ANNUAL REPORT

SCIENCE AND TECHNOLOGY ALLIANCE WORK SCHEDULE
FY 1992

Institution: **New Mexico Highlands University**

<table>
<thead>
<tr>
<th>Program Activity</th>
<th>Leader</th>
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<tr>
<td><strong>1. Program Administration</strong></td>
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<tr>
<td>A. Coordinator (10/1-08/10)</td>
<td>Dr. G. Rivera</td>
</tr>
<tr>
<td>(08/10-09/30)</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>B. Grants and Contracts</td>
<td>Dr. G. Rivera</td>
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<tr>
<td></td>
<td>Dr. R. Clark</td>
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<tr>
<td><strong>2. Faculty Development</strong></td>
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<tr>
<td>A. Faculty Travel</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td><strong>3. Student Development</strong></td>
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<tr>
<td>A. Student Support</td>
<td>Dr. M. McClanahan</td>
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<td>B. Student Placement at Labs</td>
<td>Dr. M. McClanahan</td>
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<td><strong>4. Special Projects</strong></td>
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<tr>
<td>A. Research and Sponsored Proj</td>
<td>Dr. R. Clark</td>
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<tr>
<td>B. Faculty Research</td>
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<tr>
<td>1. Ceramics Research Project</td>
<td>Dr. R. Clark</td>
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<td>2. Bioengineering Project (NASA JOVE)</td>
<td>Dr. L. Sveum</td>
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<tr>
<td>3. Optical Crystals (NASA JOVE)</td>
<td>Dr. M. Krebs</td>
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<tr>
<td>4. Chemistry Sabbatical</td>
<td>Dr. H. W. Taylor</td>
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<td><strong>C. Student Research (JOVE)</strong></td>
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<td><strong>D. Science Education Resource Center</strong></td>
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<tr>
<td><strong>E. Computer/Audio-Visual Center</strong></td>
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<tr>
<td>1. Supervision of Center</td>
<td>Mr. C. Sollohub</td>
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<tr>
<td>2. Equipment</td>
<td>Mr. C. Sollohub</td>
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<tr>
<td><strong>F. Physics Lab Equipment</strong></td>
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<td><strong>G. Waste Management Technical Workshop</strong></td>
<td>Dr. R. Clark</td>
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<td><strong>5. Curriculum Development</strong></td>
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<tr>
<td>A. Engineering</td>
<td>Dr. M. McClanahan</td>
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<td>B. Environmental Science</td>
<td>Dr. K. Jensen</td>
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<td>C. Physical Sciences</td>
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<td>D. Biology</td>
<td>Dr. L. Sveum</td>
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<td><strong>6. Equipment</strong></td>
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<td></td>
<td>Ms. N. Kirkpatrick</td>
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<td>Dr. M. McClanahan</td>
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### SCIENCE AND TECHNOLOGY ALLIANCE MILESTONE SCHEDULE FY 1992

**Institution:** New Mexico Highlands University

#### 1st Quarter, FY92

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<th>Milestone</th>
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<tr>
<td>4.D. Nov 91</td>
<td>Conduct SWOOPE workshop</td>
<td>Dr. R. Lessard</td>
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<tr>
<td>4.E. Fall 91</td>
<td>Purchase equipment for Computer/AV Center</td>
<td>Mr. C. Sollohub, Dr. M. McClanahan</td>
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<tr>
<td>4.E. Oct 91</td>
<td>Hire student help for computer lab</td>
<td>Mr. C. Sollohub</td>
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<tr>
<td>4.F. Fall 91</td>
<td>Purchase equipment for physics labs</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>4.G. Fall 91</td>
<td>Determine theme of Fall 92 workshop</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>5.A. Fall 91</td>
<td>Begin curriculum development for Engineering</td>
<td>Dr. K. Jensen</td>
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<td>5.B. Fall 91</td>
<td>Begin curriculum revision in Env Sci</td>
<td>Dr. R. Lessard</td>
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<tr>
<td>5.C. Fall 91</td>
<td>Begin curriculum development in Physics Dr. L. Sveum, Dr. D. Ross</td>
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#### 2nd Quarter, FY92

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<tr>
<td>3.A. Spring 92</td>
<td>Arrange Puerto Rico trip to Waste Mgt conference</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>3.A. Spring 92</td>
<td>Supervise student poster competition at Puerto Rico conference</td>
<td>Dr. R. Lessard, Dr. R. Clark</td>
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<tr>
<td>3.B. Feb 92</td>
<td>Arrange summer placement of students at labs</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>4.B. March 92</td>
<td>Renew contract for optical crystals grant</td>
<td>Dr. R. Clark</td>
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<tr>
<td>4.C. Spring 92</td>
<td>Select NASA student scholarship awardees</td>
<td>Dr. H. W. Taylor</td>
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<tr>
<td>4.D. Spring 92</td>
<td>Coordinate Regional Science Fair</td>
<td>Dr. T. Salazar</td>
<td></td>
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<tr>
<td>4.E. Spring 92</td>
<td>Purchase Computer/AV Center equipment</td>
<td>Mr. C. Sollohob Dr. M. McClanahan</td>
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<tr>
<td>4.G. Spring 92</td>
<td>Complete preliminary planning for Waste Management Technical Workshop</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>5.A. Spring 92</td>
<td>Prepare proposal for Engineering program</td>
<td>Dr. K. Jensen</td>
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<tr>
<td>5.B. Spring 92</td>
<td>Prepare proposal for revision of Env Sci curriculum</td>
<td>Dr. R. Lessard</td>
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<tr>
<td>5.C. March 92</td>
<td>Advertise for Physics faculty position</td>
<td>Dr. L. Sveum</td>
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<tr>
<td>5.D. Spring 92</td>
<td>Teach biotechnology course</td>
<td>Ms. N. Kirkpatrick</td>
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<td>6. Spring 92</td>
<td>Begin purchase of equipment</td>
<td>Dr. M. McClanahan</td>
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<th>3rd Quarter, FY92</th>
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<tr>
<td>2.A. April 92</td>
<td>Attend Waste Mgt Conference in PR</td>
<td>Dr. R. Lessard Dr. R. Clark</td>
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<tr>
<td>3.B. May 92</td>
<td>Send students and faculty to national labs</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>4.D. Spring 92</td>
<td>Develop SERC activities for K-12 students/teachers</td>
<td>Dr. T. Salazar</td>
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<tr>
<td>4.D. May 92</td>
<td>Conduct SWOOPE workshop</td>
<td>Dr. R. Lessard</td>
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<tr>
<td>4.G. Summer 92</td>
<td>Finalize plans for Waste Management Technical Workshop</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>5.A. May 92</td>
<td>Present Engineering program to B of R for approval</td>
<td>Dr. K. Jensen</td>
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<td>Dr. M. McClanahan</td>
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<td>4th Quarter, FY92</td>
<td>Descriptive Title</td>
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<tr>
<td>4.G. Sep 92</td>
<td>Host Waste Management Technical Workshop</td>
<td>Dr. M. McClanahan</td>
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<tr>
<td>5.A. Aug 92</td>
<td>Initiate Engineering degree program</td>
<td>Dr. K. Jensen</td>
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<td>Dr. M. McClanahan</td>
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<tr>
<td>5.B. Sep 92</td>
<td>Prepare Env Sci program for School Curriculum approval</td>
<td>Dr. R. Lessard</td>
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<td>Dr. M. McClanahan</td>
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<tr>
<td>6. Sep 92</td>
<td>Complete equipment purchases</td>
<td>Dr. M. McClanahan</td>
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Budget info. removed
Institution: New Mexico Highlands University

1. Administration

The Science and Technology Alliance program is administered by the Vice President for Academic Affairs, Dr. Gilbert Rivera. Dr. Melinda McClanahan, the Dean of the School of Science and Engineering, served as Coordinator from 1 October 91 through 10 August 92 at which time Dr. Rivera assumed this position. The Coordinator of Research and Sponsored Projects, Dr. Ron Clark, and the Director of the Science Education Resource Center, Dr. Tomas Salazar, participate in various aspects of the project.

2. Faculty Development

Faculty development continues to focus on faculty travel to professional meetings and on special activities that promote the university or other program areas. One faculty member held a summer appointment at ORNL.

3. Student Development

Sixteen students held summer appointments at LANL and at SNL.

4. Special Projects

Several special projects were completed in FY92 or are ongoing.

A. Dr. Ron Clark is serving as the Coordinator of the Office of Research and Sponsored Projects (1/4 time).

B.1. Dr. Ron Clark, Dr. Larry Sveum, and Dr. Micheal Krebs are continuing research in the area of ceramics.

B.2./ Dr. H. W. Taylor and Dr. Ron Clark are continuing work on NASA-sponsored research projects.

B.3. Dr. George Sprenger completed a one-year research sabbatical at LANL.

E. The Computer/AV Center received heavy use by both students and faculty.
G. The Waste Management Technical Workshop was held on the Highlands' campus September 17-19, 1992.

The workshop, entitled Research Partnerships in Minority Institutions, was co-hosted by NMHU and LANL and attended by 82 participants from numerous minority and majority universities, state and federal agencies, private business, and national laboratories (see Addendum 1, FY92 Fourth Quarter).

5. Curriculum Development

Several faculty received partial Alliance support for curriculum development in their respective areas:

- Dr. Tom Cheavens, Chemistry
- Dr. Dick Greene, Engineering
- Dr. Elmer Grubbs, Engineering
- Ms. Nancy Kirkpatrick, Life Sciences
- Mr. Albert Maez, Engineering
- Dr. Dan Ross, Engineering
- Dr. Harry W. Taylor, Engineering
- Dr. George Zrilic, Engineering

A. Electrical Engineering Program

The NMHU Board of Regents approved the new B.S. degree program in Electrical Engineering presented to them by Dr. Gilbert Rivera, Vice President for Academic Affairs, and Dr. Melinda McClanahan, Dean of the School of Science and Technology, on May 16, 1992. The new program was initiated in the Fall 92 semester. Support of this program will be the first priority of the NMHU Alliance effort in FY93.

B. Environmental Waste Management Program

Work continued on curriculum development for the revised B.S. degree program in Environmental Science.

C. Physical Sciences Curriculum Development

Planning continued in the development of new courses in Chemistry, Physics, and Geology/Hydrology to support the revised Environmental Science program and in a separate Chemistry lab for Engineering and Engineering Technology students.

The search for a new Physics faculty member was unsuccessful, and the search will be re-opened in November 1992.
D. Life Sciences Curriculum Development

A new biotechnology course was developed in Spring 91 with the help of a grant from the Department of Education's Minority Science Improvement Program (MSIP) and was taught for the second time in Spring 92. A total of 14 students have taken the course which covers several aspects of biotechnology including industrial microbiology, plant and animal cell culture, protein engineering, genetic engineering, bioremediation, and ethics. Laboratory studies include recombinant DNA techniques, organelle isolation, protoplast isolation, plant tissue culture, and SDS polyacrylamide gel electrophoresis for proteins.

6. Equipment

Equipment purchases included computer equipment (and software), VCR/TV monitors, environmental science field equipment, and an ultra-low temperature freezer to support the biotechnology course.
ADDENDUM 1

WASTE MANAGEMENT TECHNICAL WORKSHOP: RESEARCH PARTNERSHIPS
AT MINORITY INSTITUTIONS

NEW MEXICO HIGHLANDS UNIVERSITY
17-19 SEPTEMBER 92

SPONSORED BY THE SCIENCE AND TECHNOLOGY ALLIANCE
U.S. DEPARTMENT OF ENERGY

NEW MEXICO HIGHLANDS UNIVERSITY
MELINDA L. MCCLANAHAN, WORKSHOP DIRECTOR

LOS ALAMOS NATIONAL LABORATORY
PHIL VERGAMINI, WORKSHOP COORDINATOR
ABAD Sandoval, S&T ALLIANCE COORDINATOR

PREPARED BY MELINDA L. MCCLANAHAN
2 NOVEMBER 92
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WASTE MANAGEMENT TECHNICAL WORKSHOP: RESEARCH PARTNERSHIPS AT MINORITY INSTITUTIONS

The Waste Management Technical Workshop: Research Partnerships at Minority Institutions was held at New Mexico Highlands University on September 17-19, 1992. This workshop was sponsored by the Department of Energy through the Science and Technology Alliance and was co-hosted by New Mexico Highlands University and Los National Laboratory. The 82 participants at the first day's activities were from 25 organizations and included scientists from Los Alamos National Laboratory, Sandia National Laboratories, and Oak Ridge National Laboratory; faculty members, administrators, and students from 16 universities; representatives from private and corporate business; and agents from the City of Las Vegas, the State of New Mexico, the U.S. Department of Energy, and the U.S. Environmental Protection Agency (Enclosures 1 and 2). Approximately 60 attendees participated in the last two days' activities which included a tour of selected facilities at Los Alamos National Laboratory and preliminary preparation of collaborative research proposals by small break-out groups.

The workshop organization and management team consisted of Melinda L. McClanahan, NMHU Director; Phil Vergamini, LANL Workshop Coordinator; Abad Sandoval, LANL S&TA Coordinator; and support staff (Enclosure 3, p. 17). The eight Group Facilitators for the break-out sessions included two faculty
members from New Mexico Highlands University, one from North Carolina A&T University, one staff member from Los Alamos National Laboratory, one from Oak Ridge National Laboratory, and three faculty members from non-Alliance universities (Enclosure 3, p. 16). The featured speakers and the workshop agenda are described in the Program (Enclosure 3, pp. 12-15).

We expect continued productive results from this workshop in the form of collaborative research projects and other cooperative efforts by both Alliance members and non-Alliance attendees. To date, four research proposals have been received by Alliance national laboratories as a direct result of this workshop. Enclosure 4 is a compilation of the pre-proposals/reports developed by the eight groups.

This endeavor was an example of cost effective expenditure of federal funds. Both NMHU and LANL contributed $10,000 from their 1992 Alliance budgets for a total of $20,000 federal funds to finance the workshop. In addition, $6,750 in registration fees was received. Because of excellent fiscal management and cost control by the NMHU Director and her Administrative Assistant, Ms. Cindy Griego, the expenditures for the workshop totaled only $18,197, considerably under budget (Enclosure 5).

The workshop was well-planned, well-organized, and the activities functioned smoothly. Written evaluations from 34 participants at the close of the workshop showed a very positive response to the format, the activities, and the results (Enclosure 6). The social activities were
complimented for enhancing cameraderie and the development of new friendships. Valuable contacts were made by scientists and educators representing minority institutions, and networking was strongly promoted. One aspect of the workshop that respondees felt could have been improved was the participation by federal agencies for the duration of the workshop.

An overall final analysis of the workshop's results is continuing, but indications are that the workshop's goals were met. We were successful, therefore, in demonstrating the beneficial impact that a small state-supported minority university such as New Mexico Highlands University can have on generating cooperative environmental research at the national level, given the active partnership with Los Alamos National Laboratory and the support of the other S&T Alliance members and the U.S. Department of Energy.
PARTICIPANTS (NAMES/ADDRESSES)
WASTE MANAGEMENT TECHNICAL WORKSHOP:
Research Partnerships at Minority Institutions

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NEW MEXICO HIGHLANDS UNIVERSITY/LOS ALAMOS NATIONAL LABORATORY
September 17-19, 1992, Las Vegas, NM

UNIVERSITIES, NATIONAL LABS, and AGENCIES attending
WASTE MANAGEMENT TECHNICAL WORKSHOP: Research Partnerships at Minority Institutions funded by U. S. DOE

Alabama A&M University
City College of New York
Howard University
Morehouse College
New Mexico Institute of Mining and Technology
New Mexico State University
North Carolina A&T State University
Northern Arizona University
Rocky Mountain College
St. Augustine's College
Salish Kootenai College
Southern University and A&M College
Texas Southern University
Tuskegee University
University of Turabo
Virginia State University
Los Alamos National Laboratory
Sandia National Laboratories
New Mexico Attorney General's Office
City of Las Vegas
U.S. Department of Energy
Office of Waste Management
U.S. Environmental Protection Agency
Martin Marietta Energy Systems, Inc
Renewable Energy Systems, Inc
Hazardous & Radioactive Materials Bureau NMED
Waste Management Technical Workshop

Research Partnerships at Minority Institutions

S & T A

Sponsored by the U.S. Department of Energy Science and Technology Alliance

September 17-19, 1992
New Mexico Highlands University
Las Vegas, NM
WASTE MANAGEMENT TECHNICAL WORKSHOP

Program

Thursday, September 17
All events will take place in the NMHU Student Center Ballroom, unless otherwise noted.

8:00-9:00 Workshop Registration/ Continental Breakfast

9:00-9:20 Welcoming Remarks
Gilbert Sanchez, President, NMHU
David Sanchez, Deputy Associate Director
for Research and Education, LANL
Tony Martinez, Jr., Mayor, City of Las Vegas

9:20-10:15 Plenary Address
"Innovation in the DOE Waste Management Program." Jill Lytle, Deputy Assistant Secretary, Office of Waste Management, U.S. Department of Energy

10:15-10:30 Break

Presentations

10:30-11:00 "Environmental Partnerships – the Key to Our Common Future," Jim Shipley, Program Director for Applied Environmental Technologies, LANL

11:00-11:30 "Energy, Environment and Technology Transfer at Sandia National Labs", #1 Fred Norwood, Sr. Member of Technical Staff, Sandia National Labs; #2 Leo Gomez, Sr. Member Technical Staff, Sandia National Labs.

Replacement for Jenny Haire
11:30-12:00  "Potential Research Collaborations with the Environmental Protection Agency," Charles T. Mitchell, Environmental Health Scientist, Office of Research and Development, U.S. Environmental Protection Agency

12:00-12:15  Break

12:15-1:30  Lunch
Keynote Address:  "WIPP and the State," Lindsay Lovejoy, Assistant Attorney General, State of NM

Presentations


2:15-2:45  "HBCU/MI Opportunity Areas," Terry Weaver, ERWM Minority Initiatives Program Manager, Martin Marietta Energy Systems

2:45-3:00  Break

3:00-3:20  "Solar Detoxification Project," William Dawes, Sandia National Laboratories

3:20-3:40  "WERC," Ron Bhada, Director, Waste Management Education and Research Consortium, New Mexico State University

3:40-4:00  "Environmental Education and Corporate Management: A Dangerous Gap," John Uribe, Associate Professor of Economics, NMHU

4:00  Announcements and Adjournment

5:00-7:00  Wine and Cheese Reception, The Plaza Hotel
Friday, September 18

Workshop Theme: Creating collaborative research proposals between minority institutions and a) government, b) industry, and c) universities.

7:30-8:00 Continental Breakfast

8:00-8:15 Introduction of Topic I: "Getting Started."
Phil Vergamini, LANL

8:15-9:30 Break-out group development of Topic I

9:30-10:15 Team reports and general discussion on Topic I.
Moderator: Phil Vergamini, LANL

10:30 Buses depart New Mexico Highlands University for Los Alamos National Laboratory.
Box lunches provided en route.

12:30-12:45 Buses arrive at Physics Division Auditorium, TA-3, SM-215

12:45-1:00 Welcome

1:00-1:30 Overview of waste management research efforts at LANL

1:30-3:30 Break-out groups tour selected facilities

3:30-5:30 Buses return to Bonita Ranch, outside Las Vegas

5:30-8:30 Barbecue and bluegrass music by The Atomic Grass

8:30-9:00 Buses return visitors to campus. NMHU vans will provide transportation to hotels.
Saturday, September 19

7:30-8:00 Continental Breakfast

8:00-8:15 Introduction of Topic II: "Developing Coalitions and Networking."
   Abad Sandoval, LANL

8:15-9:30 Break-out group development of Topic II

9:30-10:15 Team reports and general discussion on Topic II
   Moderator: Abad Sandoval, LANL

10:15-10:30 Break

10:30-10:45 Introduction of Topic III: "Maintaining the Momentum."
   Ken Holley, Sandia National Laboratories

10:45-12:00 Break-out group development of Topic III

12:00-1:15 Lunch

1:15-2:30 Team reports and general discussion on Topic III.
   Moderator: Ken Holley, Sandia National Laboratories

2:30-3:00 Round table discussion and summary of workshop
   Moderator: Melinda McClanahan, NMHU
Group Facilitators for Break-out Sessions

**Dr. Kenneth Bentson**, Assistant Professor of Environmental Science, Department of Life Sciences, New Mexico Highlands University, Las Vegas, NM 87701

**Dr. Harry Boston**, Research Staff Scientist and Project Manager, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831

**Dr. Milford Greene**, Director of Engineering Programs, Morehouse College, Atlanta, GA 30314

**Dr. Henry Hooper**, Associate Vice President for Academic Affairs, Northern Arizona University, Flagstaff, AZ 86011

**Dr. Jeanette Jones**, Vice President for Research and Development, Alabama A & M University, Normal, AL 35762

**Dr. Bob Lessard**, Professor of Earth Sciences, Department of Physical Sciences, New Mexico Highlands University, Las Vegas, NM 87701

**Dr. Dilip Shah**, Associate Professor, Department of Construction Management and Safety, North Carolina A & T University, Greensboro, NC 27411

**Dr. Jeffrey Weinraeh**, Staff Member, Waste Minimization Programs Office, Los Alamos National Laboratory, Los Alamos, NM 87545
Workshop Organization and Management Team

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LANL S&TA Coordinator
Abad Sandoval, Staff Member, Office of University Research and
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Logistic and Clerical Staff

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Waste Management Program; Administrative Assistant, Science and
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Millie Saxman, Protocol Office, Los Alamos National Laboratory, Los Alamos,
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Acknowledgements

The workshop team gratefully acknowledges the help and cooperation of: Ms.
Janice Odom, NMHU Interim Dean of Students; Mr. Toby Lucero, Student
Center Operations Supervisor; the NMHU Environmental Science Club; Ms.
Polly Mullen, NMHU Photographer; Dr. Drake Bingham, NMHU Department of
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University Relations; the NMHU Print Shop staff; the NMHU Physical Plant;
The Plaza Hotel: Steve Catheart and Marcie Goke, Marriott Management
Services; the S&TA Alliance members; and all others who helped make this
workshop a success.

A special thank you and a rousing "Yee-haw!" to the Hooper family of
Bonita Ranch.
Science and Technology Alliance

The Science and Technology Alliance, funded by the U.S. Department of Energy, is dedicated to the enhancement of science and technology studies at minority universities. The Alliance’s mission is to encourage and support minority students' involvement in research and education in scientific and technological fields through networking, research, and cooperative employment opportunities.

Members

New Mexico Highlands University
North Carolina A. & T. State University
Sistema Universitario Ana G. Mendez
Los Alamos National Laboratory
Sandia National Laboratories
Oak Ridge National Laboratory

The Waste Management Technical Workshop
is hosted by
New Mexico Highlands University
and
Los Alamos National Laboratory

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REPORTS FROM BREAK-OUT GROUPS 1-6

GROUP 1

FACILITATOR: Dr. Robert Lessard

PARTICIPANTS: Ms. Amy Long
Dr. Robert Taylor
Dr. Jack Ainsworth
Dr. Ray Granam
Dr. Gerald Hill
Dr. Guillermo Martinez
Dr. Wondi Merie
Dr. Lin Fannao
Dr. Shoo-Yun Chang
Mr. Lee M. Saca
Dr. Sunnie H. Abarime

I. Characterization of heterogeneity of soil properties
   A. Hydraulic properties
   B. Chemical properties (organic/inorganic sorption)
   C. Application to mixed wastes
   D. Correlation between properties

II. Modeling: use of simulation as a "laboratory" for complex systems

III. Develop/try new lab/field methods
   A. Parameterization
   B. Monitoring
   C. Testing of theoretical models

IV. Human development
   A. Involvement of students (HS-PhD) in related research

GROUP 1 Second Session

Objective: Contamination of soils by mixed (organic/inorganic) wastes

Goal: To develop cost-effective remediation strategies for soils contaminated by mixed wastes.

Problems to address:
   --- heterogeneity of soil projects
   --- add from yesterday's notes

Strategies: Include lab computer, possibly field components
   - Design lab component such that each institution can use enhance its particular expertise/facilities (involvement of students at appropriate levels)
   - Lab analysis of sorption/desorption wastes on a variety of soil types
   - Lab analysis of sorption/desorption of mixed wastes on heterogeneous soil columns collected from the field
   - Evaluate multi-component transport/reaction simulator for heterogeneous soils
   - Use lab column data to verify/compare simulations
   - Test a variety of remediation techniques (e.g., soil washing, surfactant enhanced soil washing, steam strip mine) and soil columns contaminated by mixed wastes
   - Use simulator to test strategies on arctic soils

KEEPING THE MOMENTUM

The soil and groundwater contamination and treatment subgroup charged the organizers of this conference with the task of channeling our proposals to the national labs and keeping subgroup members informed of the laboratories' plans for utilization of our processes. The national labs should perform critiques of the submitted proposals providing any possible criticisms and rationale for negative feedback, along with suggestions for improving proposals to make them suitable for funding.
FACILITATOR: Dr. Harry Boston

PARTICIPANTS: Dr. Wilbert Osam
Dr. John Rier
Dr. Guillermo Martinez
Dr. Edgard Resto
Dr. Eileen Chant
Mr. Andy Vigil
Mr. Terry Weaver
Ms. Barbara Lynch
Dr. Chukwu Onu
Mr. Ed Aebischer

RESEARCH PROPOSAL TOPICS:

BIOLOGICAL TREATMENT:
- Whole Plant Systems/In Vitro Selection
- In Situ Bicrimation
- Ex Situ Bicreatment

PROCESS MODELING:
- Mass Transfer

GROUP 2, SECOND SESSION

HOW TO BUILD AND SUSTAIN COLLABORATIVE RELATIONSHIPS

1. RESEARCH PARTICIPATION OPPORTUNITIES AT D.O.E. SITES
   A. FACULTY
      - Environmental Management Career Opportunities for
        - Minority Institutions
        - Minority Institution Research Travel
   B. STUDENTS (Graduate and Undergraduate)
      - Student Research Participation
      - Professional Internships
      - D.O.E. Science and Engineering Research Semester
      - E.M.C.E.M. Fellowships (Academic Year, Summer, at Lab)

2. PROPOSAL DEVELOPMENT
   A. Biological Treatment (3)
      - Process Modeling (3)
      - Waste and Site Characterization (3)

3. COALITION BUILDING
   A. MODELS FOR JOINT PROJECTS
      - Lab-University Joint Projects
      - University-University Partnerships
      - Identification and Selection of Plants for Bicrimation (Metals and
        Organics)

CHEMICAL CHARACTERIZATION/WASTE and SITE

Real-time Analysis
Methods Development/Extraction Characterization
In Situ Banners/Containment

Session 3: REMEDIATION/DECONTAMINATION TECHNOLOGY

MAINTAINING THE MOMENTUM

1) Implement working-level partnerships between minority institutions and with one
   or more universities
2) Build specialized training components (s) for facility and students into targeted
   research projects
3) Formalize research plans in at least three areas:
   a) Soil Detoxification
   b) Bicrimation
   c) Plant Species Metabolism of Metals and Organics
4) Establish DCE Research-Participation programs to involve more faculty and
   students in ongoing projects at labs
5) Create special summer collaborations in targeted areas
MUNICIPAL WASTE MANAGEMENT

WASTE MINIMIZATION RECYCLING AND INDUSTRIAL ECOLOGY

GROUP 3

FACILITATOR: Dr. Jeffrey Weinrach

PARTICIPANTS: Dr. Jaya Krishnanagaran
Dr. Ken Soderstrom
Dr. Merritt Helvensten
Ms. Crystal Funano

GROUP 7

FACILITATOR: Dr. Henry Hooper

PARTICIPANTS: Dr. Peter Benson
Dr. Robert W. Taylor
Dr. Shoo-Yun Chang

I. Environmental Recovery of Waste Sites

A. Mine Wastes
B. Superfund/Clean-up Sites
   1. Chemical waste sites
   2. Radiation waste sites

II. Appropriate use - methods

A. Characterization of sites
   1. Control sites
      (a) Inventory plants and animals
      (b) Identify plants or fungi which act as bioaccumulator
   2. Test sites
      (a) Identification of dominant species
      (b) Study Physiology, Biochemistry, Genetics, etc., of surviving species
      (c) Determine accumulators
         1) where does accumulation occur
         2) how does accumulation occur

III. Possible Research topics / timetable

A. Site Characterization - one year
B. Development of technology needed to clean up sites - two years
C. Computer modeling of ecological restoration
D. Commercialization of Technology - two years

Group 3 & 7

Three Proposal Topics

1. Byproduct use
2. Metal Separation
3. Recycling and energy recovery processes

All topics should include Systems Analysis (modeling)
SITE CHARACTERIZATION AND SAMPLING TECHNIQUES

GROUP 4

FACILITATOR: Dr. Dilip T. Shah
Dr. Augustine Rios

PARTICIPANTS: Dr. Alan Gutian
Dr. Constance Hill
Dr. Vasil Diyamangodlu
Mr. Frederico Asmar
Mr. Jim Kearns

TOPICS THE GROUP WOULD PURSUE:

SITE CHARACTERIZATION:

1. Heterogeneity of site
2. Identify which parameters
3. Dynamic changes of site?
4. Site characteristics? Before? After?
5. Impact of regulations/standards on methodology
6. Developing/evolving methods of characterization

SAMPLING TECHNIQUES:

1. What constitutes a representative sample?
2. What factors determine appropriate analysis technique?

TOPICS TO BE PURSUED FURTHER BY THE GROUP

GROUP 4, SECOND SESSION

DEVELOPING COALITIONS AND NETWORKING

1. PARAMETERS
   - Need to identify the parameters, whether soil or water, that will be most useful in solving waste problems associated with the site.

2. DYNAMIC CHANGES OF WASTE STORAGE
   - Realizing that wastes are not necessarily static in terms of composition, there is a need to study the character of the wastes. Studies needed to ID the initial composition of wastes, how they change over time, the rate of change, and if the changes produce more hazardous materials.

3. SITE CHARACTERISTICS OF SITE
   - Methods used, techniques applied and parameters used would vary depending on whether a site is proposed or already in use. Questions required such as:

4. REGULATIONS
   - Efforts needed to develop site characteristic methods and analysis which produce convincing, less disputable results in light of changing regulations. Propose that we address methodology issues from the shorter term standpoint of meeting regulations so that the longer term environmental health issues may be addressed.

5. METHODS OF CHARACTERIZATION
   - Need to identify the analytical techniques that should be used depending on the sites. Need to develop new techniques of characterization so that new wastes are not generated. New methods needed for extraction of liquids that better simulate the specific liquid in a particular site.

MAINTAINING THE MOMENTUM

THINGS TO DO:

1. Our Proposal is Feasible
2. Work Short Term with One of the Lacs
3. Re-do the Proposal
4. Seek Funding Agency
TOXICOLOGY AND RISK MANAGEMENT

GROUP 5

FACILITATOR:
Dr. Kenneth Bentson

PARTICIPANTS:
Mr. Randall Leathers(NC A&T State Univ.)
Dr. Astatkie Zikarge(Texas So. Univ)
Ms. Karla Garcia(NMHU)
Dr. Jafara S. Turay(St. Augustine's)
Dr. Piara S. Gill(Tuskegee U.)
Dr. Susan A. Nicholson(NMHU)
Dr. Chet Richmond(CORNLLMMES) crp@ornl.gov
Dr. Merritt Hevenston(NMHU)

TOPICS:
Biomarkers
Datackses
Risk Communication
Tox. Chem.
Industra/Occupational Hygiene
Environmental Transport
Epidemiology
Risk Assessment
Waste Sites:
Effects and exposure in humans

Page 1:
- Develop coalition for Risk Assessment Methods Development and Technology Transfer
- Produce students trained in Risk Assessment Methods
- Community education in Toxicology
- Collaborate with other workshop groups:
  (1) Exposure Evaluation - direct
      a) minority community-training students
      b) cleanup workers
  (2) Exposure Evaluation - Indirect
      a) environmental fate studies
      b) exposure estimates based on transport
  (3) Epidemiology of exposed populations
  (4) Screening for health effects near waste sites - vital statistics & tumor registries
  (5) Problem of toxicology of complex mixtures - lack of tests
  (6) Risk Estimation technique development
      a) complex mixtures
      b) Risk communication

Page 2:
(1) Obtain list of established hazardous waste sites
(2) Identification of minority population in area
(3) Exposure Assessment to determine if levels are sufficient to cause health problems
   a) establish hazards materials present
(4) If levels are established, then epidemiological studies should pursue (need of epids. specialists)
   a) gathering of health information from local health facilities, county, etc.
   b) Local Surveys/occupations shifts, etc.
(5) Obtaining results/publish/educate community of results/deal with fears & questions
   with workshops
RESTORATION ECOLOGY

GROUP 6

FACILITATOR: Dr. Milford Greene (404) 525-6272

PARTICIPANTS: Ms. Pat Hurley, (406) 675-4800 X-344
Dr. Erne Glaznev, (602) 823-3133
Ms. Saruse Aranna, (919) 373-9796 Rm 5
Dr. Cons Garcia,
Dr. Emel Taylor, (519) 334-7795
NCA & T

I. Environmental Recovery of Waste Sites

A. Mine Wastes
B. Superfund/Clean-up Sites
   1. Chemical waste sites
   2. Radiation waste sites

II. Appropriate use - metrics

A. Characterization of sites
   1. Control sites
      (a) inventory plants and animals
      (b) Identify plants or fungi which act as bioaccumulator
   2. Test sites
      (a) Identification of dominant species
      (b) Study Physiology, Biochemistry, Genetics, etc., of surviving
         species
      (c) Determine accumulators
         1) where does accumulation occur
         2) how does accumulation occur

III. Possible Research topics / timetable

A. Site Characterization - one year
B. Development of technology needed to clean up sites - two years
C. Computer modeling of ecological restoration
D. Commercialization of Technology - two years

Need: To identify bioaccumulator and/or detoxifying plants, fungi and/or bacteria
in a variety of habitats which can be used to recover chemical waste sites
throughout the northern hemisphere.

Philosophy: the recovery should mimic natural succession as closely as possible,
using native or naturalized species where possible

I. Site Characterization

A. Processes should be replicated in 4 regions to develop methodologies which will
   apply in a variety of environments.
   1. Southeast: Warm mesic habitats
   2. Southwest: Warm, xeric habitats
   3. Southeast: Cold, xeric habitats
   4. Southwest: Cold, mesic habitats

B. General Design
   1. Establish study sites, including a waste site and a control site
   2. Identify dominant species in each site, with an emphasis on those
      species which appear to be surviving in waste sites. Organisms chosen
      for study should be prioritized as follows: native species, establised
      species, recently or not-yet introduced species
   3. Analyze identified species
      a. Chemical analyses to determine if the organisms are
         accumulating or breaking down toxins. Identify specific
         issues.
      b. Genetic analysis to compare site organisms with same
         species from control site, and to identify, if possible specific
         gene(s) responsible for survival traits.
      c. Determine growth parameters of the organisms (method of
         reproduction, rate of reproduction, nutrient/light requirements)

II. Develop organisms as biotechnological tools

A. Genetically altered organisms which grow faster, detoxify at a greater rate and
   volume
B. Develop "time-como" physiology for any altered species so that they are
   removed from the ecosystem when the soil is detoxified.

III. Develop computer models

A. Statistical models based on species and habitat to predict rate and
   expected changes during subsequent stages.
B. Physiological. Genetic models to characterize patterns of detoxification which
   may apply to other species as they are identified.
GROUP 6, Second Session
Network Alternatives

1. Individual Regional Research
Send researchers to specialty institutions to learn processes and standardize approaches

2. Share specimens,'farming out' according to expertise (eg. ecol., genetics, physiol., computer modeling.

3. Quality control mechanism (swap % of samples (esp. genetic) to check replaceability) This is a model for a joint-research project in restoration ecology. Many possibilities for specific research pulled from this model.

Maintaining Momentum

1. What are $ sources?
   Superfund?
   How do we commit with program directors and/or managers who have $ (eg. division leaders)

2. Match interests with agencies. Via public meetings where face-to-face exchanges occur

3. Work with Ed. Support organizations eg., NA, FEO, UNCE, AIHEC, LULAC

4. Match needs, priorities, interests with trace organizations and individual industry (eg. chem.Man. Org)

5. Project Institutions
   A. Develop/Assessment Instrument which identifies:
      a. Personnel expertise, interests
      b. Facilities
      Needs
   c. Institutional commitment eg. release time, etc. available?
   B. Quarterly update publication to maintain progress, communication

IV. Develop commercial value of recovery plants
   A. Stable seed/cutting sources
   B. Growth and distribution plans alternative project: Develop a successional technology for site recovery—is it possible to accelerate succession?

SOLAR DETOXIFICATION MEETING

1. Program split into six activities.
2. UT - flat plate, contact: local industry.
3. NMHU - modeling process performance and economics, solar troughs.
4. NC A&T - chemistry of catalyst, contact: local industry.
5. Oak Ridge - analytical chemistry of solar detox (chemistry).
6. Los Alamos to support NMHU with computer modeling efforts (process efficiency, economics).
7. SEEK from each school as seen money.
8. All faculty members involved in each school to come to Sandia.
9. Select date for meeting at Sandia (a meeting with NMHU faculty to precede date selection).
10. Each institution to make a list of equipment, prepare a budget, select a principal investigator; this information will be due two weeks after the meeting at Sandia.
11. Plan should be for three years (two as a minimum); also a representative each from Los Alamos and Oak Ridge.
12. Project to emphasize student participation.
13. Proposal intended for EPA, DOE, NSF.....

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MUNICIPAL WASTE MANAGEMENT
WASTE MINIMIZATION RECYCLING AND INDUSTRIAL ECOLOGY

GROUP 3

FACILITATOR: Dr. Jeffrey Weinrach

PARTICIPANTS: Dr. Jaya Krishnagopalan
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GROUP 7

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Group 3 & 7

Three Proposal Topics

1. Byproduct use
2. Metal Separation
3. Recycling and energy recovery processes

All topics should include Systems Analysis (modeling)
Group 3 & 7: Municipal Waste Management; Waste Minimization, Recycling and Industrial Ecology

Participants:
Dr. Jeff Weinrauch - LANL
Dr. Henry Hopper - Northern Arizona U.
Dr. Shoo-Yun Chang - North Carolina A&T State U.
Dr. Ken Soderstrom - University of Turabo
Dr. Peter Benson - Renewable Energy Systems, Inc.
Dr. Robert Taylor - Alabama A&M U.
Dr. Jaya Krishnagopalan - Tuskegee U.
Ms. Crystal Furlano - Student, New Mexico Highlands U.

TOPIC/TITLE: Waste Treatment (i.e., for the removal of heavy metals and hazardous organics) using plant/cell systems with by-product utilization.

OBJECTIVES:
The proposal will address waste treatment problems by utilizing suitable plant/cell systems for waste (i.e., solid waste/land fill, waste water) treatment. The scope will include the by-product plant systems utilization techniques for energy, etc.

CURRENT STATUS/STATUS QUO:
Currently, there are serious problems in the treatment techniques for waste water from municipal sewage treatment, industrial processes etc. Some work has been carried out in the area of plant/cell systems utilization, but have not been very successful. This project will aim to study known and new plant/cell systems for waste water treatment. Presently, such an approach has not been made for municipal soil waste treatment.

TASKS:
The major tasks in this project will include the following:
1. Identify specific local & regional waste treatment problem(s)
2. Identify whole plant/cell systems that are suitable for a specific waste treatment problem
3. Characterization of the waste: effect of plant system
4. Limits on technology
5. System analysis
6. By-product utilization to maximize resource recovery - reclamation of plants/cells - resource (energy, feed stock) recovery
7. Working models

LONG RANGE GOAL:
Data gathered from model waste treatment systems will be used to develop and engineer plant systems for other waste treatment problems.
SOCIAL AND LEGAL ASPECTS OF WASTE MANAGEMENT

GROUP 8

FACILITATOR: Dr. Jeanette Jones

PARTICIPANTS: John Uribe
Anita Arceneque
Catherine Ratliff
Dorothy Leflore
Leo S. Gomez
Warren Miller
Bobby Wilson
Ron Bhada
Armando C. Furlano
Charles Mitchell

PROBLEMS: Identify social and legal aspects of waste management.

ASPECTS
Environmental Awareness
1. Educators
2. K-12
3. Scientists
4. non-scientists
5. Professionals
6. Regulators and bureaucrats (politicians)

RISKS
1. Health
2. Economics
3. Legal
4. Social and psychological
5. Political

Planning/Implementation/Evaluation
1. Talking to each other
2. Contact persons at each National Lab
3. Capability statements on each institution
4. Formation of working teams (which may include persons outside this group)
5. Define role of each governmental agency and institutional partner
SUMMARY OF RATINGS FROM 34 EVALUATION FORMS

WASTE MANAGEMENT WORKSHOP
RESEARCH PARTNERSHIPS AT MINORITY INSTITUTIONS
HOSTED BY
NEW MEXICO HIGHLANDS UNIVERSITY
AND
LOS ALAMOS NATIONAL LABORATORY

WORKSHOP EVALUATION
19 September 92

For future planning purposes, please help us by giving your candid opinion about this workshop. Thank you for taking the time to answer the following:

I. Overall workshop
   - NOT USEFUL
   - USEFUL
     1  2  3  4  5
   
   0  0  3  17  14

2. Presentations by DOE and EPA
   - NOT USEFUL
   - USEFUL
     1  2  3  4  5
   
   0  1  4  22  7

3. Presentations by private and corporate business
   - NOT USEFUL
   - USEFUL
     1  2  3  4  5
   
   1  3  12  13  2

4. Presentations by national laboratories
   - NOT USEFUL
   - USEFUL
     1  2  3  4  5
   
   0  0  6  19  8

5. Small group activities
   - NOT USEFUL
   - USEFUL
     1  2  3  4  5
   
   0  2  6  7  19

6. The content of this workshop met my expectations.
   - STRONGLY DISAGREE
   - STRONGLY AGREE
     1  2  3  4  5
   
   1  2  8  16  7

7. The workshop contained ideas I can apply in my work.
   - STRONGLY DISAGREE
   - STRONGLY AGREE
     1  2  3  4  5
   
   1  2  8  13  10

8. The technical level of the workshop was appropriate for my needs.
   - STRONGLY DISAGREE
   - STRONGLY AGREE
     1  2  3  4  5
   
   1  4  10  12  7

The best aspects of the workshop were:


The workshop could be improved by:


30
BEST ASPECTS OF WORKSHOP

1. Meeting people in the SAT Alliance and from other minority institutions (5 responses)
2. Personal contacts and networking; interaction with attendees; new collaborations and friendships (10 responses)
3. Meeting individuals with same research interests; getting to know people at other institutions and at national lab which will help me prepare a research project in my interests
4. Meeting other scientists from HBCU/MI and national laboratories
5. One-on-one interactions between faculty from different institutions
6. Good group communication and sharing and translating ideas
7. Interrelationships between academia, private business, government, and community
8. Information about projects at LANL and SNL; obtaining information about technical work done currently and where funds are currently being spent
9. Visit to LANL (2 responses)
10. Information regarding matching my needs with DOE interests
11. Proposal development
12. Workshop break-outs; small group activities very productive (6 responses)
13. First day's individual presentations
14. Great organization of three-day meeting; workshop well organized and planned (5 responses)
15. Very nice social activities; nice mixture of activities planned; food was good; hospitality - outstanding (4 responses)
16. Above all...the workshop was informative.

IMPROVEMENT POSSIBLE/SUGGESTIONS

1. Too many presentations on the first day; reduce number of formal presentations on first day and include one of the group activities that day (2 responses)
2. Use people from national labs, EPA, DOE as facilitators for small groups; more funding agency participation in small groups; more active participation by labs and agencies (4 responses)
3. Invite scientists from labs to participate in each small group to provide expertise in discussion
4. Be more specific about the goals of the workshop before enlisting participants; set research agenda prior to meeting (2 responses)
5. Need more program directors represented from DOE, EPA, DOD, etc.
6. Provide specific guidelines for small group activities with more time for break-out groups
7. Target specific research funding possibilities or RFPs
8. More discussion on national R&D needs
9. Make technical presentations on different projects of national labs; more technical information regarding ongoing research projects; more information on research work (3 responses)
10. Spending more time visiting the national lab and interacting with the research work being done and exchange our ideas with lab scientists; meet with upper level management at lab
11. The site visit to LANL was not very good - no content except two minor research projects
12. Include more industrial interests
13. Provide list of participants research interests
14. Evaluate each speaker individually to clearly see who should and who shouldn't be invited to speak at the next conference
15. Arrange a bus to bring people from Albuquerque airport instead of renting cars - more cost effective; a bus service for a fee of $25 or more can save the rest a lot of inconvenience (2 responses)
16. Need more time to soak up local culture and to shop for spouses
DATE
FILMED
10 / 13 / 93
END