

Education:

MS, Environmental Engineering, University of Southern California, 1974

MS, Petroleum Engineering, University of Southern California, 1967

BS, Civil Engineering, Missouri School of Mines, 1967

Registrations:

Registered Civil Engineer, California (#22631), 1973

Registered Civil Engineer, Arizona (#29095), 1995

Registered Civil Engineer, Nevada (#17976), 2005

Registered Civil Engineer, New Mexico (#17226), 2006

Registered Corrosion Engineer, California (#727), 1977

Mr. Stirrat has more than 30 years of experience in civil engineering and hazardous and municipal solid waste landfill permitting, design, and operation. He is a highly regarded civil and environmental engineer and an authority on innovative landfill remediation programs and regulatory agency liaison. Mr. Stirrat has been Chief Consulting Engineer for projects at landfill facilities throughout California, Arizona, Oregon, New Mexico, and Montana. He was principal consulting engineer for the first U.S. EPA approved RCRA closure of a Class I, Hazardous Waste Landfill in the U.S. (BKK Landfill) and has advised state and federal agencies on closure technologies for hazardous and solid waste sites.

Solid Waste Planning:

Solid Waste Planning Study, San Bernardino County, California. Chief Consulting Engineer to Norcal/San Bernardino in the development of the Partnership Strategy Implementation Plan (PSIP), a long-range strategic planning study for the operation and management of 46 active and inactive landfills and transfer facilities in San Bernardino County, California.

Regional Landfill Options for Orange County (RELOOC) Study. Chief Consulting Engineer/Project Manager for the preparation of the long-range solid waste planning study for Orange County Study. The primary objective of the RELOOC study is to select a set of solid waste disposal options and/or technological alternatives to meet the long-term regional disposal capacity requirements of Orange County. Alternatives evaluated include expansion of existing landfill facilities, development of a new landfill, export of waste to out-of-county facilities, and use of alternative waste disposal technologies.

North Orange County Landfill and Alternative Technology Study (NOCLATS). Provided comprehensive engineering design and analysis during Phase II of the study. This included conceptual design of landfill disposal sites at four different locations within Orange County, California, incorporating resource recovery/recycling and assessing potential environmental impacts.

Solid Waste Bond Funding Study, Orange County, California. Chief Consulting Engineer for the preparation of the Engineer's Statement for the Orange County Public Financing Authority Waste Management System Refunding Revenue Bonds Series 1997. This report included an evaluation of the current status of the County waste management system including a summary of system expenses (i.e., landfill closure funding, post closure funding, maintenance cost for the County's 22 closed sites, Article 5 funding, environmental liability).

Inactive Landfill Site Strategic Plan. Chief Consulting Engineer for preparation of a strategic plan for the management of 18 inactive disposal sites for a large public landfill owner. The project included site inspections;

Memberships and Achievements:

University of Missouri-
Rolla, Academy of
Civil Engineers

Governor's Task Force
on Solid Waste

CIWMB Advisory
Committee on Municipal
Landfill Closure

SWANA Landfill Gas
Committee

American Society of Civil
Engineers, Vice President,
Los Angeles Section
(1988)

Member Pi Epsilon Tau,
Petroleum Engineering
Honor Society

National Association of
Corrosion Engineers
Western Region -
Engineer of the Year
(1979)

Elected into College of
Fellows of the Institute for
the Advancement of
Engineering (1982)

American Public Works
Association

American Society of
Mechanical Engineers

Southern California Waste
Management Forum

evaluation of site maintenance costs; cost-benefit evaluation of sites based on costs for maintenance, corrective action requirements, and potential end-use options; and financial modeling of differing operations scenarios.

Landfill Expansion/Master Planning:

Expansion Permitting and Design, Mid-Valley Sanitary Landfill, San Bernardino County, California. Chief Consulting Engineer to the County of San Bernardino for the permitting of the expansion of this regional municipal landfill facility. The project involved expansion of an existing 170-acre landfill into a regional disposal facility. This involved lateral development of the site into six major excavation fill phases over a 400-acre area.

Expansion Permitting and Design, Prima Deshecha Landfill, Orange County, California. Chief Consulting Engineer to the Orange County Integrated Waste Management Board for the expansion and facility permitting. The project has involved development of the site's Master Development Plan and two phases (Phases A and A1) of liner construction bid documents in support of development of this 1,500-acre regional metropolitan landfill.

Expansion Master Planning and Permitting, Olinda Alpha Landfill, Orange County, California. Chief Consulting Engineer to the Orange County Integrated Waste Management Board for vertical expansion project which involved preparation of master plan and permitting assistance for the vertical expansion of this 340-acre metropolitan landfill facility.

Master Development Planning & Phasing Design, Frank R. Bowerman Landfill, Orange County, California. Chief Consulting Engineer, for development of a comprehensive Master Development Plan for long-term site planning, intermediate phasing designs, operational designs, and coordination of refuse disposal and borrow excavation activities. Work also included the development of plans and specifications for liner construction documents.

Landfill Master Planning and Design, Flathead County Landfill, Kalispel, Montana. Chief Consulting Engineer for site master planning and development. Project involves on-call solid waste engineering services in support of site development activities.

Landfill Planning and Permitting, Glendale Landfill, Glendale, Arizona. Chief Consulting Engineering for master planning and development of the Glendale Landfill. Project has included review of the facility's master development plan, development interim fill sequencing plans, design of improvements to the gas extraction and treatment system, permitting and regulatory agency liaison, and preparation of end-use plans for the site's existing 140-acre footprint.

Professional Experience:*1984 - Present*President,
Bryan A. Stirrat &
Associates
Diamond Bar, California

Landfill Expansion Permitting, Crazy Horse Landfill, Salinas, California. Chief Consulting Engineer for the City of Salinas providing engineering design services for landfill expansion and preparation of the Draft and Final EIR for the Crazy Horse Landfill. The project included construction, engineering, operational, and permitting assistance for the master planning and development of this 160 acre Class III landfill.

*1978 - 1984:*Director of Engineering
National Engineering
Company
Industry, California

Landfill Siting and Expansion Planning, Central Landfill, Maui, Hawaii. Chief Consulting Engineer to the County of Maui for the siting and expansion of the existing Central Landfill located in the County of Maui, Hawaii. This included preparation of a master plan for vertical expansion and development of future phases of the site.

*1975 - 1978*Head of Planning and
Engineering,
Los Angeles County
Sanitation Districts
Solid Waste Management
Department

Master Plan Development, Aca Verde and Valle Verde Landfills, Mexico. Chief Consulting Engineer for the development of Master Plans.

*1972 - 1975*Senior Design Engineer
Los Angeles County
Sanitation Districts
Sewage Treatment Plant
Design Department

Municipal Landfill Design, Corral-Del-Indio Landfill, Mexico. Chief Consulting Engineer to the Municipality of Naucalpan (Mexico City) on the design of the 450-acre Corral-Del-Indio Landfill.

Municipal Landfill Design, BKK Landfill, West Covina, California. Chief Consulting Engineer responsible for the design of the 170-acre Class III Municipal Landfill at the BKK site (opened July 1, 1987).

Municipal Landfill Design, Los Angeles County, California. Chief Consulting Engineer to the Elsmere Corporation for the proposed municipal landfill in Elsmere Canyon in North Los Angeles County, California.

Landfill Siting and Conceptual Design, Ventura County, California. Chief Consulting Engineer responsible for the selection of a potential landfill site (Alamos Canyon) in Ventura County for a large land developer. Study included siting, grading design, access road design, geotechnical evaluation, capacity studies, and groundwater evaluation.

Landfill Closure:

Closure/Redevelopment Planning, Palos Verdes Landfill, Los Angeles County, California. Chief Consulting Engineer for environmental engineering associated with the development of an 18-hole golf course and clubhouse facilities on the 173 acre site of a closed landfill. This includes development of designs presented in the EIR, technical and public meeting support to the EIR process, engineering and evaluation of special-purpose membrane cap and landfill gas control systems, drainage controls, irrigation controls, monitoring systems, and methane controls for the clubhouse and a re-located equestrian center. The site was used as a co-disposal site for municipal and hazardous waste from 1957 to 1980.

Landfill Closure Design, Elsinore Landfill, Riverside County, California. Chief Consulting Engineer for final cover design, drainage and grading plans, borrow evaluation, QA/QC Plan, Health and Safety Plan, and construction management services.

Landfill Closure Design, Coyote Canyon Landfill, Orange County, California. Project involved preparation of Final Closure and Post-Closure Maintenance Plans for this 300-acre site. This included development of final landfill disposal plans, final cover design, leachate and landfill gas control systems evaluation and design, storm drain designs, and construction support services.

Landfill Closure Plans, Santiago Canyon Landfill, Orange County, California. Chief Consulting Engineer for the County of Orange Integrated Waste Management Department providing the Closure and Post-Closure Maintenance Plans for the Santiago Canyon Landfill

Landfill Gas Management:

Landfill Gas System Upgrades, San Bernardino County, California. Chief Consulting Engineer for the implementation of upgrades to landfill gas extraction and treatment systems at the Colton, Mid-Valley, Milliken, and San Timoteo landfills in San Bernardino County, California. The program was implemented under an accelerated schedule as mandated by the requirements of the alternative energy tax credit program.

Landfill Gas System Upgrades, Lopez Canyon Landfill, Los Angeles, California. Chief Consulting Engineer for the design of the flare station and landfill gas collection and condensate handling system.

Landfill Gas-to-Energy System Evaluation, Glendale Landfill, Glendale, Arizona. Chief Consulting Engineer on a project to develop landfill gas resources for energy generation purposes at this municipal landfill facility.

Remedial Engineering

Investigation and Clean-Closure of former landfill in Anaheim, California. Chief Consulting Engineer providing regulatory agency interface, and program management services during the closure of a former landfill where the Anaheim Redevelopment Agency wishes to construct a commercial development. This has included evaluation of waste excavation, landfill capping, landfill gas control, and installation of a membrane systems under proposed structures

Evaluation of Remedial Cost Alternatives, Cal Compact Landfill, Carson, California. Prepared preliminary cost estimates for an investment group that was evaluating the feasibility of developing a shopping mall at the site. This included development of cost estimates for the construction of a five-foot thick

mono cover utilizing on-site soils; installation of a gas control barrier to mitigate migration of landfill gas into mall buildings; and installation of landfill gas and groundwater extraction and treatment systems.

Expert Review Services in connection with litigation to determine the allocation of responsibility among responsible parties associated with the Cal Compact Landfill site. Developed estimates of actual waste tonnage in place; estimated of the amount of landfill gas generated since site began operating; reviewed remediation approach presented in the DTSC-approved Remedial Action Plan (RAP); developed a conceptual mitigation system design based on the process approved RAP for costing purposes; and prepared estimates of costs to implement the RAP and operate, monitor, and maintain the mitigation system.

Remediation Program, Fairchild Controls Brownfields Site, Manhattan Beach, California. Chief Consulting Engineer for preparation and implementation of a Remedial Action Plan for the site of an aerospace manufacturing firm and features chromium, PCE and TCE contamination in groundwater.

Chief Consulting Engineer for the preparation of a Supplemental Remedial Investigation/ Feasibility Study and design of a liner system and gas extraction and treatment system to mitigate hydrogen sulfide migration conditions at the Belmont Learning Center site in downtown Los Angeles.

Hazardous Waste Landfill Closure, BKK Class I Landfill, West Covina, California. Responsible for the preparation, design, and implementation of the Closure Plan for the 170-acre former Hazardous Waste Disposal Area. This included design of a final cover system, leachate management system, interior and perimeter landfill gas extraction systems, landfill gas flaring system, and drainage system.

RI/FS, Final Cover Design/Construction Management, Royal Boulevard Land Reclamation Site, Torrance, California. The project involved design of a final cover system for a former foundry waste disposal site, preparation of final grading and drainage plans, and construction management during site closure construction.

Closure Evaluation, Gardena Valley 1&2 Landfill, Gardena, California. Chief Consulting Engineer for the remedial action plan and closure planning for a former Class II landfill which is listed as a State Superfund Site. The project involves preparation of an RI/FS, a Baseline Health Risk Assessment, and preparation of a Remedial Action Plan. The preferred alternative in the approved RAP included preliminary designs for a multi-layer low permeability cover, a landfill gas collection and treatment system, and long-term monitoring of the site. Special consideration was taken during the preliminary design to ensure that the site could be commercially developed upon completion of remedial activities.

Site Control and Monitoring Activities, Operating Industries, Inc. Landfill, Monterey Park, California. Project Director to the PRP Technical Committee (1989 – 1995) for the site control and monitoring and leachate management systems (SCM/LMS) for the Operating Industries Landfill (Federal Superfund Site) in Monterey Park, California.

Civil Engineering:

Industry Hills Civic Recreation Complex Project, Industry, California. Overall Engineering Coordinator for project involving construction of a hotel complex and two championship golf courses on the site of a former municipal landfill. The project won the 1981 Outstanding Civil Engineering Achievement Award from the American Society of Civil Engineers.

Highway Interchange Design, Project Manager for the design of Crossroads Parkway Interchange to the Pomona Freeway. Project included a new freeway interchange on the Pomona Freeway and construction of a railroad overcrossing and triple box storm drains.

Water Supply System Design, Industry, California. Project Manager for the design and construction of five MGD reclaimed water supply systems to the Industry Hills Recreational Complex. This system services the irrigation needs for two 18-hole championship golf courses encompassing roughly 260 acres.

Tres Hermanos Ranch Infrastructure Design, Project Coordinator included design of internal roadway circulation storm drain facilities, water systems supply, storage, and distribution.

Storm Drain Assessment, Beverly Hills, California. Chief Consulting Engineer for an assessment of the storm drain system along Hamilton Way in the City of Beverly Hills.

Plaza at West Covina Shopping Mall Expansion, West Covina, California. Chief Consulting Engineer for project which included parking lot reconfiguration and rehabilitation, plus street, storm drain, utility planning, and grading improvements during Phases I and II of the expansion of this major commercial shopping mall.

Director of Engineering for the National Engineering Company. Responsibilities included infrastructural projects in the City of Industry.

Street Corridor Improvement Projects, Industry, California. Project Engineer, Gale Avenue and Azusa Avenue corridor street improvement projects.

Expert Testimony:

Del Rio Landfill. Expert witness for the City of Phoenix regarding a claim concerning offsite migration of contamination from the Del Rio Landfill.

Weyerhaeuser Mortgage Company regarding the migration of landfill gas at the Coastal and Santa Clara Landfills in California.

Meeks versus Birdsall regarding a landfill gas explosion and fire in a leachate collection sump at the Monmouth County Landfill in New Jersey.

Represented Emcon versus Hillsborough Homeowners Association regarding landfill maintenance and gas migration control systems at the closed Hillsborough Landfill.

Represented City of Los Angeles versus SCAQMD regarding landfill gas control system design for the Lopez Canyon Landfill.

Ghilotti Brothers Contractors regarding a landfill gas explosion in a storm drain manhole adjacent to the San Quentin Landfill.

Birtcher Riverside Marketplace versus Union Pacific Railroad Company. Represent the Union Pacific Railroad in the lead contaminated Riverside Market Place Remedial Action Plan review and cost estimate evaluation.

Represented City of Beverly Hills versus Arman regarding the performance of a storm drain system.

Represented the municipal defendants in the Acme Landfill hazardous waste site in the review of remedial alternatives and cost estimates.

Represented the County of San Diego at the former Duck Pond Landfill in the evaluation of remedial alternatives and cost reviews.

Represented Chevron Oil Company at the West Contra Costa Hazardous Waste site in the evaluation of closure alternatives and cost reviews.

Represented the Los Angeles Unified School District regarding methane gas remediation at the proposed Belmont Learning Center Site, a public high school facility in downtown Los Angeles.

Represented the City of Brea at the Brea Reservoir Construction Site, regarding cost overruns and poor environmental remediation.

Represented the County of San Bernardino in the application of a variance for South Coast Air Quality Management District Rule 1150.1 monitoring (landfill gas monitoring) during the closure of the Milliken Sanitary Landfill.

Publications:

"The Influence of Design and Construction on the Performance of Landfill Gas Extraction Wells" B.A. Stirrat, K. Johnson, R. Bauer, G. Andraos, A. Rivera; Solid Waste Association of North America 2004 Landfill Gas Symposium, San Antonio, Texas.

"Golf Course Reuse for a Landfill that Accepted Hazardous Waste and State-of-the-Art Review – Palos Verdes Landfill" B.A. Stirrat, R. Katherman; 2004 Brownfields Conference, Phoenix, Arizona.

"Regional Landfill Options for Orange County (RELOOC), County of Orange Integrated Waste Management Department Long-Range Strategic Planning" B.A. Stirrat, J.V. Goss, S. McClanahan, C. Arbogast, Solid Waste Management Association of North America Western Regional Meeting, Lake Tahoe, Nevada, 2002.

"On-Site Treatment of Dual-Phase Solvent/Alcohol Groundwater Contamination at an Old Paint Plant in Southern California," A. Lebel and B. A. Stirrat, *Proceedings of AEHS' Fifth Annual West Coast Conference on Contaminated Soils and Groundwater*, Long Beach, California, 1994.

"Cost-Effective Pump and Treat System for Groundwater Remediation Using Innovative Technology," A. Lebel and B. A. Stirrat, *Proceedings of WEF's Site Management Specialty Conference*, Miami, Florida, 1994.

"Leachate Treatment Facility at a Large Hazardous Waste Landfill in Southern California: An Environmental Perspective," A. Lebel and B. A. Stirrat, *Fourth International Conference on Environmental Quality and Ecosystem Stability*, Jerusalem, Israel, 1989.

"Startup Operation of Biophysical Leachate Treatment Facility," A. Lebel, A. Raveh, R. Meeden, and B. A. Stirrat, *61st Annual WPCF Conference, Water Pollution Control Federation*, Dallas Texas, 1988.

"Biophysical Treatment Facility for Hazardous Waste Landfill Leachates," A. Lebel, R. Meeden, and B. A. Stirrat, *14th Semi-Annual IAWPRC Conference*, Brighton, England, 1988.

"Biophysical Treatment of Landfill Leachates Containing Organic Compounds," T. McShane, E. Pollock, A. Lebel, and B. A. Stirrat, *41st Annual Purdue Industrial Waste Conference*, Purdue University, Indiana, 1986.