

William J. Smith
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Career Summary

Twenty years contributing technical expertise and leadership to the development and analysis of biological and chemical programs and processes.

Experience Highlights

- Manager of project to develop low-cost personal decontamination system for distribution by first-responders
- Counterproliferation analysis of biological and chemical programs and processes for producing weapons of mass destruction
- Engineering design, permitting, construction, start-up and operation of a \$34,000,000 chemical processing plant
- Project manager for field demonstrations of emerging chemical process technologies, including one developed by Lawrence Livermore National Laboratory
- Design and testing of biological and chemical processes for destroying organic and inorganic chemicals, including chemical agents
- Process development and field support for biological processes in remote and primitive locations within oil-fields
- Modeling dispersion and environmental fate of toxins from industrial facilities

Credentials

Ph.D., Chemical Engineering (Biochemical), Stanford University
B.S., Chemical Engineering, Iowa State University
Registered Professional Chemical Engineer, California
US Army Chemical Corps Officers Advanced Course

Experience Summary

Twenty years of experience in the petroleum, chemical and radiological materials process industries including: management of a project to develop a personal decontamination system; counterproliferation analysis of biological and chemical programs and processes for producing weapons of mass destruction; the design, construction, and operation of thermal treatment and chemical agent destruction systems; design, installation, and performance monitoring of biological systems; and technology development, evaluation, and field deployment for commercial, DOD, and DOE clients.

Modeled chemical processes to identify potential signatures for processes that would violate the Chemical Weapons Convention and analyzed intelligence on biological weapons programs. Developed and updated numerous mass and energy balances, process flow diagrams, process instrumentation diagrams, and equipment assembly drawings required to permit, construct, and operate chemical plants. Project manager for a \$4,000,000 project to commercialize molten salt oxidation for the Department of Energy and the permitting manager for the design and construction of a \$34,000,000 commercial facility for treating radioactive and chemical waste. Designed a chemical process for a Japanese trading company to destroy chemical munitions abandoned by the

Japanese in China after WWII. Developed clothing that would self-decontaminate nerve agents.

Professional Societies

American Institute of Chemical Engineers
American Chemical Society

Society of Industrial Microbiology

Publications and Patents

Smith, W.J., F. Feizollahi, R. Brimley, ATG Inc.; T. Broderick, ADA Technologies (USA), "Demonstration of a Stabilization Process for the Treatment of Radioactively Contaminated Wastes Containing Mercury at Concentrations Greater than 260 ppm," Proceedings of WM'01, Tucson, AZ, February 25-March 1, 2001.

Smith, W., F. Feizollahi, ATG Inc.; J. Surma, D. Lamar, IET; T. Eicher, W. Lin, Focus Environmental, "Results of Testing to Demonstrate the Equivalency of Full-Scale Plasma System to Incineration for the Destruction of Hazardous Wastes," Proceedings of WM'01, Tucson, AZ, February 25-March 1, 2001.

Jaraysi, M., C. Massimino, D. Domingo, F. Feizollahi, S. Goldenberg and W.J. Smith, "Mixed Waste Facility Risk Assessment for a Commercial Plasma-Based Gasification and Vitrification (GASVIT™) System," Proceedings of WM'99, Tucson, AZ, February 28-March 4, 1999.

Smith, W., S. Goldenberg and F. Feizollahi, "Mixed Waste Facility Risk Assessment," Proceedings of the Incineration and Thermal Treatment Technology Conference, Orlando, FL, May 10-14, 1999.

Inloes, D.S., W.J. Smith, D.P. Taylor, S.N. Cohen, C.R. Robertson, and A.S. Michaels, "Hollow-Fiber Membrane Bioreactors Using Immobilized E. coli for Protein Synthesis." *Biotech. Bioeng.*, 25: 2653-81, 1983.

Hoskin, F.C.G., E.T. Reese, and W. J. Smith, "Mipafox Inhibition of Cholinesterase, Neurotoxicesterase, and DFPase," *Neurobiology of Acetylcholine*, N.J. Dun and R.L. Periman, eds., Plenum Publishing, pp. 451-58. 1987.

Smith, W.J. "Future Directions in the Bioremediation of Petroleum Contaminated Soils," Advanced Science and Technology Institute Executives Conference, Portland, Oregon, 1992.

U.S. Patent: No. 442206, 1984. "Method of Using Isotropic, Porous-wall Polymeric Membrane Hollow-fibers for Culture of Microbes" 1984.

U.S. Navy Technical Report, "Results of bench-Scale Treatability Study of Enhanced Extraction for Site 13, Naval Air Station, Alameda," 1993.

Biological Processes

Technical Project Officer and Executive Assistant, U.S. Army Natick Research, Development, and Engineering Center

As a Chemical Corps officer, produced, isolated and purified biological materials as part of a program to develop self-decontaminating clothing that would provide longer lasting protection against chemical agents. Developed and operated both fermentation and purification processes to produce the biological materials.

Biological Treatment of Petroleum Sludges, Process Engineer, Chevron Exploration and Production, Timbalier Bay, LA

Reviewed remedial designs and performance of in situ slurry systems for the treatment of over 20,000 gallons of petroleum sludge. The mixing and aeration were adequate to slowly remove volatile hydrocarbons, but drainage of the field where heavier sludge fractions were landfarmed was inadequate. Regrading and the installation of additional French drains improved drainage.

Biological System Design, Construction, and Operation, Project Engineer, AFCEE, Castle AFB, Atwater, CA

For a former refueling facility where several acres of soil had been contaminated with JP-4 fuel, briefed client representatives, prepared a field work plan, reviewed the health and safety work plan, supervised the procurement of equipment and services, and was the field supervisor during the initial operation of a biological soil vapor extraction system. Developed field-monitoring procedures that allowed site characterization and remedial construction to proceed simultaneously. By replacing expensive laboratory analyses, the field monitoring procedures significantly reduced the cost of monitoring soil venting and bioventing systems while providing operators with reliable and nearly instantaneous information on system performance. These biological soil vapor extraction systems removed most of the hydrocarbons originally estimated to be present and were expanded to address previously unknown source areas.

Process Engineering

Lawrence Livermore National Laboratory

Project Manager, Livermore, CA

Manage a \$720,000 project to develop a low-cost personal system for decontaminating chemical agents. Recruited an international project team, oversaw the preparation of the winning proposal, and negotiated an intellectual property agreements, Non-Disclosure and Cooperative Research and Development (CRADA) Agreements, that granted LLNL access to patents held by the Canadian government and exclusively licensed to a Candian firm.

**Lawrence Livermore National Laboratory
Process Analyst, Livermore, CA**

As a member of CAPS (Counterproliferation Analysis Planning System) in NAI's (Nonproliferation, Arms Control and International Security) Q-Division estimated potential emissions from chemical processes that would violate the Chemical Weapons Convention. Modeled the process with simulation software from Aspen. As Aspen's process simulation software primarily supports petroleum processes with nearly ideal fluids, used data from the former US Chemical Weapons Program and new simulation methods with thermodynamic equations of state to model processes with highly non-ideal process streams. Analyzed intelligence reports on facilities and institutions to assess their capabilities to develop biological weapons of mass destruction.

**The Richland Environmental Technology Center Mixed Waste Facility,
Manager of Mixed Waste Process Development, Richland, WA**

As manager of permitting and process development for ATG's Integrated Mixed Waste Facility, which now treats both DOE and commercial wastes, obtained a combined RCRA/TSCA permit, a NESHAPS permit, an Environmental Impact Statement, and a radiation permit for the facility. The facility has over \$30M in contracts with DOE to process contact-handled low-level mixed waste. Mixed waste contains both hazardous chemicals and radioactive materials. Completed designs for waste handling, pre-treatment, stabilization, and innovative proprietary thermal treatment systems. Directed civil engineers, mechanical engineers, chemical engineers, draftsmen, toxicologists, air modelers, and health physicists to prepare a 12-volume permit application and a risk assessment for the facility. Both the permit application and the risk assessment are cited by regulators as models for other facilities around the country.

**The Richland Environmental Technology Center Mixed Waste Facility,
Project Manager and Process Engineer, Molten Salt Oxidation, Richland, WA**

Manager of a \$4,000,000 joint project with the Department of Energy to commercialize a molten salt oxidation process for destroying hazardous organic wastes and immobilizing non-volatile hazardous and radioactive constituents in salt. Prepared process flow diagrams, piping and instrumentation diagrams, equipment arrangement drawings, and other drawings required to install a pilot system and to permit a full-scale system. Managed the operation of the pilot system.

Project and Team Management

Mercury Stabilization Demonstration Projects, Project Manager, Lockheed Martin Energy Systems and University of Tennessee/Battelle, Richland, WA

Managed both the winning proposals for this effort and the resulting demonstration projects. ATG's formulation was the only one that successfully stabilized all of the mercury species tested. The mercury stabilization projects all demonstrated stabilization processes for the treatment of materials contaminated with low-levels of radioactive materials and low-to-moderate levels of mercury and other hazardous constituents. The stabilization demonstrations compared readily available commercial formulations and specialty formulations in bench-scale studies, and demonstrated the best formulations in full-scale processes. Results of the studies will be used by the Department of Energy to

justify the classification of stabilization by the US EPA as a Best Demonstrated and Available Technology (BDAT) for solid wastes containing moderate to high concentrations of mercury.

Innovative Technologies Support, Project Manager/Chemist, Berkeley Environmental Restoration Center (BERC), Berkeley, CA

Supported the University of California BERC in their development, deployment, and implementation of cleanup technologies from the Lawrence Berkeley National Laboratory (LBNL) and Lawrence Livermore National Laboratories (LLNL) at the Naval Air Station, Alameda. Managed a subcontracting program with preselected minority businesses to implement technologies such as steam enhanced soil vapor extraction and bioremediation of hydrocarbon contaminated soil and sediments.

Hazardous Waste Treatment, Team Leader, Chevron Research & Technology, Richmond, CA

Evaluated emerging technologies for the treatment of hazardous soils and sludges, especially thermal and biological technologies. Initiated an in-house program to evaluate White Rot fungi for the treatment of carcinogenic chemicals in soil. Reviewed proposals, remedial designs, and field data for a variety of remedial projects involving both soil and sludge containing petroleum hydrocarbons. Served as the technical editor for innovative remedial technology handbooks, which were distributed to several major oil companies.

Soil Vapor Extraction (SVE) of Chlorinated Hydrocarbon, Soil Recycling, and Groundwater Treatment, Process Engineer/Field Supervisor, CytoCulture International, Safeway, Sequoia Station, Redwood City, CA

Supervised the start-up, operation, and monitoring of an above ground vapor extraction system for soil containing parts per million levels of chlorinated hydrocarbons, which included the dry cleaning solvent PCE. The SVE system removed all but traces of the solvent in less than 30 days of operation. Managed the excavation, transport, and recycling into lightweight aggregate of several hundred tons of soil containing heavy waste oil. Installed, permitted, and operated a proprietary biological system for treating groundwater both within an aquifer and in above ground bioreactors. The site is now a popular mini-mall located on a commuter rail line.

Remediation and Fate and Transport of Toxic Chemicals

Feasibility Study, Technical Reviewer, USACE, Aberdeen Proving Grounds, MD

As the principal technical reviewer for a feasibility study of remedial alternatives for groundwater containing chlorinated solvents at a former chemical weapons test site, oversaw the development of the rationale for selection of institutional controls as the preferred remedial alternative. Intrinsic remediation attributed to tidal action at the site, was a key part of the rationale. Approval of institutional controls at this site, based largely on the effectiveness of intrinsic remediation, set a precedent for other sites at this base.
