

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

in 4
 West Broadway, Suite 425
 San Diego, CA 92161-4444
 (619) 590-4856



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 MCAS EL TORO
 SSIC # 5090.3

December 22, 1994 12:35 PM

Mr. Wayne D. Lee
 Assistant Chief of Staff
 Environment and Safety
 Marine Corps Air Station El Toro
 P.O. Box 95001
 Santa Ana, California 92709-5001

Dear Mr. Lee:

POSSIBLE RESOURCE FOR EXPEDITING THE INSTALLATION RESTORATION PROGRAM

The Department of Toxic Substances Control (Department) has received the enclosed correspondence from TUFTS University. They have offered to come to San Diego in early January 1995 to meet with us and share their knowledge with the El Toro Base Closure Team.

If, after receiving the enclosed letter, there is sufficient interest, the Department will pursue a meeting between the parties. Please RSVP by close of business December 28, 1994 to Ms. Sherrill Beard at (310) 590-5528.

Sincerely,

Juan Manuel Jimenez
 Remedial Project Manager
 Region 4 Base Closure Unit
 Office of Military Facilities

cc: Ms. Bonnie Arthur
 U.S. Environmental Protection Agency
 Region IX
 Hazardous Waste Management Division, H-9-2
 75 Hawthorne Street
 San Francisco, California 94105

Mr. Joseph Joyce
 BRAC Environmental Coordinator
 Department of the Navy
 Naval Facilities Engineering Command
 Environmental Division
 1220 Pacific Highway, Room 18
 San Diego, California 92123-5181



Mr. Wayne D. Lee
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Mr. Lawrence Vitale
Remedial Project Manager
Regional Water Quality Control Board
Santa Ana Region
2010 Iowa Avenue, Suite 100
Riverside, California 92507-2409

Mr. Dante J. Tedaldi, Ph.D, P.E.
BECHTEL National, Inc.
401 West A Street, Suite 1000
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Ms. Sherrill Beard
Engineering Geologist
Geotechnical Support Group
Office of Military Facilities
Southern California Operations
Department of Toxic Substances Control
245 West Broadway, Suite 425
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Ms. Alice Gimeno
State Project Team Leader
Office of Military Facilities
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245 West Broadway, Suite 425
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TUFTS UNIVERSITY

Chemistry/CFAST
Center for Field Analytical Studies & Technology

December 5, 1994

Dr. Juan Hemanus
California Environmental Protection Agency
Department of Toxic Substances Control
Site Mitigation Branch
245 W. Broadway, Suite 425
Long Beach, CA 90802-4444

Dear Dr. Hemanus,

The problems related to the effective testing and monitoring of chemical compounds *in-situ* are of such complexity and magnitude as to warrant a partnership approach by industry, academe and government. Recognizing this the Chemistry Department at Tufts University has expanded its already significant research programs by establishing the Center for Field Analytical Studies and Technology (CFAST). CFAST provides an opportunity for Tufts, other academic institutions, and private and public developers to form cooperatively a vigorous research organization that will address new developments in field analytical technologies and acceptance of that technology by the regulatory and user communities.

Enclosed are materials that will explain the depth and scope of the Center's activities. CFAST has a goal to promote and facilitate development, validation and educational programs that foster the broad use of new field technologies and encourage regulatory acceptance. Your involvement in CFAST will expand the Center's capacity to meet this goal.

We feel that CFAST and California's EPA could collaborate resulting in expanded knowledge and utility of field technology. I will contact you within the week to discuss your involvement with CFAST and answer any questions you might have about the Center. If you require additional materials please don't hesitate to call (617-627-3135).

Sincerely Yours,

Andrea Henderson-Kinney
Program Manager - CFAST



Center for Field Analytical Studies
and Technology (CFAST)
Department of Chemistry
Tufts University
62 Talbot Ave.
Medford, MA 02155

CENTER PHILOSOPHY:

The mission of the Center for Field Analytical Studies and Technology (CFAST) at Tufts University is to facilitate the research, development, commercialization and use of field-based analytical instruments and methodologies. CFAST's primary objective is to provide a bridge among private and public sector developers, users and regulatory communities, resulting in implementation of innovative field technologies required to conduct hazardous waste site characterization and monitoring of the clean-up process. CFAST promotes and facilitates development, validation and educational programs that foster the broad use of new field technologies and encourage regulatory acceptance. Through this process, CFAST expands the existing knowledge base of currently-used field technologies and identifies future needs required to solve complex environmental problems.

STATEMENT OF PROBLEM:

The environmental analytical marketplace is regulatory driven. Long lead times exist between technology development and state/federal acceptance of technology and methods. Only five percent of all samples collected at hazardous waste sites are analyzed utilizing field analytical methods and instrumentation. State and Federal regulators recognize that a problem exists, with policy barriers inhibiting the rapid acceptance of new field-based analytical technology. Manufacturing companies are reluctant to commercialize field-based analytical instrumentation due to long technology validation times, which result in standardized methods by regulators resulting in an average of 5 - 10 years for new technology to be marketed. This has resulted in limited production of tools that are rugged and easily operated that can detect a wide variety of

environmental contaminants. Users, such as environmental engineering companies or site owners, want only to reduce the cost and time of federally-mandated monitoring or site assessments. They are reluctant to utilize field technology due to lack of acceptance and knowledge, though it would represent a considerable cost savings. CFAST understands the issues that surround these problems and has brought field technology successfully from the research and development stage to commercialization and implementation by user communities around the country.

CENTER BACKGROUND:

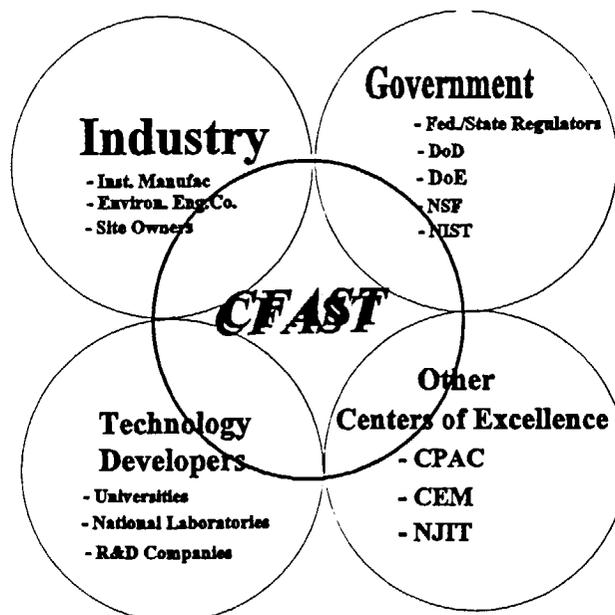
CFAST's goal is to build the bridge required to gain expedient and wide acceptance of field instrumentation that can address complex questions associated with the characterization and monitoring of hazardous waste sites, and compliance with pollution prevention Acts. CFAST investigators have over 25 years' experience in research and development of field-based analytical instrumentation resulting in the licensing and commercialization of technology. CFAST faculty have published over 170 peer-reviewed publications, hold over a dozen patents, and have conducted several field demonstrations, field versus laboratory data validations, cost/benefit analyses, and remedial investigation (RI) projects with the EPA, Army, Navy, Department of Agriculture, and several private sector companies. Seminars, workshops and training courses on field analytical technologies and Dynamic Workplans have been presented to leading environmental engineering companies, private sector site holders and venture capital firms. CFAST has fostered partnerships with government agencies such as DoD, DoE, and the EPA. These partnerships have resulted in acceptance and use of field methods and instruments in real-world applications. For example, a site characterization for the Navy, which utilized rapid screening GC/MS and ICP/AE developed by CFAST researchers, experienced an acceleration of work product resulting in the Record of Decision (ROD) being completed by December of 1995 rather than the originally agreed upon date of December, 1996 in the Federal Facilities Agreement. The project was 2.5 years behind schedule when project managers started to use CFAST generated technology. After one hundred working days utilizing CFAST technology the project was three months ahead of schedule which resulted in a cost savings of approximately

50% from the original site characterization estimate of \$22 million. EPA has ranked this field effort as the most productive site characterization conducted over the last three years. This clearly illustrates the cost and time savings that can occur when field-based technologies are used.

Increasing awareness of organic contamination from underground storage tanks has produced a need for in-situ monitoring technology that eliminates the costly and arduous off-site analysis of conventional sampling. CFAST has developed and licensed technology that addresses this need. For example, a fiber-optic sensor that measures environmentally significant levels of volatile organic contaminants (VOC) *in-situ* has been used at several sites contaminated by jet fuel and gasoline. The advantages of monitoring sensors is that they are inexpensive to construct, provide real-time *in-situ* measurements, allow for a larger number of samples to be taken, decrease required sampling well diameters and decrease occupational hazards associated with currently-used electrical devices.

CENTER FUNCTIONS:

The Center's functions are best illustrated by the following schematic which show how CFAST links groups involved in the use and implementation of field-based analytical instrumentation and methods.



Through expansions in CFAST membership, new programs will be aimed at evaluation of policy initiatives, technology transfer issues, research in field analytical instrumentation and acceleration of acceptance and commercialization of new tools. The members of CFAST will be composed of all community groups whose basic mission is to work together to provide and develop technology to protect and improve the quality of the environment.

BENEFITS TO DEVELOPERS:

CFAST helps developers (public and private) with acceptance of new technology by: 1) helping prepare them to meet the challenges of on-site measurement and 2) correctly positioning their instrumentation through field demonstrations with the appropriate audiences, such as EPA or the user community. Validation and comparison studies using state-of-the-art environmental instrumentation and established methodology are conducted by CFAST prior to demonstration events. Developers are informed of potential problems and offered suggestions on how to re-design instrumentation or re-structure the analysis method. Cost comparison studies performed by CFAST on new technology further illustrate to the user community the true financial benefits of field technology. Once instrumentation has been field tested, CFAST can arrange demonstrations with the appropriate audiences to help researchers transfer technology and gain acceptance by the regulatory community.

BENEFITS TO USERS:

Users, such as site owners and engineering companies, are provided information on recent developments in new field-based tools through educational programs held at CFAST that emphasize the gains in acceptance the Center is making. Demonstrations and cost benefits are defined clearly and greater utilization of field technologies should result.

BENEFITS TO GOVERNMENT:

The breaking of barriers concerning acceptance by the regulatory community is accomplished through educational seminars, workshops and field demonstrations which enhance the understanding of the utility of field tools. CFAST, in collaboration with the Department of

Urban, Social and Environmental Policy, the Center for Environmental Management, Fletcher School of Law and Diplomacy and the Department of Civil and Environmental Engineering at Tufts, conducts studies that look at the factors that inhibit or foster technology transfer from the laboratory to commerce. CFAST, also examines the reception to field-based technologies by public agencies and service companies that provide support for government agencies and industry in site assessment and site remediation. Quality assurance paradigms, perceptions of value tradeoffs, objective and subjective factors that shape the decisions regarding technology innovation and choice of analytical methods are studied.

Environmental technologies that monitor contaminant releases *in-situ* or provide for rapid quantitative and qualitative screening of sites that are suspected to be contaminated can be used to improve risk estimates. The federal government has stated a need for improvements in ascertaining of human exposure which are used to formulate risk estimates. Field-based instrumentation and methods expand the capacity to obtain better quality data on environmental contaminants, due to real-time measurements and increased quantity of data collected without degradation in data quality. Advantages of improved data quality and quantity, QA/QC protocols, and real-time monitoring of contaminant concentrations should improve the estimated exposure dose, which ultimately impacts decisions made by public health officials on acceptable exposure levels.

CENTER RESEARCH INTERESTS:

CFAST is committed to the development of new field-based analytical technology. Instrumentation developed at CFAST perform functions that range from screening to generation of more quantitative standard EPA data. Research areas include microsensor development for characterization of environmental media and improving existing field instruments and methods for more rapid, higher quality field measurements.

Research interests focus on a variety of instrumentation and methods that expand monitoring and measurement capabilities in the field. CFAST research goals include the development of instruments that utilize lasers, fiber optics and fluorescence for detection of environmental pollutants. Research focused on instrumentation that takes a multidimensional

fluorescence "fingerprint" will enable the quantitative and qualitative identification of various components of mixtures fluorescent compounds without the need for costly separation devices. Electrochemical techniques are also being explored to monitor metals *in-situ* for surface and ground water.

New developments in screening field methods and instruments, such as XRF and GC/MS, will expand existing technology by providing a rapid screening of contamination at a high sensitivity level. More quantitative tools that involve the use of ICP/AE, MIP/MS and GC/MS will be incorporated into field tools to give on-site data that can be obtained in a fraction of the time of conventional off-site testing with comparable sensitivity. Developments in sensors, which are capable of re-newing themselves, will eliminate the need for costly sampling efforts while providing valuable information on ambient concentration levels. This technology can also be expanded to include other chemical compounds currently being monitored by the federal government.

MEMBER OR SPONSOR BENEFITS:

CFAST offers members from industry, government and academia the following benefits:

- Access to third party objective views from basic researchers and scientists in industry, government agencies and laboratories, and various centers of excellence on state of the art technology that sponsors can use to focus their own internal R&D investments. Examples of such access include visiting research laboratories, sending scientists for training, and testing new technology on-site with a trained CFAST researcher.
- Collaborative research projects conducted with researchers from various departments within Tufts, such as the Center for Environmental Management; Urban, Social and Environmental Policy; Chemistry; Electrical, Mechanical, Environmental and Civil engineering, as well as other universities, centers, government agencies and industry which are used to gain a better understanding of the acceptance of new technology and instrumentation needs and requirements.

- CFAST relationships with the regulatory, government and developer communities are utilized by members to facilitate acceptance of new technology.
- Research contracts between members and CFAST faculty which are focused on developing new field instruments and methods that are rugged and compact, detect a wide variety of chemical contaminants with little or no sample preparation, data acquisition tools that can extract usable information from noisy and complex data. These contracts are used by developers to expand utility of existing instrumentation for field applications or develop new tools that address specific environmental testing problems.
- Informative publications, such as quarterly newsletters, annual meetings, and technical publications, keep sponsors aware of new developments in field technology.
- Educational programs, such as workshops and seminars, are held at CFAST or various locations that are convenient to the member community it addresses, to increase awareness and utility of field analytical instrumentation and methods.
- Member scientists receive specialized training on new technology and methodology with emphasis on barriers related to transfer of technology developed in a laboratory setting to field application.

LICENSING AND PATENT POLICY:

CFAST will protect intellectual property resulting from CFAST research and provide sponsors with timely access to research results. Sponsors will have use of results and the opportunity to license rights to inventions for commercial purposes. Tufts encourages all research faculty to publish their research results, but will work with sponsors to insure protection of confidential information and intellectual property. Tufts, with input from CFAST sponsors, will file for patent protection and make those inventions available for licensing. All sponsors will have access to CFAST intellectual property for their own internal research purposes.

A CFAST sponsor may notify the CFAST director that they have interest in licensing technology for commercial purposes. The Unified Office for Technology Transfer will work with sponsors to construct non-exclusive, worldwide license or an exclusive license to a particular invention. In addition to the programs and benefits that are part of the sponsors formal association with CFAST, sponsors will have access to CFAST staff expertise on field technologies through special arrangements that address the needs of an individual sponsor. This may apply to a specific programs offered by CFAST or involve a demonstration project using technology that is proprietary to the sponsor. CFAST faculty are also available to consult with sponsors on a project by project basis.

CFAST intends to be a leader in development of novel technologies for field analytical testing and will be equally proactive in identifying partners and demonstration programs that will promote commercialization of the technology. CFAST will seek to identify partners, including sponsors, non-sponsors, government agencies, government research laboratories or academic centers interested in collaborative development efforts involving specific technologies or methodologies. Sponsors are encouraged to suggest ideas and actively participate in this technology transfer process. Among the activities with which CFAST may be involved are the following:

- organization and sponsorship of regular technology transfer forums involving field analytical technologies and services, their developers (public and private) and providers,
- publicizing the availability of technologies developed through CFAST or those developed in cooperation with other research centers,
- coordination of efforts to seek government funds to support the development and demonstration of specific technologies, and
- guiding efforts by emerging and smaller companies to seek financial support from public and private sources for the development and deployment of new technologies.