturers, petroleum refineries and bulk storage & distribution facilities, fertilizer manufacturing plants, refractory manufacturing; aerospace maintenance facilities; adhesives formulators, polymer manufacturing and extrusion lines, hospitals and healthcare facilities, aluminum extrusion and machining facilities, auto parts manufacturers, explosives manufacturers, electric motor production plants, rocket motor (propellant) manufacturing and testing, ore refining facilities, tool manufacturers, metal and wire products manufacturers, steel mills, a lead battery recycling facility, indoor and outdoor firing ranges, nuclear fuel rod manufacturing plants, gasoline stations, dry cleaners, office parks, strip malls, agricultural facilities, pesticide/herbicide sites, a radioactive healthcare products manufacturing facility, pharmaceutical manufacturers, rail lines and railroad maintenance facilities, a railroad accident/spill site, concrete and refractory manufacturers, RCRA solid and hazardous waste treatment, storage and disposal facilities, and a public zoo.

Department of Defense clients and Federal facilities have included Fort Belvoir, VA; Fort Eustis, VA; Fort Monroe, VA: Fort Story, VA; Fort Lee, VA; Naval Station Norfolk, VA; MCB Quantico, VA; Oceana Naval Air Station, VA; Radford Army Ammunition Plant, VA; Fort Detrick, MD; Aberdeen Proving Grounds, MD; Naval Surface Weapons Center, Dahlgren, VA; Naval Surface Warfare Center, White

Oak, MD; Fort Detrick, MD; former Edgewood Arsenal, MD; National Naval Medical Center, MD; National Institutes of Health, Bethesda, MD; Naval Ship Research and Development Center, Annapolis, MD; USCG Baltimore, MD; Charleston Naval Complex, SC; Dover AFB, DE; Picatinny Arsenal, NJ; Walter Reed Army Medical Center, DC; Fort McClellan, AL; FEMA, Mount Weather, VA; Newport Army Ammunition Plant, IN; Ravenna Army Ammunition Plant, OH; Lockbourne AFB, OH; Cape Lisburne, AK; the Pentagon; dozens of GSA facilities; numerous Veterans Administration hospitals and facilities; numerous National Guard facilities, Indiana Dunes National Park (firing range remediation); National Park Service (various sites); and DoD facilities in Panama, Japan, Puerto Rico, and Italy.

PFAS

Mr. Marshall has prepared and presented PFAS webinars and training sessions at multiple venues.

Confidential Client, Inactive Landfill, Northeast US: SCS provided due diligence services for a potential buyer in conjunction with the potential acquisition of a portfolio of waste management facilities. Select PFAS constituents were detected in multiple groundwater monitoring and supply wells in and around an inactive landfill included in the portfolio. SCS performed an extensive review of site characterization and background reports, including multiple rounds of monitoring data. We prepared cost estimates for designing and implementing additional onsite and offsite groundwater characterization, working with the state regulatory agency, and groundwater remediation.

Confidential Client, Assessment of PFAS in Compost, Mid-Atlantic US: SCS designed and implemented a field-scale pilot program to assess the effectiveness and feasibility of composting a mixture of vegetative waste and wastewater treatment plant sludge (aka biosolids) generated by a publicly owned treatment works (POTW). As a project component, SCS prepared and implemented a PFAS characterization plan to assess the presence and concentrations of multiple PFAS constituents in the final compost. In the absence of EPA laboratory methods for analyzing PFAS in solids, SCS worked with multiple laboratories to identify an internal isotope dilution method that covers about 50 PFAS constituents and incorporates stringent QA standards. The sampling and analysis plan identifies a series of considerations to minimize the potential for cross-contamination of the compost samples by field personnel, sampling equipment, and sample shipment. Upon receipt of the laboratory results, we provided a report documenting the sampling and analysis, including data evaluation. Risk-based PFAS guidelines for compost and bio-solids developed by several state agencies were identified and presented for comparison.

Confidential Client, Assessment of PFAS in Groundwater, Active and Closed Landfill Cells, Mid-Atlantic US. In conjunction with a County-wide assessment of PFAS in environmental media, SCS is assisting in developing a detailed work plan that addresses PFAS in groundwater near the municipal landfill complex. The facility includes old, unlined, closed waste disposal and active lined cells. SCS assists in identifying, evaluating, and selecting appropriate laboratory analysis methods, monitoring the well network, and providing detailed sample collection guidance to prevent cross-contamination. After implementing the sampling and analysis plan, SCS will assist the client in data evaluation and identifying appropriate future PFAS response measures.

Confidential Client, Assessment of PFAS in Fire Protection Systems, Large Industrial Complex in SE US. Perform sampling and laboratory analysis of AFFF in 19 active fire protection systems and provide recommendations for future system upgrades and modifications.

Confidential Client, Active MSW Landfill, North Carolina. Provide interpretation and evaluation of PFAS data generated under the facility's groundwater monitoring program.

Air Emissions Compliance Evaluations and Permitting

Mr. Marshall has considerable experience in air emissions issues, including preparing and negotiating permit applications, evaluating permitting requirements and exemptions, performing compliance assessments, preparing emissions inventories and annual statements, developing permit compliance plans, and consulting regarding a broad range of greenhouse gas issues.

Subject systems and facilities have included over a dozen environmental remediation systems (groundwater pump-and-treat/air stripping, soil vapor extraction systems, vapor intrusion control systems); scores of landfills; several hospitals, including two medical waste incinerators (Title V); an aerospace manufacturing facility and plating shop in Iowa; a large commercial plating facility in VA; commercial printing plants in VA, TN, WV and PA; a hot mix asphalt/reclaimed asphalt pavement plant in VA; a Coast Guard facility in Baltimore; an electric motor manufacturing facility in North Carolina; an electronic instrumentation manufacturer in MD; two metal products fabrication plants in MD; a plastic products (polystyrene) extrusion and blow molding facility in VA; several emergency power generators; a marine engine R&D facility in NJ; and numerous fumigation facilities (VA, NC, MD, NJ, PA, DE, GA, FL, IL). Fumigation facility experience includes Title V permitting, case-by-case MACT evaluations, synthetic minor permitting, state operating permits, air emissions modeling, and risk assessments for facilities employing methyl bromide, phosphine, and sulfuryl fluoride. Modeling experience includes AERMOD, AERSCREEN, SCREEN3, and others.

Mr. Marshall has assisted many facilities with NESHAP applicability reviews and compliance. NESHAP experience includes Subpart XXXXXX (Metal Fabrication and Finishing Source Areas); Subpart ZZZZ (Reciprocating Internal Combustion Engines); Subpart T (Halogenated Solvent Cleaning); Subpart MMMM (Surface Coating of Miscellaneous Metals Parts and Products); Subparts DDDDD and JJJJJJ (Industrial, Commercial and Institutional Boilers); Subpart VVVV (Boat Manufacturing); Subpart II (Shipbuilding and Repair); Subpart EEE (Hazardous Waste Combustors).

Environmental Claims

Mr. Marshall has provided third-party review, litigation support, depositions, expert reports, and expert testimony for several dozen claims associated with hazardous substance and environmental compliance issues, EPA & state environmental regulations, and OSHA hazardous materials regulations. Key issues have included waste characterization, environmental permitting, subsurface fate & transport of hazardous constituents, hydrogen sulfide generation/exposure/migration, chlorinated solvents, RCRA and CERCLA compliance, emergency response and remediation, and petroleum storage tanks.

Vapor Intrusion (VI)

Vapor intrusion (VI) experience includes the design and implementation of several subsurface (shallow soil gas, deep soil gas, soil, and groundwater) and indoor air investigations to evaluate the VI pathway for VOCs and radon, performance of quantitative risk assessments, and VI modeling (Johnson & Ettinger, EPA, and others). Design experience includes active and passive VI control systems for dozens of buildings, including the new VDOT Camp 30 administration building, Fairfax County Public Safety Transportation Operations Center, industrial facilities, dry cleaners, a new condominium development with a sub-grade parking garage, luxury townhomes on the eastern shore, and a variety of residential and commercial developments.

Waste characterization, treatment, and disposal recommendations are provided based on the industrial wastes' chemical, physical, and biological properties.

Mr. Marshall has provided evaluations of special waste applications and disposal receipts to assess waste compatibility and reactivity in association with odor assessments and subsurface heating event studies at multiple landfills.

Environmental Permitting

Mr. Marshall has prepared dozens of permit applications for many federal, state, and local environmental regulatory programs. Examples include Part A and Part B permit applications for RCRA Subtitle C (hazardous waste) and Subtitle D (solid waste) facilities, RCRA Subpart X (open burning/open detonation) submittals and technology evaluations for ordnance and energetic hazardous wastes (e.g., Naval Surface Warfare Center, Ravenna Army Ammunition Plant, Los Alamos National Laboratories and several others); NPDES (wastewater and stormwater), industrial pre-treatment (wastewater), permit-by-rule (vegetative waste composting, transfer stations, C&D material recovery facilities, medical waste management, etc.), air emissions including Title V (e.g., medical waste incinerators, fumigation facilities, landfill gas-to-energy plants), synthetic minor and State Operating Permits, groundwater extraction/water appropriations, and groundwater injection.

Environmental Compliance Audits

Mr. Marshall is experienced in the performance of multi-media environmental compliance audits addressing environmental regulations promulgated under RCRA, CERCLA, TSCA, CAA, SDWA, CWA, FIFRA, OPA, EPCRA, AAI, and numerous state regulatory programs. Similar experience includes compliance issues associated with OSHA's hazardous materials regulations. Examples include audits at about 20 Virginia Department of Transportation facilities throughout the Commonwealth; a tungsten carbide ore refining facility in Nevada; rubber and silicone products manufacturing facilities in Bedford and Buchanan, VA; a nuclear fuel rod manufacturing facility in VA; a fiberglass resin boat manufacturing plant in TN; aluminum extrusion and machining facilities in VA; an electric motor manufacturing plant in NC; aviation repair, remanufacturing, and warehouse facilities in TX, FL and GA; a large rotogravure printing facility in TN; commercial off-set printing plants in VA, WV and PA; the Oceana Naval Air Station, VA; watch manufacturing and distribution facilities in AR and CT; four printed circuit board, computer component, and communications equipment manufacturing plants in CO and KS; a municipal hospital, regional cancer center, and medical waste incinerator in VA; an Army hospital and medical waste treatment center at Fort Belvoir; newspaper printing and distribution facilities in VA, MD and DC; aerospace parts distribution warehouses and service (lithium battery, landing gear and brakes) facilities in TX, GA and FL; about a dozen General Services Administration facilities including offices, an indoor firing range, warehouses, a courthouse, and a motorcycle storage and maintenance facility, and scores of solid and hazardous waste treatment, storage and disposal facilities nationwide.

Landfill Services

Mr. Marshall provides over 39 years of experience in landfill-related services, including the design and implementation of multi-media (groundwater, surface water, stormwater, soil, landfill gas) investigations for closed landfills, preparation and implementation of Groundwater Monitoring Plans, statistical evaluation of monitoring data, groundwater remediation (design, permitting, construction, O&M, peer review), permitting and compliance audits, leachate control and management, closure/post-closure care issues, waste characterization, special waste and industrial waste management/treatment/disposal, odor investigations – including hydrogen sulfide, and subsurface heating events (e.g., subsurface fires, exothermic aluminum dross reactions). He has also provided technical support for several landfill redevelopment projects.

Landfill experience covers a broad range of sites, including municipal solid waste (i.e., RCRA Subtitle D) landfills, industrial waste landfills, mixed-waste landfills, construction and demolition debris

landfills, vegetative waste disposal sites, DoD disposal areas, open dumps, and CERCLA Superfund sites. Landfill locations include Virginia, Maryland, New York, New Jersey, North Carolina, South Carolina, West Virginia, Massachusetts, New Hampshire, Ohio, Missouri, Pennsylvania, Kansas, Illinois, Florida, Texas, California, Washington, Louisiana, Oklahoma, Japan, Israel, Argentina, and Canada.

Chlorinated Solvents

Mr. Marshall has extensive experience providing investigation and remediation services for chlorinated solvent contamination at dry cleaners, commercial facilities, and industrial plants. He has performed Phase I and II Environmental Site Assessments, vapor intrusion evaluations, risk assessments, and remediation assessments at dry cleaners, industrial laundry facilities, spill sites, and an industrial park that housed the International Fabricare Institute. He provides site investigation, regulatory negotiations, design and construction of soil and groundwater remediation systems for industrial facilities with TCE, PCE, and 1,1,1-TCA contamination in Virginia, Maryland, North Carolina, South Carolina, New Jersey, Missouri, and others.

Notable projects include:

Cambridge, Inc., MD. Site investigation of soil, groundwater, surface water, and sediments contaminated with 1,1,1-TCA and degradation products; prepare design plans for groundwater remediation and soil vapor extraction system; obtain environmental permits (NPDES, air emissions, groundwater extraction); provide construction assistance; prepare and implement O&M plans; provide quarterly reporting and annual performance evaluation reports; provide regulatory negotiations; design and implement a natural attenuation evaluation for a small chlorinated solvent plume at an adjacent warehouse.

Clifton Precision, Murphy, NC. Multi-media onsite and offsite investigations of TCE and degradation products; design and permit groundwater and soil remediation systems and treatment systems to provide potable water for manufacturing plant, daycare center, convenience store, and several private residences; regulatory negotiations; design, permitting, and O&M of remedial systems; implement several UST removals; close wastewater treatment systems.

In-situ Bioremediation, Dry Cleaners, Hampton, VA. Design and implement an in-situ groundwater treatment program to provide accelerated in-situ bioremediation of chlorinated solvents in groundwater using an injection of an emulsified oil substrate. Site-wide chlorinated solvent concentrations were reduced by over 85%, and concentrations in several wells were reduced by over 99%.

Design/Build In-situ Bio wall, USDA, Beltsville, Maryland. Design/build services for an innovative in-ground bio wall to promote biodegradation of chlorinated solvents in groundwater downgradient of the Beaver Dam Road Landfill Superfund site.

Site Investigations

Mr. Marshall has performed hundreds of site investigations, ranging from Phase I and II Environmental Site Assessments to complex multi-media, multi-year investigations (e.g., CERCLA Remedial Investigations, RCRA Facility investigations, and several state voluntary cleanup and remediation programs). He has planned, managed, and implemented scores of investigation and remediation projects associated with asbestos (both construction materials and naturally occurring asbestos), lead-based paint, underground and above-ground storage tanks, radon, and dozens of industrial chemicals, including PCBs, heavy metals, chlorinated solvents, pesticides and herbicides,

dioxane, and PFASs. Many of these projects included extensive negotiations and coordination with EPA and state environmental agencies (e.g., Virginia, Maryland, DC, New Jersey, New York, Pennsylvania, North Carolina, South Carolina, etc.).

Mr. Marshall provided arsenic investigation and risk assessment services for several residential sites in the Spring Valley neighborhood in Washington, DC, an area that the Department of Defense used for ordnance activities during the World War I era.

Superfund/CERCLA Services

Mr. Marshall provides over three decades of experience with CERCLA sites, including:

- Remedial Investigation, Risk Assessment, Feasibility Study, Remedial Design, Remedial Action oversight, five-year review for Fulbright and Sac River Landfill sites, Springfield, MO.

- Provide assistance in identifying waste generators (i.e., potential responsible parties) at NPL landfills.

- Remedial Investigation, Risk Assessment, Feasibility Study, interim measures design, construction oversight, and remedial design for Hosier Road Landfill, Suffolk, VA.

- Remedial Investigation and Endangerment Assessment, Riverfront Park Landfill, Kansas City, MO.

- Remedial Investigation, Risk Assessment, Feasibility Study for multiple New York State Superfund sites, including:
  - Union Road is a former railroad yard and rail maintenance facility in Buffalo.
  - Booth Oil, an inactive oil reclamation facility in Buffalo.
  - Storonske Cooperage, a drum and container reclamation facility, Rensselaer County.
  - Village of Bedford Wells, dry cleaners, and regional chlorinated solvent plume.

- Review background documents, prepare independent Hazard Ranking System score, perform supplemental site characterization, and submit comments in response to proposed NPL listing, City of Chesapeake Landfill, VA.

- Review background documents, prepare independent Hazard Ranking System score, and submit comments in response to the proposed NPL listing, an inactive landfill in Baltimore, MD.

- Supplemental Remedial Investigation to evaluate the source of groundwater contamination and litigation support, Odessa Chromium #2, TX.

- Assist National Gypsum, a PRP, in estimating response actions and costs at six NPL sites.

- Preliminary Assessment, Site Investigation, and Expanded Site Investigation services for several CERCLIS sites are being considered for addition to the NPL, including a fertilizer manufacturing facility in VA.

- Assist the Virginia Department of Transportation in evaluating human health risks associated with the proposed highway improvements and recreational facility construction at the Camp Allen Salvage Yard, Norfolk Naval Base, VA.

- Technical support for PRP cost allocation of multiple confidential Superfund sites.

- Third-party review of response actions and costs to evaluate consistency with CERCLA requirements and protocols at multiple sites nationwide.

Human Health and Environmental Risk Assessment

Mr. Marshall has prepared dozens of qualitative and quantitative risk assessments (RAs), and has provided peer review of RAs prepared by others. The RAs are typically used to assess the need for remediation, engineering controls, and institutional controls at sites where contamination has been identified. RA experience includes active and closed landfills, chemical manufacturing facilities, dry cleaners, a former concrete and fertilizer manufacturing plant, UST and AST sites, DoD facilities, a 66-acre junkyard located on Lake Manassas, PCB-release sites, and miscellaneous active and inactive industrial sites. RA protocols have included CERCLA, RCRA Subtitle C, RCRA Subtitle D, several state voluntary remediation and cleanup programs, and numerous air emissions/permitting scenarios. In conjunction with an air emissions permit application, he prepared a human health RA for hazardous air pollutant emissions from a landfill-gas-to-energy facility and several fumigation facilities. Ecological RA experience includes an evaluation of aquatic risks resulting from PAHs in various fuel oil compositions. Mr. Marshall is also experienced in designing and implementing laboratory studies to evaluate the toxicological effects of chemicals.

Industrial Hygiene and Indoor Air Quality

Mr. Marshall has provided IH and IAQ services for chemical and biological constituents at industrial, commercial, governmental, and residential facilities. Projects have included a chlordane assessment at a residential rental unit owned by the Folger Theater in Washington, DC**;** multiple indoor air quality assessments for various areas within hospitals, including the operating room suites; mold assessment and remediation services for the new Leesburg courthouse; assessment of airborne lime dust and treated sludge/metals at a municipal wastewater treatment plant in Manassas, Virginia; scores of VOC assessment and remediation projects; assessment and remediation of hydrogen sulfide emissions produced by anaerobic degradation of wallboard (gypsum) at landfills and industrial sludge ponds; assessment of hydrogen sulfide generation at a coal-fired power plant; assessment of IAQ impacts from a commercial printing facility; assessment of hydrogen cyanide emissions from an industrial waste landfill; and Anthrax sampling and analysis services for private mail rooms in Washington, DC.

Stormwater Services

Mr. Marshall has assisted dozens of industrial and commercial facilities with industrial stormwater management, permitting and compliance issues, including preparation of permit applications (new and renewal) for individual National Pollutant Discharge Elimination System (NPDES) permits; preparation of permit applications for coverage under a variety of general NPDES stormwater permits; No Discharge Certifications; permit applicability determinations; stormwater sampling and analysis covering chemical analytes and aquatic toxicology (biological); preparation of Discharge Monitoring Reports; preparation and update of Stormwater Pollution Prevention Plans; stormwater pollution prevention training programs; Stormwater Compliance Improvement Plans; negotiations assistance for Administrative Consent Orders regarding stormwater compliance issues; Erosion and Sediment Control Plans; Annual Stormwater Compliance Evaluations.

Petroleum

Mr. Marshall has extensive experience in the environmental aspects of petroleum management, release investigation, and remediation. He has prepared scores of Spill Prevention Control and Countermeasure Plans (SPCC), Facility Response Plans, Oil Discharge Contingency Plans (Virginia), Spill Prevention and Response Plans (West Virginia), and Integrated Emergency Response Plans.

Permitting experience for petroleum facilities includes UST/AST registrations, preparation of stormwater permit applications, stormwater management plans, air emissions permit applications, and annual air emissions statements.

Design and inspection experience includes UST systems, AST systems, and secondary containment systems. Secondary containment experience also includes inspections, capacity evaluations, upgrades, and PE certifications for existing systems.

Multiple Projects, Virginia Petroleum Storage Tank Program. Mr. Marshall has worked on scores of investigation and remediation projects under the Virginia Petroleum Storage Tank Program. His oil and petroleum experience includes crude oil, gasoline, diesel fuel, various grades of heating oil, mineral spirits, Stoddard solvent, jet fuel, avgas, Bunker C/No.6 fuel oil, vegetable oils, and soy-based inks. Petroleum facilities include bulk petroleum storage and distribution facilities, service stations, commercial and industrial facilities, railroad maintenance facilities, residences, apartment and condominium complexes, DoD facilities, hospitals, landfills, etc.

Remediation experience includes soil, groundwater, surface water, and sediments. Soil remediation experience includes excavation, in-situ and ex-situ bioremediation, low-temperature thermal desorption, soil vapor extraction, stabilization, and cover systems. Groundwater remediation experience includes free product removal systems, dual-phase recovery systems, air stripping, carbon adsorption systems, and enhanced in-situ bioremediation technologies.

In the late 1990s, Mr. Marshall provided support to the Virginia Department of Environmental Quality, Underground Storage Tank group in researching and developing investigation and remediation approaches for MTBE at storage tank sites.

Innovative Technology Evaluation

Mr. Marshall's chemical engineering capabilities, combined with several decades of experience in the environmental industry, have been used to support the technical and economic evaluation of dozens of new and innovative environmental technologies. Such evaluations have been performed for potential investors, technology developers, and potential users - i.e., commercial firms and government agencies that are interested in purchasing and applying new and innovative environmental systems. Mr. Marshall's experience includes evaluation of groundwater remediation systems, wastewater treatment technologies, soil remediation systems, air emission control systems, hazardous waste treatment systems, solid waste conversion technologies, and waste-to-energy systems.

Waste Characterization

Mr. Marshall employs his expertise in environmental regulations, chemistry, analytical laboratory methods and regulatory agency guidance to assist clients in the design and implementation of sampling protocols and RCRA waste characterization efforts, and the interpretation of laboratory data. Such experience includes hazardous waste, industrial waste, special wastes, used oil, municipal solid waste, landfill leachate, landfill gas, landfill gas condensate, wastewater, storm water, air emissions, and other unique waste streams.

Special Wastes and Industrial Wastes

Mr. Marshall provides expertise in the characterization, management, treatment and disposal of special wastes and industrial wastes generated by a host of sources. Such wastes include energetic/ordnance wastes, R&D wastes, biosolids, sanitary and industrial WWTP sludge, dross, slag, baghouse dust, flue gas desulfurization materials (e.g., gypsum), coal combustion residuals,

plating wastes, construction and demolition debris (including gypsum/wallboard), paper plant sludge, refinery sludge (Ramat Hovav), wood processing byproducts, food and food processing wastes, agricultural wastes, remediation waste, sulfur-bearing wastes, pesticides and herbicides, used paint blasting grit, low level radioactive wastes, asbestos containing materials, lead-based paint wastes, treated lumber, RCRA universal wastes (e.g., mercury-containing equipment, lamps, batteries), used oil and lubricants, spent solvent reclamation wastes, firing range cleanup materials, paints and solvents, and many others.

RCRA Closure

Experience includes several Department of Defense Sites (Naval Surface Warfare Center - Dahlgren, NSWC- White Oak, the Ravenna Army Ammunition Plant, and the Cape Lisburne Long Range Radar station located on the north slope of AK), a mixed hazardous/rad waste treatment system at the National Institutes of Health, two fertilizer manufacturing facilities, a fiberglass/resin facility, a metals plating and wastewater treatment facility, and scores of storage tank sites. Waste management units have included hazardous waste storage facilities, a hazardous waste tank mixing facility, indoor and outdoor waste piles, and a 360,000 gallon waste storage tank system for a fertilizer manufacturer in Chesapeake, VA; a hazardous waste surface impoundment for a metal finishing facility in South Boston, VA; a hazardous waste storage area and a wastewater treatment system for a metal parts manufacturer in Blairsville, GA; a waste treatment system and several underground storage tanks for metal plating wastes at a metal parts manufacturing site in Murphy, NC; a waste solvent tank at a manufacturing facility in Tidewater, VA; two paint waste disposal areas at a municipal yard in Chesapeake, VA; a hazardous wastewater treatment system at a steel plant in California; five surface impoundments at two cutting tool manufacturing facilities in Pennsylvania; ordnance heat deactivation furnaces; and several open burning and open detonation systems for treatment of ordnance wastes.

Regulated Medical, Infectious and Pathological Waste

- Evaluation of upgrade requirements to comply with the new EPA Emission Guidelines for Hospital/Medical/Infectious Waste Incinerators (HMIWI Rule, 40 CFR 60, Subpart Ce) for an existing HMIWI owner/operator.

- Feasibility study to evaluate technical and economic aspects of medical waste treatment and disposal alternatives, Rockingham Memorial Hospital, Virginia.

- Preparation of permit-by-rule documentation for medical waste storage facilities.

- Provide medical waste compliance review in preparation of regulatory compliance audit, DeWitt Army Hospital, Fort Belvoir, Virginia.

- Response to EPA notice of violation regarding air compliance issues, issued to a medical waste incinerator operator, Wilkes-Barre, Pennsylvania.

- Compliance evaluations for multiple Army and Navy medical facilities throughout the US.

- Provide compliance assistance services related to medical waste generation, storage, transportation, treatment and disposal requirements for a confidential medical waste generator with facilities nationwide.

- Provide evaluation of narrow permit exemptions, notification requirements, and recordkeeping requirements for the incineration of small quantities of medical waste under EPA's Title V HMIWI and CISWI regulations.

- Value Engineering assessment for medical/infectious waste incinerator facility design at an Army R&D facility.

- Evaluation of nationwide availability of HMIWI facilities and services.

- Identification and assessment of non-incineration alternatives for pathological medical waste treatment and disposal.

- Preparation of facility-wide air emissions permit applications for new hospitals in Rockingham County, VA and Fredericksburg, VA.

- Medical waste compliance assessment services for scores of private and government clinics.

- RCRA hazardous waste permitting and compliance assistance for a medical waste and spent solvent distillation and recycling system at a Navy hospital in Tidewater, VA.

- RCRA Closure of mixed haz/rad waste treatment unit, NIH, Bethesda, MD.

Environmental Management Systems (EMS)

Environmental Management experience includes ISO 14001 seminars, preparation of SPCC Plans for scores of oil storage facilities, SPCC training programs, Oil Discharge Contingency Plans, Stormwater Pollution Prevention Plans, Integrated Contingency Plans and Emergency Response Plans, O&M Plans, Waste Minimization Audits and Plans, Waste Characterization and Management Programs, Loss Prevention Plans, Environmental Training Programs, and miscellaneous permit compliance assistance and negotiations for facilities nationwide. Mr. Marshall worked with the VA Department of Transportation to develop a compliance auditing program and environmental management system for implementation throughout the organization.

Brownfields and Voluntary Remediation

Projects have included investigation and remediation of a former rail yard in conjunction with the construction of the new Time Life headquarters building in Alexandria, VA; investigation and remediation of arsenic-based herbicide contamination along an inactive rail corridor being re-developed as a vintage trolley system in Charlotte, NC; investigation of two inactive landfills to support the design and construction of a new access road at Fort Belvoir, VA; site investigation and risk assessment at an inactive landfill to support redevelopment for use as sports fields, Winston-Salem, NC; investigation and remediation of a former construction maintenance yard during re-development and construction of a new newspaper printing and distribution facility in College Park, MD; and preparation of a feasibility study for a former used oil recycling facility in Buffalo, NY; investigation, risk assessment, and remediation of a former fertilizer and concrete manufacturing facility contaminated with arsenic, mercury, chromium, and lead in Portsmouth, VA; investigation and remediation of former industrial sites (brewery, plastics manufacturing, dry cleaner, sign shop, auto junk yard, rail maintenance facility) for the Norfolk Redevelopment and Housing Authority; redevelopment of a closed landfill into a major commercial freight delivery facility .

Similar investigation, risk assessment and remediation projects performed under state voluntary remediation programs include several dry cleaners, auto repair facilities and gas stations, a nursery, warehouses, a fertilizer manufacturing plant, a concrete plant, a municipal maintenance facility,

former orchards, and several urban lead sites. Experience includes the development and implementation of deed restrictions and engineering controls to limit human exposure to residual contamination.

National Environmental Policy Act

NEPA experience includes:

- Detailed engineering support for preparation of NEPA Environmental Impact Statements for Army binary chemical production facilities. Specific issues included hazardous materials, hazardous waste, water consumption, wastewater treatment and disposition, air emissions, energy consumption, and environmental permitting.

- Provided third party review and public comments regarding the Environmental Impact Statement for relocation of the U.S. Patent and Trademark Office from Crystal City to Alexandria. Specific issues included environmental contamination resulting from historic site uses.

- Primary author, Environmental Impact Review (Virginia's equivalent of an Environmental Assessment under the federal NEPA program) for the redevelopment of the Virginia Department of Transportation's regional service center and administrative facility at the new McConnell Public Safety and Transportation Operations Center, Fairfax County.

- Preparation of Environmental Assessments to support Findings of No Significant Impact (FONSI) for several federal and state-funded projects.

Remediation and Waste Treatment

Projects have addressed groundwater, surface water, wastewater, leachate, soil, sediments, air, landfill gas (LFG), and LFG condensate. Remediation systems have employed chemical, physical, thermal, and biological approaches, including bioremediation, air stripping, carbon adsorption, thermal treatment, soil vapor extraction, air sparging, scrubbing, settling, filtration, catalytic destruction, chemical conversion (redox reactions), neutralization and precipitation, in-situ lead stabilization (e.g., firing ranges and battery disposal sites), encapsulation, capping, UV enhanced oxidation, chemical oxidation, and monitored natural attenuation. Contaminants have included cyanides, chlorinated solvents, petroleum constituents, pesticides, herbicides, heavy metals (e.g., arsenic, chromium, lead, mercury), PCBs, PAHs, radionuclides, VOCs, semi-volatile organic compounds, and energetic materials.

Polychlorinated Biphenyls (PCBs)

Mr. Marshall has performed dozens of projects involving the management of PCBs, and the investigation and remediation of PCB releases under the TSCA Spill Cleanup Policy and CERCLA. For example, Mr. Marshall managed a multi-media investigation of indoor and outdoor releases of PCB dielectric fluid associated with a dedicated electrical system for a research laser at the National Naval Medical Center, Bethesda, MD. The release investigation included sampling and analysis of indoor and outdoor concrete surfaces, indoor equipment surfaces, groundwater seeps into the basement, soil, and surface water and sediments in an adjacent stream. The investigation results were used to prepare plans and specifications for remediation, including surface decontamination and soil removal. SCS assisted in the selection of a remediation contractor, provided oversight of remediation, and prepared the final remediation report for submittal to USEPA. Other PCB projects performed by Mr. Marshall include an assessment and remediation of PCB transformer releases at the Virginia-American Water Company, Hopewell, Virginia; RI/FS for a former used oil reclamation

facility in Buffalo, New York; assessment of PCBs in soil at a metals recycling facility in Virginia, and environmental compliance audits of multiple GSA facilities with known PCB contamination at indoor electrical control rooms. Guidance has been provided to numerous commercial property owners, management firms, and demolition firms regarding the characterization and disposal of fluorescent light ballasts and used oil. Mr. Marshall has prepared and presented various training sessions on PCB management and spill response.

Asbestos

Asbestos experience includes asbestos containing building materials (ACBM). naturally-occurring asbestos, and asbestos landfills. Mr. Marshall has managed and directed scores of ACBM projects, including building inspections, O&M Plans, abatement plans, and asbestos removal projects. Subject facilities have included industrial plants (electronics, fertilizer, metal products, etc.), government facilities, office buildings, communications centers, hospitals and healthcare facilities, and hotels. He has also provided health protection and monitoring programs for several construction projects in areas underlain by natural actinolite and tremolite veins. Services have included preparation of specifications and project work plans to control employee exposures during drilling, blasting, excavation, utility line installation, and concrete and steel construction. Additional services included preparation of Health and Safety Plans, employee training programs, ambient air monitoring services, airborne asbestos dust control, waste disposal service, and assistance in addressing concerns raised by regulatory agencies.

Environmental Due Diligence

Mr. Marshall is an environmental professional who has prepared hundreds of Phases I and II Environmental Site Assessment (ESA) Reports. He has been performing ESAs since the mid-1980s – i.e., many years prior to the first ASTM ESA standard and EPA's All Appropriate Inquiries regulations.

Due diligence experience includes Phase II ESA for a solar project at a closed landfill. Phase II was performed to support tax incentives under the Inflation Reduction Act.

U.S. EPA

Mr. Marshall has been involved in several EPA environmental regulatory development programs, including an evaluation of the Superfund program and recommendations for the development of the RCRA Corrective Action Program, performed for the Office of Solid Waste; a nationwide investigation of leaking underground storage tanks; household hazardous waste studies for EPA's Land Disposal Branch in relation to the 1984 Hazardous and Solid Waste Amendments to RCRA; and an evaluation of location standards for Subtitle D facilities.

Prior Experience

Chemical Process Design Engineer. Prior to joining SCS in 1985, Mr. Marshall spent three years with the U.S. Army Chemical Research and Development Center at the Aberdeen Proving Ground, MD. Responsibilities included the design of handling, treatment, storage, transportation, and disposal systems for the many hazardous substances (e.g., nerve gas and precursors, elemental phosphorus, smoke, and obscurant agents, ordnance, and energetic materials) used and wastes generated at DOD chemical manufacturing facilities. Mr. Marshall also assisted in the preparation of NEPA Environmental Impact Statements for various chemical production facilities. Much of this work was related to phosphorus, organophosphate, and sulfate chemicals. Such compounds are very similar to many of the pesticides currently of environmental concern.

Subsequent process design engineering experience includes:

- Industrial wastewater and stormwater treatment systems
- Sanitary wastewater treatment systems
- Anaerobic organic waste digestion and chemical synthesis systems
- Aerobic bioremediation systems for soil and groundwater
- Groundwater pump-and-treat systems covering a wide range of organic and inorganic contaminants, including chemical, biological, and physical treatment methods
- Thermal desorption and incineration systems
- Used solvent recovery and reclamation systems
- Carbon adsorption systems, vapor phase and liquid phase
- Ordnance and energetic materials treatment and disposal technologies (e.g., RCRA Subpart X)
- Air emissions capture and control technologies
- Medical waste treatment
- Solid and hazardous waste treatment – minimization, neutralization, stabilization, solidification, thermal treatment, chemical treatment, etc.
- Waste-to-energy and waste-to-fuel technologies

Publications and Presentations

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Marshall, Jeffrey D., and Mike Miller. "What does EPA's Proposed PFAS Regulation Mean for Commercial Real Estate? A new designation for certain chemicals regulated by the Superfund law could impact property transactions." In Development magazine, Fall 2023.

Marshall, Jeffrey D., Sam Cooke, and Dr. Gomathy Rodhakrisha Iyer. "Managing PFAS in Landfill Leachate and Sludge in a Changing Regulatory Climate" Live webinar presented July 21, 2022.

Marshall, Jeffrey D. and Tony Kollasch. "PFAS – An Update on This Emerging Contaminant" [Presented at] Wisconsin Safety Council 79th Annual Conference. April 20-22, 2021. (Virtual Conference).

Christman, Ryan and Jeffrey D. Marshall. "Air Permitting Challenges for the Commodity Fumigation Industry" [Presented at] 113th Annual Conference and Exhibition. Sponsored by the Air and Waste Management Association. June 30 – July 2, 2020. (Virtual Conference).

Marshall, Jeffrey D. "Mitigating Hydrogen Sulfide Issues at CCR and MSW Co-disposal Sites" [Presented at] World of Coal Ash. Sponsored by the American Coal Ash Association. May 11, 2017. (Lexington, KY).

Marshall, Jeffrey D. "Hydrogen Sulfide Issues at CCR and MSW Co-disposal Sites" [Presented at] Coal Ash Management Forum. Sponsored by the Environmental Research and Education Foundation, and National Waste and Recycling Association. July 21, 2016. (Charlotte, NC).

Marshall, Jeffrey D. "Coal Combustion Ash" [Presented at] Maryland Recycling Network/Solid Waste Association of North America Mid-Atlantic Conference. June 16, 2011. (Linthicum, Maryland).

Marshall, Jeffrey D. "Ash Management" [Presented and published in the proceedings of] The 13th Annual Landfill and Landfill Gas Seminar. Sponsored by SCS Engineers. April 14 (Baltimore, MD), April 29 (Roanoke, VA), and April 30, 2010 (Richmond, VA).

Marshall, Jeffrey D. and Michelle Leonard. "Landfills and LEED Certification" in Brownfield News, Volume 11, Issue 4, August 2007, published by Environomics Communications, Inc. and the National Brownfield Associations, page 22.

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Marshall, Jeffrey D. "Applicability of the ACGIH Hydrocarbon Limit to Landfill Gas" [Presented and published in the proceedings of] The 13th Annual Landfill and Landfill Gas Seminar. Sponsored by SCS Engineers. April 27 (Roanoke, VA), April 28 (Richmond, VA) and May 17, 2006 (Baltimore, MD).

Marshall, Jeffrey D. "Traversing the Medical Waste Permit process" [Presented at] WASTEEXPO/The Medical Waste Conference sponsored by the Environmental Industries Association, May 5, 2005 (Las Vegas, NV).

Marshall, Jeffrey D. "Hydrogen Sulfide Generation, Prevention, and Mitigation" [Presented and published in the proceedings of] The 12th Annual Landfill and Landfill Gas Seminar. Sponsored by SCS Engineers. April 21 (Roanoke, VA) and April 22, 2005 (Richmond, VA).

Marshall, Jeffrey D. "Emerging Remediation Technologies: Microturbines, Metals Stabilization, Nanoscale Zerovalent Iron, Phytoremediation, Update on Monitored Natural Attenuation" [Published in] Environment, Energy and Resources Law, The Year in Review 2004, The American Bar Association, Section of Environment, Energy and Resources. 2005.

Marshall, Jeffrey D. "Does Your Landfill Need an Environmental Management System?" [Presented and published in the proceedings of] The 10th Annual Landfill and Landfill Gas Seminar. Sponsored by SCS Engineers. April 24 (Roanoke, VA) and April 25, 2003 (Richmond, VA).

Marshall, Jeffrey D. "Exposure Pathways Assessment for Landfills". [Presented and published in the proceedings of] The Eighth Annual Landfill and Landfill Gas Seminar. Sponsored by SCS Engineers. March 26 (Roanoke, VA) and March 27, 2001 (Richmond, VA).

Marshall, Jeffrey D. "New Clean Water Act Regulations for Wastewater Discharges from Landfills". [Presented and published in the proceedings of] The Seventh Annual Landfill Seminar. Sponsored by SCS Engineers. April 11 (Roanoke, VA) and April 12, 2000 (Richmond, VA).

Marshall, Jeffrey D. "Spill and Release Reporting". [Presented and published in the proceedings of] the Executive Enterprises Environmental Regulations Course. April 2000 (Alexandria, VA); October 1999 (Washington, DC); August 1999 (Philadelphia, PA); June 1998 (Virginia Beach, VA); June 1997 (Virginia Beach, VA); December 1995 (Baltimore, MD); August 1995 (Baltimore, MD); June 1995 (Baltimore, MD).

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Marshall, Jeffrey D. and John Kinsella. "Should You Pursue ISO 14000?" in FOCUS, published by Virginia Manufacturers Association, Volume 4, Number 1, Spring-Summer 1998.

Ward, Christopher G. and Jeffrey D. Marshall. "Risk Assessment Approaches for Evaluation of Groundwater Impacts at Subtitle D Landfills." [Presented by C.G. Ward and published in the proceedings of] The Fourth Annual Landfill and Landfill Gas Seminar in Richmond, VA. Sponsored by SCS Engineers. February 25, 1997.

Marshall, Jeffrey D. "Virginia Voluntary Remediation Program." [Presented at] Seminar: Technical and Legal Overview of the Virginia Voluntary Remediation Program. Sponsored by SCS Engineers and Williams, Mullen, Christian & Dobbins. Virginia Beach, VA; Richmond, VA; Roanoke, VA; and Tysons Corner, VA. December 1995.

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Shaffer, Robert J. and Jeffrey D. Marshall. "Using Consolidated Emergency Planning as a Catalyst for Pollution Prevention." [Presented by R. J. Shaffer at and published in the proceedings of] 13th Annual Virginia Waste Management Conference, sponsored by the Solid Waste Association of North America (SWANA). April 26, 1995.

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Marshall, Jeffrey D. and Aileen C. Smith and Michael W. McLaughlin. "Remedial Investigation and Feasibility Study at the Hosier Road Landfill." [Presented at and published in the proceedings of] Twelfth Annual Virginia Waste Management Conference. Sponsored by Solid Waste Association of North America and Virginia Department of Environmental Quality. Richmond, VA. April 26, 1994.

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