

Curriculum Vitae

Robert L. Scotto

CAREER SUMMARY

A meteorologist with over 40 years experience in providing consulting services in all facets of Clean Air Act (CAA) compliance, e.g., permitting, air dispersion modeling, and ambient air monitoring. Particularly skilled in designing CERCLA-related air exposure assessments to ensure the protection of human health and welfare in support of hazardous waste site remediations, as well as in the application of the U.S. EPA (EPA) Data Quality Objective (DQO) process in support of such activities. National expert in a broad range of Superfund-related QA/QC issues, especially relating to the procedural framework set forth in the National Contingency Plan (NCP), and well-versed in Gaussian air dispersion theory and AERMOD modeling. Principal and co-founder of Minnich and Scotto.

Zone-wide QA manager for NUS Corporation, EPA's Field Investigation Team (FIT) contractor, responsible for QA program implementation and audit performance in all four Zone I FIT offices (EPA Regions 1 through 4). Rewrote the corporate QA Manual for the NUS Waste Management and Superfund Divisions, developed and implemented a comprehensive QA/management training program for staff, and consulted to EPA's ad hoc work group on QA Project Plan development and DQO process implementation. The total value of the FIT contract was \$300 million.

EDUCATION AND PROFESSIONAL DEVELOPMENT

M.S. Meteorology, The Graduate School, Rutgers University, 1978

B.S. Meteorology, Cook College, Rutgers University, 1975

A.S. General Science, Brookdale Community College, 1972

EPA Air Pathway Analysis Workshop, 1989

10-Hour OSHA Training Course - Construction Safety and Health (2013)

EPA HRS-2 Superfund Workshop, 1989

American Management Association Project Management Workshop, 1985

40-Hour OSHA Hazardous Waste Site Training, 1985

Superfund Field Training Certification, 1984

EXPERIENCE

Minnich and Scotto, Inc. – Freehold, New Jersey

Air Quality Consulting Firm

June 1996 - Present, Principal

Lead developer of e-Calc, Minnich and Scotto's proprietary software package created to generate air pollutant emission rates from a wide range of ground-level sources, in real-time. E-Calc utilizes open-path monitoring and onsite meteorological data for the real-time demonstration of acceptable exposure to nearby communities during the cleanup of former manufactured gas plant (MGP) and other hazardous waste sites.

Invited member of a New Jersey Department of Environmental Protection (NJDEP) technical committee for the preparation of a guidance document on site-remediation community air monitoring.

For Atmos Energy Corporation, managed a field project using PICMET (e-Calc's predecessor) to provide real-time protection to the local community during the cleanup of a former MGP site in Bristol, Tennessee. This was the first time Method TO-16 was used during such a cleanup, and was the project which led to a methods-development contract with the Gas Technology Institute (GTI). Atmos Energy

chose our firm based on our demonstrated capability to meet strict program objectives for community protection, as the site was a mere 30 meters from the Sullivan County Court House. Atmos Energy was the recipient of the Southern Gas Association's "2005 Environmental Excellence New Technology Award" for its use of this air monitoring and notification system.

Managed an extensive field investigation involving several process sources at an Alabama pulp-and-paper mill, in support of the mill's defense against a lawsuit brought by the local community. Served as expert witness for the defendant's attorney (Gibson, Dunn & Crutcher) in the case, which was adjudicated in favor of the mill based largely on results of the field work performed. Work included use of our e-Calc software to assess hydrogen sulfide (H₂S) emission-rate measurements in real-time from a 252-acre (1 square kilometer) polishing pond and other onsite effluent (wastewater) treatment sources, including a 14-acre aeration basin.

Directed an air dispersion modeling study which demonstrated that the planned remediation of the Gowanus Canal Superfund Site (Brooklyn, New York) would result in the release of airborne contaminants to the surrounding residents at IDLH levels (Immediately Dangerous to Life and Health). Work was performed to support a legal action against the USEPA on behalf of the local community, and was largely responsible for the design and implementation of a much safer, alternate clean-up remedy.

Principal investigator for several comprehensive H₂S field measurement programs to support City Environmental Quality Review (CEQR) air quality analyses for the upgrade of two New York City municipal wastewater treatment plants (WWTPs) – Bowery Bay and 26th Ward. For each facility, provided criteria pollutant air permitting support beginning with major source applicability analyses for several upgrade scenarios. Managed subcontractors for meteorological system installation and directed open-path FTIR spectrometer operations in support of program execution. Employed Jerome meters to collect approximately 3,000 individual samples at each facility to support emission-rate estimation.

For the Bowery Bay plant, provided Title V air permit support for nonattainment pollutants, including performance of detailed netting analyses and calculation of required offsets. Performed air dispersion modeling to evidence a net air quality benefit for each netting and offset analysis scenario considered.

As part of the field work for 26th Ward, managed a controlled tracer-gas release program involving open-path FTIR (Fourier-Transform infrared) spectroscopy for the direct calculation of the vertical dispersion coefficients used in the model (AERMOD) for emissions back-calculation. Dual tracer gases were released at known, constant flow rates from two upwind distances, and a best-fit, second-degree polynomial was created to describe the vertical dispersion over the downwind region of interest. These curves, each of which provided accurate simulation of the plume's vertical dispersion over the corresponding event period (typically 10 minutes), were then substituted into the model to maximize the accuracy of the emissions estimation. This work received accolades from D. Bruce Turner, widely regarded as the "father of air dispersion modeling."

For 26th Ward, managed a CEQR analysis for the upgrading of the emergency generator system. A facility capping analysis was performed to define a worst-case, allowable fuel-use scenario in order to keep the facility from becoming "major" in terms of its potential to emit (PTE), and to prevent exceedances of applicable ambient air quality standards or increments. Subject to a less-restrictive State Facility Permit by virtue of its status as a "synthetic minor source," the facility remains able to generate sufficient power during times when the local utility company reduces or interrupts electricity to the facility due to excessive regional demand.

Also for 26th Ward, prepared detailed greenhouse gas (GHG) calculations to support NYCDEP's recently implemented Climate Change Program. Calculations of carbon dioxide equivalent (CO₂e)

emissions were performed for all stationary combustion sources, including digester gas flares, as well as digester gas known to leak from the collection system and storage tanks.

For a Northeast law firm, performed refined air dispersion modeling to assess annual ambient air concentrations of volatilized mercury to which residents and public school students in the vicinity of the former DuPont Pompton Lakes Works facility could potentially be exposed.

For EPA's Office of Research & Development (ORD), provided meteorological consulting to support a feasibility assessment for using path-averaged, cavity ring-down spectroscopy (CRDS) to quantify fugitive methane emissions from natural gas production sites in the front range of the Rocky Mountains. Successfully applied the area-source technique to measure condensate-tank emissions in the field.

Performed Hazard Assessments (HAs) and Offsite Consequence Analyses (OCAs) for the NYCDEP under a 6-month, on-call contract in BEPA offices. The goal of this Risk Management Plan (RMP) work was to reduce the risk to the public from accidental chemical releases related to NYCDEP-operated water supply and wastewater treatment facilities. Provided BEPA personnel training in OCA-performance procedures.

Conducted a TOXCHEM+ modeling study to facilitate evaluation of chemical addition options for reducing the discharge of dissolved nitrogen at the NYCDEP's Hunts Point WWTP. Work was performed under contract to the URS/AKRF upgrade project team for this facility.

Conducted TOXCHEM+ modeling to assess emissions of hazardous air pollutants (HAP) and other regulated air contaminants in connection with an upgrade of the Tallman Island WWTP under contract to the Blasland, Bouck & Lee / EarthTech project team. Predicted emissions were applied to 179 area sources and 3 point sources, and annual standards were exceeded for chloroform, 1,4-dichlorobenzene, and tetrachloroethene. However, because none of these exceedances was greater than 10 times its respective standard (pursuant to New York State regulations for carcinogens), a BACT (Best Available Control Technology) analysis was performed to demonstrate the economic infeasibility of controlling emissions to the degree necessary to achieve full compliance. As such, BACT for this plant was defined as "no control," and further control of air toxics was not required. Results of this work were used by the project team and the NYCDEP to support the final upgrade design.

For Metcalf & Eddy, performed pre-construction air quality analyses to support permit procurement for a state-of-the-art floating 28.5 MW (megawatt) cogeneration facility to be permanently moored to a pier in the East River and supply steam to three Brooklyn housing projects. Work involved ensuring the facility was not defined as a "major source," and that the delicate balance between facility engineering decisions and permit procurement time was maintained while ensuring that power supply contractual provisions were not jeopardized.

For Goldman Sachs, managed procurement of a synthetic minor air permit (RADIUS) for a boiler and emergency generator for a commercial development project in Jersey City, New Jersey. Work involved ensuring that PTE levels could be maintained below major source thresholds while allowing for maximum operating flexibility.

For Sadat Associates, provided air pathway analysis (APA) support, including design and management of a comprehensive human health exposure assessment and an ambient air monitoring program for PCB-contaminated inhalable particulates at the Martin Luther King – Jefferson School in Trenton, New Jersey. Work was necessitated by the improper placement of contaminated construction aggregate fill material, in violation of the NJDEP's Technical Requirements for Site Remediation. Human exposure was assessed for both the undisturbed state (no-action option) and for the removal action. Particulate

concentrations were measured during removal activities to ensure that control measures were adequate to protect the community from adverse exposure. Results of the study demonstrated that community safe levels were not exceeded during either option.

Designed and executed a 4-week particulate air monitoring program to ensure community protection during the removal of thousands of cubic yards of diatomaceous earth (DE) at a potable water treatment facility in Poughkeepsie, New York.

Carala Air Services – Cranbury, New Jersey
Air Quality Consulting Firm

November 1995 - June 1996, Vice President

Designed and managed a comprehensive air permitting study in support of a project to re-power the existing Warbasse Cogeneration Facility in Brooklyn, New York. Analyses were performed to demonstrate compliance with State and Federal requirements, i.e., NSR (new source review), NAA (nonattainment area analyses), and PSD (Prevention of Significant Deterioration) as they apply to existing major NO_x sources and the CEQR review process. Managed all phases of a continuous emissions monitoring (CEM) system procurement.

Provided support in preparation of Method TO-16 for open-path FTIR spectroscopy, as well as implementation of a joint venture with AIL Systems (open-path FTIR manufacturer) for market development.

ETG Services – Cranbury, New Jersey
Air Quality Consulting Firm

July 1994 - November 1995, Vice President

Managed a comprehensive pilot-scale air monitoring program at Exxon's Bayway Refinery in Linden, New Jersey to support a remedial permit demonstration in accordance with NJDEP requirements. Open-path FTIR spectroscopy was employed, together with Summa canister, Tedlar bag, and PM₁₀ monitoring, to develop maximum potential emission rates during site-disturbance activities associated with the clean-up of sand pits and lagoons contaminated with petroleum hydrocarbons. Emission rates were demonstrated below significance levels for each of 41 target contaminants, and all analyses were performed to the satisfaction of the NJDEP.

Managed a model validation study involving use of open-path FTIR spectroscopy for a confidential client in Texas in support of a litigation case. A tracer gas was used to simulate normal facility operations, and downwind path-integrated monitoring results were compared to path-integrated concentrations as predicted by the ISCST Model.

Blasland, Bouck & Lee – Cranbury, New Jersey
Environmental Engineering Firm

January 1992 - July 1994, Associate

August 1989 - January 1992, Senior Scientist

Invited member of EPA's *ad hoc* committee for the creation of an air sampling guidance document for use by On-Scene Coordinators (OSCs) in the Superfund removal program.

Responsible for Project Plan preparation for numerous open-path FTIR field monitoring projects.

Managed turnkey air permitting projects in support of several proposed cogeneration facilities. A major accomplishment involved completion of a \$1.1 million “benchmark” air permitting study in support of a 280 MW gas-fired cogeneration plant in Brooklyn, New York. Work entailed addressing the requirements of the Clean Air Act and applicable NYSDEC air pollution control regulations. Procurement of PSD and NAA permits were required pursuant to the applicability of EPA NSR regulations. This involved detailed BACT and LAER (Lowest Achievable Emission Rate) reviews, and assessment and subsequent procurement of required emissions offsets. Other cogeneration projects involved preparation, submission, and procurement of RACT (Reasonably Available Control Technologies) noncompliance plans for existing sources, and ensuring their subsequent implementation pursuant to CAA Title I regulations as implemented by the NYSDEC.

Managed an open-path FTIR community air monitoring (CAM) program in support of an 11-month emergency removal action at the Michigan Avenue Dump Site near Detroit, Michigan. Monitoring was performed to ensure that volatile organic compound (VOC) emissions generated during the excavation of waste materials did not exceed off-site, health-based exposure levels, and to support the application of vapor suppressants whenever exposure levels were approached. This was the first time that a Method TO-16-based monitoring approach was used to drive an emergency removal action.

Managed all air investigation activities in support of site-wide remedial activities at the former American Cyanamid industrial wastewater facility in New Jersey. Work included a baseline air monitoring program to estimate VOC emissions from an on-site wastewater lagoon, comprehensive assessment of contaminant migration via the air pathway from more than ten on-site sources in support of a baseline endangerment assessment, and preparation of all necessary NJDEP air permit applications for pilot- and full-scale waste solidification equipment.

Managed a field program at an industrial aeration basin in Bayonne, New Jersey, to measure emission factors in support of an NJDEP air permit approval.

Managed a two-phased, open-path FTIR air characterization assessment in support of the remediation of the Caldwell Trucking Site in Fairfield, New Jersey. The first phase, conducted during pilot-scale remediation activities, involved development of emission factors to address NJDEP permit-equivalency requirements and to demonstrate that applicable air standards would not be compromised during full-scale remediation. The second phase involved implementation of a CAM program during actual cleanup to support protection of nearby residents and application of vapor suppressants whenever offsite adverse exposure levels were approached.

NUS Corporation – Edison, New Jersey
EPA Field Investigation Team Contractor, Region 2

February 1987 - August 1989, Zone-Wide Quality Assurance Manager

June 1984 - February 1987, Region 2 Quality Assurance Representative

October 1983 - June 1984, Senior Air Quality Specialist

Zone-wide QA manager, responsible for QA program implementation in all four EPA Zone I/FIT offices (Regions 1 through 4). The total value of that contract was \$300 million.

Re-wrote the corporate QA Manual for NUS Corporation’s Waste Management Division and Superfund Division, and developed and implemented a comprehensive QA/management training program for staff. Developed comprehensive zone-wide QA audit program.

Provided project manager training to ensure that all work was performed using a planned, systematic approach in conformance with applicable guidelines and procedures. Developed and implemented

procedures (Work Instruction Manual) for monitoring project activities to verify compliance with QA and contractual requirements and to assess QA program effectiveness. This included performing dozens of site-inspection(SI) and remedial-investigations (RI) field audits to ensure prompt identification of nonconformances (conditions adverse to quality) and implementation of effective corrective actions. For each such condition, measures were implemented (training program adjustments) to preclude their recurrence.

Developed an EPA Region 2 Standard Operating Procedure (SOP) for the design and execution of air monitoring studies using open-path FTIR and UV techniques, a predecessor to Method TO-16 for open-path FTIR spectroscopy.

Managed several Hazard Ranking System (HRS) projects employing such air sampling techniques as sorbent tubes, Tedlar bags, and Summa canisters.

Enviroplan, Inc. – West Orange, New Jersey
Air Quality Consulting Firm

December 1980 - October 1983, Senior Scientist

August 1978 - December 1980, Scientist

Managed a \$1 million special field study for the Cleveland Electric Illuminating Company Avon Lake Power Plant to investigate the impact of the Avon Lake upon dispersion of air pollutants from the facility in support of a State Implementation Plan (SIP) revision to allow use of higher sulfur-content coal. The project involved use of LIDAR for the direct measurement of horizontal and vertical dispersion coefficients to develop a less-conservative site-specific air quality model which was approved for use by the appropriate regulatory agencies.

Managed a \$250,000 air quality modeling study for Central Illinois Light Company (CILCO) to determine the extent to which the SO₂ (sulfur dioxide) emission standards for the Edwards Station could be revised upwards while still ensuring attainment of all National Ambient Air Quality Standards (NAAQS) and PSD increments. All sources (33 stacks) in the Peoria area were modeled at each of 398 prediction locations based on 5 years of meteorological data. Results of this study allowed CILCO to burn the higher sulfur-content coal, and led to a cost savings of more than \$1 million per year.

Conducted meteorological tower siting study in support of emergency preparedness plan development for a nuclear power plant located in complex terrain in western Pennsylvania.

SELECTED PUBLICATIONS

Perimeter Air Monitoring for Litigation Avoidance During the Cleanup of Former MGP Sites. Schulz, Stuart P.; Scotto, Robert L.; et al. (unpublished manuscript)

Innovative Air Monitoring for Mitigating Litigation and Minimizing Risk During MGP Site Remediations: Status of an ORS Methods-Development Initiative. Takach, Stephen F.; Minnich, Timothy R.; Scotto, Robert L.,et al. Proceedings of Electric Power Research Institute MGP 2007 Symposium, Atlanta, GA, January 2007.

Status of ORS-Based Perimeter Air Monitoring Initiatives During the Cleanup of Former MGP Sites. Takach, Stephen F.; Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 99th Annual Conference and Exhibition, New Orleans, LA, June 2006.

An ORS-Based, Mass-Balance Method for Estimating Air Emissions from AFO Area Sources. Minnich, Timothy R., Scotto, Robert L., et al. Proceedings of the A&WMA/WEF Animal Agricultural Specialty Conference, St. Louis, MO, September 2005.

ORS-Based Air Monitoring During an MGP Site Cleanup: A Case Study. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 98th Annual Conference and Exhibition, Minneapolis, MN, June 2005.

Cleanup of Former MGP Sites: Community Exposure, Responsible Party Liability, and Optical Remote Sensing. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 97th Annual Conference and Exhibition, Indianapolis, IN, June 2004.

Identification of Odor-Control Needs for a Municipal Wastewater Treatment Plant Upgrade: A New York City Success Story. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of WEF/A&WMA Odors and Air Emissions Specialty Conference, Bellevue, WA, April 2004.

Use of Open-Path FTIR Spectroscopy to Support Development of Refined Estimates of H₂S Emissions from a New York City Municipal Wastewater Treatment Plant. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 95th Annual Conference and Exhibition, Baltimore, MD, June 2002.

Use of Open-Path FTIR Spectroscopy to Address Air Monitoring Needs During Site Remediations. Minnich, Timothy R. and Scotto, Robert L., pp. 79-92 of Remediation Journal (invited article), Summer 1999, John Wiley & Sons, Inc.

CAA and Open-Path Spectroscopy. Minnich, Timothy R. and Scotto, Robert L. pp. 14-16 of Environmental Testing & Analysis (invited article), Volume 5, Number 4, May 1996.

Use of Optical Remote Sensing and Flux Chamber Technologies for Determining Emission Rates from a Pulp Mill Wastewater Treatment Facility. Schmidt, Charles E.; Barton, Douglas A.; Hasegawa, Mark; Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 87th Annual Conference and Exhibition, Cincinnati, OH, June 1994.

The Role of Open-Path FTIR Spectroscopy in the Development of a Successful Accidental Release Detection Program. Minnich, Timothy R. and Scotto, Robert L. Proceedings of A&WMA/CMA International Symposium on Optical Sensing for Environmental Monitoring, Atlanta, GA, October 1993.

Air Pathway Analysis Using Open-Path FTIR Spectroscopy at a Repository for the Disposal of Salt Cake Fines. Scotto, Robert L., et al. Proceedings of A&WMA 86th Annual Conference and Exhibition, Denver, CO, June 1993.

Remote Sensing of VOCs: A Methodology for Evaluating Air Quality Impacts During Remediation of Hazardous Waste Sites. Minnich, Timothy R.; Scotto, Robert L., et al. pp. 247-255 of Sampling and Analysis of Airborne Pollutants, Winegar, E.D. and Keith, L.H., editors, Lewis Publishers, Boca Raton, FL, 1993.

Air Monitoring During Site Remediations Using Open-Path FTIR Spectroscopy. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of HMC/Superfund Conference and Exhibition, Washington, D.C., December 1992.

VOC Emission Rate Determinations Using Open-Path FTIR Spectroscopy During Pilot-Scale Site Disturbance and Remediation Activities: A Case Study Using the Ratio Technique. Scotto, Robert L., et al. Proceedings of A&WMA 85th Annual Conference and Exhibition, Kansas City, MO, June 1992.

Air Pathway Analyses Using Open-Path FTIR Spectroscopy During Waste Removal and Solidification Activities at a Large Industrial Lagoon. Scotto, Robert L., et al. Proceedings of A&WMA 85th Annual Conference and Exhibition, Kansas City, MO, June 1992.

Validation of a Gaussian Plume Dispersion Model Based on Data from the Kansas Open-Path FTIR Intercomparison Study. Scotto, Robert L., et al. Proceedings of A&WMA 85th Annual Conference and Exhibition, Kansas City, MO, June 1992.

A Practical Methodology Using Open-Path FTIR Spectroscopy to Generate Gaseous Fugitive-Source Emission Factors at Industrial Facilities. Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA/CMA Symposium on Optical Remote Sensing and Applications to Environmental and Industrial Safety Problems, Houston, TX, April 1992.

Measurement of Methane Emissions in the Plume of a Large Coal Strip Mine Using Long-Path Fourier-Transform Infrared Spectroscopy. Piccot, Stephen; Chadha, Ajay; Kirchgessner, David; Minnich, Timothy R.; Scotto, Robert L., et al. Proceedings of A&WMA 84th Annual Conference and Exhibition, Vancouver, B.C., June 1991.

Air Pathway Monitoring for a Land Ban No-Migration Petition. Lupo, Mark J.; Magnuson, Charles E.; Scotto, Robert L.; et al. Proceedings of A&WMA 84th Annual Conference and Exhibition, Vancouver, B.C., June 1991.

A Method for Estimating VOC Emission Rates from Homogeneous and Non-Homogeneous Area Sources Using Remote Sensing. Scotto, Robert L., et al. Proceedings of U.S. EPA/A&WMA International Symposium on Measurement of Toxic and Related Air Pollutants, Durham, NC, May 1991.

Emissions Estimation and Dispersion Analysis Using Path-Integrated Air Measurement Data from Hazardous Waste Sites. Scotto, Robert L., et al. Proceedings of A&WMA 83rd Annual Conference and Exhibition, Pittsburgh, PA, June 1990.

Remote Sensing Data Quality Objectives and Quality Assurance for a Pre-Remedial Hazardous Waste Site Program. Scotto, Robert L., et al. Proceedings of A&WMA 82nd Annual Conference and Exhibition, Anaheim, CA, June 1989.