

Ken I. Mullen, Ph.D.

[Nambe Technologies, LLC](#)

209 County Road 113

Santa Fe, NM 87506

Phone: 505-670-1572

Objective: I am seeking consulting opportunities where I can apply my experience in water quality, hydrology, and/or information management to interesting projects. I am also interested in serving as an expert witness.

EDUCATION

1989 B.S. Chemistry, Summa Cum Laude, Fort Lewis College, Durango, CO

1992 Ph.D. Analytical Chemistry, University of Wyoming, Laramie, WY

EXPERIENCE

6/08 to present, Principal, Nambe Technologies, LLC

Founded [Nambe Technologies](#), a consulting company specializing in water quality expertise. Recent projects include: develop a Minimum Quantitation Level (MQL) for PCBs analyzed by the congener method (Method 1668), wrote Sampling and Analysis Plans and a Conceptual Model, review/summarize journal articles on PCBs in precipitation, manage large data assembly effort, presentation on PCBs in storm water at Los Alamos National Laboratory (LANL).

6/06 to 6/08, Started Internet Company, Stay at Home Dad

Founded [Kokopelli Technologies](#), an internet company that sells microscopes, supplies to enable couples to do their own fertility testing at home. After our son was born in June 2006 I stayed home with him. I accepted the voluntary severance package from LANL in January 2008.

6/04 to 6/06, Information Management Team Leader, Water Quality & Hydrology Group, LANL

I led the team responsible for maintaining and improving LANL's Water Quality Database (WQDB). The team managed all the analytical chemistry data for the surface water, groundwater, and sediments portion LANL's environmental surveillance program. The team was responsible for coordinating with the analytical laboratory and the data validators to insure data integrity. The team developed user interfaces that managed the data flow from generating the sampling plan through data validation to creating final reports directly from the database.

5/02 to 6/04, Project Leader for Watershed Management Program, RRES-WQH, LANL

My primary responsibilities were to coordinate and develop institutional strategies for managing surface water and sediment contaminant transport issues. I wrote LANL's first Storm Water Monitoring Plan. This plan supported the EPA Federal Facilities Compliance Agreement and the EPA Multi-Sector General Permit. I was one of three subject area leaders who developed LANL's response to the New Mexico Environment Department's (NMED) Draft Compliance Order. I continued to serve as the Water Quality and Hydrology Group's primary Point of Contact for interactions with the Pueblos. I developed excellent relationships with the NMED, DOE, the Pueblo's Environment Departments, and members of the anti-nuclear activist groups. For example, I led a project to evaluate LANL's impact to PCBs in surface waters, sediments, soils, and fish. This was a cooperative effort with the NMED DOE Oversight Bureau, NMED-Surface Water Quality Bureau, DOE, San Ildefonso Pueblo, Los Alamos County, and LANL organizations. This study showed LANL to be a source of PCBs in the Rio Grande. The study also identified other sources that were previously unknown.

4/01- 5/02, Surface Water Issues Manager, ESH-18 Water Quality & Hydrology Group, LANL

This position was created in recognition of the increasing importance of surface water issues and the need for a principle point of contact for these issues at LANL. In this position I continued to lead the Watershed Integration Team (WIT) and the Pajarito Plateau Watershed Partnership (PPWP). I also continued my responsibilities as the Project Leader for the Water Quality Database.

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8/98-4/01, Hydrology Team Leader, ESH-18, Water Quality and Hydrology Group, LANL

Hydrology Team members working with me were responsible for: the groundwater, surface water, and sediments portions of Environmental Surveillance Program; managing the Monitoring Well Installation Project under the Hydrogeologic Work Plan; chairing the Groundwater Integration Team (GIT); and managing the Group's chemical analysis services and contracts, and data validation program. In addition to Team Leader responsibilities, I led the WIT, the PPWP, and the development of the Water Quality Database. The Watershed Management Program and the PPWP represented significant advances in relationship building with other LANL Divisions/Programs, regulators, and stakeholders.

As the Information Management Project Leader in ESH-18 and the Chairman of the Information Management sub-committee for the Groundwater Integration Team (GIT) I led the effort to develop the Water Quality Database. The Oracle database design was developed in cooperation with the Environmental Restoration (ER) Project and was designed to allow ESH-18 and the ER Project to share data. After the Cerro Grande Fire we made provisional water quality data available to the public through a web based interactive query tool. This was the first time LANL made un-validated data available to the public.

After the Cerro Grande Fire, I was LANL's sole representative on the Multi-Agency Coordination group directing the Park Service/Forest Service Burned Area Emergency Rehabilitation (BAER) team. I was also a member of LANL's Emergency Rehabilitation Team (ERT) led by Dick Burick. The Cerro Grande Fire marked the first time in the nation's history that more was spent on rehabilitation efforts than on fire suppression efforts.

5/95-8/98, Hydrologist, ESH-18 Water Quality & Hydrology Group, LANL

I was responsible for the surface water portion of the Environmental Surveillance Program. I was also responsible for surface water, groundwater, and sediments field sampling; sample analysis; the analytical laboratory services; and administering the analytical database. I created a database, for the Hydrology Team, in MS Access and initiated electronic data transfer from the analytical laboratory. I established a database server to allow other team members direct access to the data. I led the effort to load all the historical analytical data (1950 to 1995) into the Access database. I created a web page allowing stakeholders outside LANL to access the environmental surveillance data. I acted as Quality Assurance Officer and was responsible for the quality assurance program, data validation, and contracts with analytical laboratories.

I was issued a patent, received a CRADA to commercialize, and submitted an R&D 100 application for the Foaming Capacity Monitor. I was the PI on a project to create a dedicated fluorescence/absorbance field portable, instrument to quantify DNA in turbid samples using the Polymerase Chain Reaction (PCR).

3/93-5/95, Postdoctoral Fellow, Chemical Science and Technology-1, LANL

I developed a wet chemical/UV-Vis process monitoring technique to determine loading capacity and instantaneous degree of loading for metal ions in a chelating water-soluble polymer. I invented an on-line instrument to continuously monitor surfactant concentration (the Foaming Capacity Monitor). I designed an instrument to rapidly detect biological weapons using the polymerase chain reaction (PCR).

1989-1992, Graduate Student, Department of Chemistry, University of Wyoming

Teaching: Instrumental Methods, Freshman Chemistry Laboratories

Research: *Surface Enhanced Raman Spectroscopy (SERS) Fiber Optic Sensors* for in-situ monitoring of ions and organics in groundwater. I developed the technology from an idea to a prototype in the first two years. I received a patent on a technique I developed for fabricating SERS substrates on optical fibers.

1977-1989, Hydrologic Technician, Bureau of Reclamation, Durango, Colorado

I designed and implemented water quality monitoring programs to evaluate surface and groundwater. I performed water quality surveys and sediment deposition studies on reservoirs. I established a database for water quality sample results.

TRAINING

Groundwater Pollution and Hydrology, Robert Cleary, July 10-14, 1995
Statistical Methods for Environmental Monitoring, Lauren Ross, University of Texas at Austin, April, 1995
Vadose Zone Hydrology, Dan Stephens, Environmental Education Enterprises, October 18-20, 1995
Environmental Regulations, Executive Enterprises, September 9-11, 1996
Management Institute, 80 hour training from the LANL Leadership Center, completed November 2000
Informed Consent by Hans Bleiker (building consent among the public and stakeholders) 2001
Dale Carnegie Success Series, completed April 2002
Registered Environmental Manager, National Registry of Environmental Professionals, June 2003
Introduction to Oracle 9i: SQL, 40 hours, March 2005
Project Management institute, Certified Project Management Professional, expires September 2009

RESEARCH GRANTS

SERS pH Sensor for Ocean pCO₂ Monitoring from Detection Limit Technology, Inc., \$40,000 (1994)
Develop and Install Foam Monitor in waste treatment facility, \$50,000 (1994)
Optical Fiber Based Radiation Sensors, SBIR with Physical Optics Corporation, \$50,000 (1994)
Real-time DNA Quantification in the Presence of Humic Acids, DOE, \$100,000 (1995)
Instrument Development -DNA Quantification, DOE, \$137,500 (1996)
Small Business Initiative, CRADA with Waterfall Technologies, LANL, \$80,000 (1997)
Collaborator on Field-Portable, Pre-PCR DNA Quantitation for Soil and Sediment Samples, FBI, \$325,000 (1999)

AWARDS

Outstanding Freshman Chemistry Student, Fort Lewis College-1984
Quality Increase developed hydrologic data collection program, Bureau of Reclamation-1984
2 Special Achievement Awards, a) Crew chief for data collection program, b) Planning Team activities, Bureau of Reclamation-1985 and 1987
Hans-Peter Richert Memorial Award, Outstanding 1st Yr. Graduate Student UW-1990
Student Travel Award, Laser Applications to Chemical Analysis, from Optical Society of America-1992
Sara Jane Rhoads Award, Research Excellence- Graduating Ph.D. UW-1992
LANL Distinguished Performance Award for Polymer Filtration team-1996
LANL Achievement Award for outstanding research and development, ESH Division Review Committee-2000
LANL Achievement Award for Cerro Grande Recovery Activities-2001
Certificate of Achievement for DOE-Albuquerque, Analytical Management Program-2001, Rich Glass
Special Recognition from Richard Burick and John Browne for IFRAT work-2001
LANL Achievement Award for developing response to NMED Draft Compliance Order-2002
LANL LAAP Award for extensive work and support for the negotiation of the NMED Order, 2003
LANL LAAP Award for support of EPA NPDES Permit Reapplication, 2004

PATENTS

Process for Molecular-Specific Optical Fibers for SERS Detection, K. Carron and K. Mullen, Issued 7/5/94
Surfactant Monitoring by Foam Generation, Ken I. Mullen, Issued 1/28/97
Method of quantitating dsDNA, P.C. Stark, C.R. Kuske, and K. I. Mullen, Issued 2/26/2002

PRESENTATIONS/PUBLICATIONS

Invited Seminars:

- 1) "Selective Ultratrace Detection with SERS Fiber Optic Probes" December 6, 1991, Fort Lewis College, Durango, CO
- 2) "SERS Fiber Optic Probes" June 15, 1992, Los Alamos National Laboratory, Los Alamos, NM
- 3) "Fiber Optic Sensors" April 26, 1993, Los Alamos National Laboratory, Los Alamos, NM
- 4) "Sensors" May 5, 1993, Briefing for Brigadier General Ralph Wooten, Los Alamos National Laboratory, Los Alamos, NM
- 5) "Raman Fiber Optic Probes" Nov. 11, 1993, University of Washington, Seattle, WA
- 6) "Monitoring Systems" December 2, 1993, for 'Trade Mission to National Laboratories,' Los Alamos National Laboratory, Los Alamos, NM
- 7) "Sensors and Process Monitoring" Nov. 4, 1994, Fort Lewis College, Durango, CO
- 8) "Flow-PCR, Automated PCR for DNA Identification" July 31, 1995, Briefing for Brigadier General Walter Busbee, Joint Program Office, Washington, D.C.
- 9) "Surfactant Monitor" September 18, 1995, Diversy Corporation, Chagrin Falls, OH
- 10) "Watersheds and Wildfires- Ombudsman Brown Bag" June 19, 2000, Physics Auditorium, Ken Mullen, Los Alamos, NM
- 11) "Watersheds and Wildfires- ESH Safety Professionals" June 21, 2000, Otowi Side Room, Ken Mullen, Los Alamos, NM
- 12) "Watersheds and Wildfires- ESH-Division Seminar" June 22, 2000, ESH- DO conference room, Ken Mullen, Los Alamos, NM
- 13) "Watersheds and Wildfires" June 28, 2000, PM-1, Ken Mullen, Los Alamos, NM
- 14) "Watersheds and Wildfires" July 15, 2000, League of Women Voters, Los Alamos Inn, Ken Mullen, Los Alamos, NM
- 15) "Watersheds and Wildfires" July 18, 2000, Civitan Club, Ken Mullen, Los Alamos, NM
- 16) "Impacts of the Cerro Grande Fire" August 14, 2000, Jemez y Sangre Water Planning Council, Ken Mullen, Espanola, NM
- 17) "Watersheds and Wildfires" September 19, 2000, Santa Fe Geologic Society, Ken Mullen, Santa Fe, NM
- 18) "Watersheds and Wildfires" October 11, 2000, Water Quality and Hydrology Group, Ken Mullen, Los Alamos, NM

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- 19) "Watersheds and Wildfires" November 4, 2000, Northern New Mexico Geographic Information Systems, Ken Mullen, Albuquerque, NM
- 20) "Water Quality Issues in the Pueblo Canyon Watershed" October 3, 2002, Post-Fire Issues Affecting the Pueblo Canyon Watershed, Pajarito Plateau Watershed Partnership/ Volunteer Task Force, Ken Mullen, Los Alamos, NM
- 21) "PCB Congener Preliminary Results" March 25, 2004, Middle Rio Grande Water Quality Work Group, Ken Mullen and Ralph Ford-Schmid (NMED), Rio Rancho, NM

Presentations:

- 1) "Raman Indicators: A Possible Method for Remote Sensors?" July 30, 1990. 32nd Rocky Mountain Analytical Conference, Denver, Colo. Ken I. Mullen and K. Carron
- 2) "Remote Sensing with Fiber Optic Probes." October 3, 1990. American Water Resources Meeting, Laramie, Wyo. Ken Mullen and Keith Carron
- 3) "Detection of Hazardous Contaminants with Raman Fiber Optic Probes." July 30, 1991. 33rd Rocky Mountain Conference on Analytical Chemistry, Denver, Colo. Laura Pietersen, Ken Mullen, and Keith Carron
- 4) "Selective/Ultratrace Detection of Ionic Contaminants with SERS." October 9, 1991. FACSS XVIII Meeting, Anaheim, Calif. Ken Mullen and Keith Carron
- 5) "SERS Fiber Optic Probes." January 28, 1992. Laser Applications to Chemical Analysis, Optical Society of America, Salt Lake City, Utah. Ken Mullen and Keith Carron
- 6) "Detection of Hazardous Materials in Groundwater with SERS Fiber-optic Probes." April 5, 1992. 203rd ACS National Meeting, San Francisco, Calif. Keith Carron, K. Mullen, G. Hurley, D.X. Wang
- 7) "Process Monitoring and Process Control." August 17, 1993. Boeing, Seattle, Washington. Ken Mullen
- 8) "Monitoring the Degree of Complexation of a Polyelectrolyte," March 13, 1994. 207th ACS National Meeting, San Diego, Calif. Ken Mullen, Patrick Soran, Everett Neal
- 9) "Improving SERS for Better Sensors," July 27, 1994. Chemical, Biological, and Environmental Fiber Sensors VI, SPIE, San Diego, Calif. Hillary L. MacDonald, Chris Schoen, Ken I. Mullen
- 10) "On-line Surfactant Monitoring by Foam Generation," January 23, 1995. Ninth International Forum Process Analytical Chemistry (IFPAC '95), Houston, Texas. Ken Mullen, Everett E. Neal, Patrick D. Soran, Barbara Smith
- 22) "Surfactant Monitoring by Foam Generation" August 21, 1995, 210th ACS National Meeting, Chicago, Illinois. Ken I. Mullen, Everett E. Neal, Patrick D. Soran, Matthew A. Odom, Barbara F. Smith
- 11) "Real-Time, On-line Measurement of Beer Head," June 9, 1996, 38th Rocky Mountain Conference on Analytical Chemistry, Denver, Colo. Everett E. Neal, Patrick D. Soran, Matthew A. Odom, Barbara Smith, Ken I. Mullen

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- 12) "Field-Portable DNA Quantitation for Soil and Sediment Samples," January 14, 1998, 1998 MASINT Biological Defense Science and Technology Symposium, Patrick Air Force Base, Florida. Peter C. Stark, Cheryl Kuske, Kenneth I. Mullen
- 13) "LANL Water Quality Monitoring Program," March 18, 1998, Eight Northern Indian Pueblos Environmental Conference, Espanola Community College, Espanola, New Mexico. Ken Mullen
- 14) "Trend Analysis on Environmental Radiochemical Data, Including Effects of Analytical Measurement Uncertainty," October 1998, Tenth National Technology Information Exchange Workshop, Willowbrook, Illinois. Lawrence Pratt, Ken Mullen, Mary Mullen
- 15) "Monte Carlo Simulation of Analytical Uncertainty in Radiochemical Data Sets With Trend," October 8, 1998, International S-Plus User's Conference Washington DC. Mullen, MA, LE Pratt, K Mullen, and E Bedrick LA-UR984591
- 16) "Information Management for Groundwater Data," March 30, 1999, Groundwater Integration Team Annual Meeting, Ghost Ranch, New Mexico. K. Mullen and Sue F. Kinkead
- 17) "High Explosives Contamination in Groundwater and Interactions with the Public and Regulators," May 13-14, 1999, Environmental Monitoring and Surveillance Meeting, Los Alamos, New Mexico. Ken Mullen
- 18) "Environmental Surveillance of Waters and Sediments and Other Stories," Sept. 31, 1999, Analytical Chemistry Working Group, Los Alamos, New Mexico. Ken Mullen
- 19) "Watershed Management Planning Using the Data Quality Objective Process," Dec. 5-9, 1999, Watershed Management to Protect Declining Species, Seattle, Washington. Charles L. Nylander, Kelly A. Bitner, Kevin Hull, Ada S. Johnson; presented by Ken Mullen
- 20) "Watershed Management at a Regional Scale: Pajarito Plateau Watershed Partnership" April 12, 2000, Environmental Safety and Health Annual University of California Division Review, Los Alamos New Mexico, Ken Mullen, and Kelly Bitner, LA-UR-00-2197
- 21) "Environmental Monitoring at Los Alamos and the Cerro Grande Fire" September 20, 2000, Governor's Blue Ribbon Panel on Water Resources, Albuquerque, New Mexico. Ken Mullen
- 22) "Watersheds and Wildfires: A view of the Cerro Grande Fire" November 28, 2000, Fire Conference 2000, San Diego, Calif. Ken Mullen
- 23) "Watershed Management on the Pajarito Plateau: Past, Present, and Future" May 9, 2001, LA-UR-01-2056, New Mexico Decision-Makers, New Mexico Bureau of Mines and Mineral Resources, Los Alamos, New Mexico. Kenneth Mullen, Kelly Bitner, Kevin Buckley
- 24) "Watersheds, Wildfires, Radionuclides, and Public Access to Information" December 7, 2001, LAUR-01-3010, National Groundwater Association AGWSE 2001 Annual Meeting, Ground Water Data: Collection, Reliability, Access, and Manipulation of Basic Data, Nashville, Tennessee, Kenneth I. Mullen, Kendra L. Henning, Susan F. Kinkead, Penelope E. Gomez

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- 25) "Case Study for Developing a Comprehensive Groundwater Database Information System" December 8, 2001, National Groundwater Association AGWSE 2001 Annual Meeting, Ground Water Data: Collection, Reliability, Access, and Manipulation of Basic Data, Nashville, Tennessee, Kendra Henning, Susan Kinkead, Penelope Gomez, and Ken Mullen
- 26) "Water Quality" October 5, 2004, Library of Congress- Open World Russian Leadership Program for Environmental Leaders, Los Alamos, New Mexico, Ken Mullen
- 27) "PCB's in Rio Grande Watershed" October 25, 2004, Bosque Hydrology Group Water Quality Summit, Albuquerque, New Mexico, Ralph Ford-Schmid, Ken Mullen

Proceedings:

- 1) Remote Sensing With Fiber Optic Probes. K. I. Mullen and K. T. Carron, Proceedings of the 3rd Annual AWRA Meeting, **3**, 35, (1990).
- 2) Development of In-Situ Sensors for the Detection of Groundwater Contamination. K. Carron, K. Mullen, L. Peitersen, L. Hurley, D. Wang. Research Brief, WWRC, 1991.
- 3) Improving SERS for Better Sensors. H. L. MacDonald, C. Schoen, K. I. Mullen, Proceedings of Chemical, Biochemical, and Environmental Fiber Sensors VI, SPIE, 2293, 198 (1994).
- 4) Polymer Filtration: A New Technology for Selective Metals Recovery, Barbara F. Smith, Thomas W. Robison, Michael E. Cournoyer, Kennard V. Wilson, Nancy N. Sauer, Kenneth I. Mullen, Man T. Lu, and James J. Jarvinen, International Technical Conference Proceedings from SURFIN 95, June 26-29, pp 607-616, 1995.
- 5) Watershed Management on the Pajarito Plateau: Past, Present, and Future, LA-UR-01-149, Ken Mullen, Kelly Bitner, Kevin Buckley, May, 2001, New Mexico Decision-Makers Field Guide No. 1, New Mexico.

Publications:

- 1) Ultrasensitive Detection of Metal Ions with Surface Enhanced Raman Spectroscopy. K. Carron, K. Mullen, H. Angersbach, M. Lanouette *Appl. Spectrosc.*, **45**, 420, (1991)
- 2) Surface Enhanced Raman Spectroscopy with Abrasively Modified Fiber Optic Probes. Ken I. Mullen and Keith T. Carron *Anal. Chem.*, **63**, 2196, (1991).
- 3) Determination of pH with SERS Fiber Optic Probes. Ken I. Mullen, DaoXin Wang, L. Gayle Hurley, and Keith Carron *Anal. Chem.*, **64(8)**, 930, (1992)
- 4) Trace Detection of Ionic Species with Surface Enhanced Raman Spectroscopy. Ken I. Mullen, Dao-Xin Wang, L. Gayle Hurley, Keith Carron invited review *Spectroscopy*, **7(5)**, 24, (1992)
- 5) Adsorption of Chlorinated Ethylenes at 1-Octadecanethiol Modified Silver Surfaces. Ken Mullen, Keith Carron *Anal. Chem.*, **66**, 478, (1994)

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- 6) On-line Surfactant Monitoring by Foam Generation, Patrick D. Soran, Everett E. Neal, Barbara Smith, Ken I. Mullen, *Journal of Chemical Education*, **73**, 819, (1996)
- 7) On-Line Surfactant Monitoring. K. I. Mullen, E. E. Neal, P. D. Soran, B. Smith, *AT-Process...the Journal of Process Analytical Chemistry*, **2(5,6)**, 406, (1997)
- 8) 1993 to 1995 Environmental Surveillance Data Collected at or Near Area G, Ken Mullen, Scott Collins, David Rogers, LA-13204-MS, Sept. 1996
- 9) Environmental Surveillance at Los Alamos during 1995 (Surface Water and Quality Assurance sections), LA-13210-ENV, Oct. 1996
- 10) Environmental Surveillance at Los Alamos during 1996 (Surface Water and Quality Assurance sections), LA-13343-ENV, Oct. 1997
- 11) Groundwater annual status report for fiscal year 1998, C. L. Nylander, K. A. Bitner, D. E. Broxton, G.L. Cole, B. M. Gallaher, A. S. Johnson, D. Katzman, E. H. Keating. S. G. McLin, K. I. Mullen, B. D. Newman, D. B. Rogers, A. K. Stoker, and W. J. Stone, Los Alamos National Laboratory Report, LA-13598-SR, April 1999.
- 12) Perched Zone Monitoring Well 1995 Analytical Results, Los Alamos National Laboratory Report, LA-UR-00-949, Ken Mullen, Mary Mullen, David B. Rogers, Dec. 1997
- 13) Report of Testing and Sampling of Municipal Supply Well PM-4, Los Alamos National Laboratory Report, LA-13648, Richard J. Koch, Patrick Longmire, David B. Rogers, Ken Mullen, December 1999
- 14) EPA/NMED/LANL 1998 Water Quality Results: Statistical Analysis and Comparisons to Regulatory Standards, Los Alamos National Laboratory Report, LA-13682-MS, B. Gallaher, T. Mercier, P. Black, and K. Mullen, February 2000
- 15) Pre-PCR DNA Quantitation of Soil and Sediment Samples: Method Development and Instrument Design, Stark, P.C.; Mullen, K.I.; Banton, K.; Russotti, R.; Soran, D.P.; and Kuske, C.R, *Soil Bio. and Biochem.* **32(8-9)**, pp. 1101-1110, July 2000
- 16) Storm Water Quality in Los Alamos Canyon following the Cerro Grande Fire, Los Alamos National Laboratory Report, LA-13816-MS, M. Johansen, B. Enz, B. Gallaher, K. Mullen, D. Kraig, April 2001
- 17) Review of Wildfire Effects on Chemical Water Quality, Los Alamos National Laboratory Report, LA-13826-MS, Kelly Bitner, Bruce Gallaher, Ken Mullen, May 2001