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THE HBCU/MI

The Historically Black Colleges and Universities/
Minority Institutions
Environmental Technology Consortium

CONSORTIUM

ANNUAL PERFORMANCE REPORT

1991-1992

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1991-1992

ANNUAL PERFORMANCE REPORT

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EXECUTIVE SUMMARY

The member institutions of the Consortium continue to play a significant role in increasing the number of African Americans who enter the environmental professions through the implementation of the Consortium's RETT Plan for Research, Education, and Technology Transfer. The four major program areas identified in the RETT Plan are as follows:

Minority Outreach and PreCollege Education

GOAL: To increase the amount, access and quality of mathematics and science education and information dissemination in minority communities.

Objectives

- Develop and institute Math and Science Programs for Minority Parents and Children (pre-K-12) and pre-college Teachers
- Promote Public and Private Industry Linkages with Minority Elementary and Secondary Schools
- Develop Core Elements of precollege Programs in the Energy Sciences and Waste Management
- Accelerate Certification and Training for the Professional Training of Science and Mathematics Teachers

Undergraduate Education and Postsecondary Training

GOAL: To increase the number of qualified minority professionals available to teach and work in the

sciences and engineering, especially the energy, materials, and environmental sciences.

Objectives

- Develop and implement activities at the undergraduate level that will increase the number of minorities retained in the pipeline for graduate training in the sciences
- Develop programs to retain minority faculty and trainers as mentors and role models
- Identify elements and recommend implementation of strong undergraduate course of study in the sciences, mathematics, and engineering disciplines with minor programs in the energy, materials, and environmental sciences

Graduate and Postgraduate Education and Research

GOAL: To develop nationally recognized capabilities within the Consortium to provide graduate research, education, and support to minority students at the master's and Ph.D. levels in the discipline areas that support the energy, environment, solid, hazardous, and radioactive waste handling industries.

Objectives

- Develop a clear statement of HBCU/MI Consortium capabilities consistent with federal, state, and industry priorities and needs
- Plan and coordinate the development and support of the Consortium's interdisciplinary academic and research programs that build upon institutional strengths and track records in the sciences and engineering; and resources of its Associate and Affiliate Members
- Provide competitive fellowship support and industry access to minority graduate students pursuing master's and Ph.D.

studies at Consortium institutions in energy and environmental sciences and engineering

- Establish partnerships with the public and private energy, environmental, and waste management industry for long-term commitment to the development of skilled minority manpower to meet specific industry needs

Technology Transfer

GOAL: To effect technology transfer among HBCUs/MIs, the environmental and ER/WM industry, federal, and state governments

Objectives

- Create Consortium Technology Development Centers that establish linkages with ER/WM industry and national and federal laboratories, and technology centers for the development and application of specific priority technologies.
- Promote the development of competitive minority technical entrepreneurial talent and businesses in ER/WM areas
- Establish ER/WM Minority Manpower Training Centers and Programs

As is apparent from the reports that follow, the member institutions are continuing their efforts to implement the programs of the Consortium at their institutions. In addition to projects conducted with the funding provided by the Department of Energy, the member institutions have leveraged the DOE funding to implement projects funded by state and federal agencies, foundations, and industry.

The Consortium continued to implement programs and activities which included the participation of all member institutions. These included the programs managed by the subcontractors, the Associated Western Universities (AWU), Inc., and Basic Technologies International (BTI).

One of the most exciting Consortium activities this year, was the signing ceremony of the Cooperative Agreement between the Department of Energy and the HBCU/MI

Consortium. The signing ceremony took place in Atlanta, Georgia, on February 27, 1992. The then Secretary of the U.S. Department of Energy (DOE), Admiral James D. Watkins, attended and signed the cooperative agreement. Several Consortium member institutions presidents, key DOE officials and congressional staffers were also in attendance. Additionally, the Admiral also visited Oglethorpe Elementary School. The Admiral was anxious to meet the Oglethorpe students who participated in a DOE funded Math and Science After School Project which was conducted by through the School of Education at Clark Atlanta University.

In Addition, the HBCU/MI Environmental Technology and Waste Management Consortium organized and sponsored a major forum and workshop held in Atlanta, Georgia in October 1992.

The HBCU/MI Consortium invited approximately 50 HBCUs/MIs and Major Research Institutions to participate in the first Forum on Undergraduate Research Experiences of Minority Undergraduate Science, Mathematics, and Engineering Students and a Workshop on Graduate School Opportunities. Other sponsors included the Massachusetts Institute of Technology, the Department of Energy and the Environmental Protection Agency.

Over six hundred (600) individuals attended this exciting and successful forum. A total of 338 students and 170 faculty representing 46 Historically Black Colleges and Universities participated in the Forum. In addition, twenty-five Major Research Institutions, twelve Government Agencies and National Laboratories, and eight organizations sent representatives to the Forums.

All EMCOM students and approximately one hundred (100) other students from the HBCUs/MIs presented posters on research projects conducted the summer of 1992 or during the 1991-1992 academic year. One of the primary objectives of the forum and workshop was to make HBCU/MI faculty and students aware of the many fellowships, research and teaching assistantships, etc., available for graduate study in mathematics, the sciences and engineering.

This event was unique. It is hoped that the Forum will assist in forging a long-term relationship between and among the HBCUs/MIS that produce quality science, engineering, and mathematics graduates, major research institutions, national and federal research laboratories, and other agencies. Forum program materials are enclosed for your review.

ALABAMA A&M UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Alabama Agricultural & Mechanical University (AAMU) is a public, co-educational, land-grant institution located in Huntsville, Alabama. The predominantly native Black American student body includes a majority of Alabama residents with significant representations also of non-Blacks and international students from 45 foreign countries.

Alabama A&M University has proposed to increase the number of minorities in ER/WM related sciences and engineering by strengthening its undergraduate academic programs in biology, civil engineering, plant and soil science, chemistry and physics, and to include a stronger emphasis on environmental sciences.

PROGRAM HIGHLIGHTS

Upon the implementation of the ER/WM research and technology transfer programs, AAMU plans to develop graduate level coursework in the environmental sciences.

Specific objectives which are targeted to implement AAMU's ER/WM program are:

- to **recruit and retain** minority students in environmental science programs
- to undertake academic **curriculum program strengthening and enhance environmentally related curriculum** by utilizing peer tutoring and experiential learning opportunities for undergraduate students;
- to provide **faculty development** activities; and
- to develop **outreach programs** in ER/WM.

Program Management

- In early 1992, Ms. Cecelia Wade was appointed as the HBCU/MI Consortium Administrative Coordinator. She will assist Dr. Jones in the reporting requirements for Alabama A&M University.

- On March 25, 1992, three staff members from Alabama A&M University visited the HBCU/MI Headquarters office at Clark Atlanta University. Ms. Jewel Joyner, from the Grants and Contracts Office, Ms. Cecelia Wade, from Dr. Jeanette Jones' Office and Mr. Art Moncreif, from the Business office met with Ms. Carol Johnson and Ms. Bernice Jones to discuss reporting procedures, headquarters setup and related issues.

Faculty Development

- Five faculty members, the University Director for the Honors Program and one student attended the Second Annual Waste Management and Environmental Restoration Conference in San Juan, Puerto Rico, April 9-11, 1992. The Conference was sponsored by the U.S. Department of Energy (DOE), Office of Technology Development and the DOE Office of Energy Research. The following faculty and students presented their research findings:
 - Dr. Majorie Campbell
Environmental Toxicology, Department of Biology
 - Dr. Rather Brown
Biologist, Department of Biology
 - Dr. Sunnie Aburime
Soil and Water Engineer, Department of Plant and Soil Science
 - Dr. Jeanette Jones
Mycology/Microbiology, Vice President for Research and Development and Steering Committee Member
 - Ms. Katrina Haslett
Biology Undergraduate
 - Dr. Mary Brown
University Director, Honors Program
- A paper entitled, *"Teaching and Research in Environmental Waste and Water Quality Management (EW/WQ) Programs at Alabama A&M University"* by Drs. Sunnie A. Aburime, Robert W. Taylor, and Jeanette Jones was submitted and accepted for the Colorado

State University conference on "Water Resources and Environment: Education, Training and Research." This paper was presented at Colorado State University, July 13-17, 1992.

Outreach

Alabama A&M University sponsored the First Summer High School Teacher Enhancement in the Sciences Workshop. Twenty teachers comprising ten teams participated in a three week workshop to infuse Environmental Science in their curriculum/teaching. This project was funded by the Department of Energy. The workshop was held June 1, 1992-June 19, 1992.

CLARK ATLANTA UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Clark Atlanta University (CAU), formed in 1988, is the only totally private, predominantly African American coeducational institution of higher education in the United States. CAU inherited and is building upon the mission and heritage of its parent institutions, Atlanta University (founded in 1865) and Clark College (founded in 1869).

The University has five schools, Arts and Sciences, Business Administration, Social Work, Education, and Library and Information Studies offering undergraduate, graduate, professional degrees as well as nondegree programs. The School of Library and Information Studies has the only accredited graduate program in Georgia. The dual bachelor's degree in Engineering is offered in cooperation with Georgia Institute of Technology, Boston University, Auburn University, Rochester Institute of Technology, and Rensselaer Polytechnic Institute.

CAU is a member of the Atlanta University Center (AUC). The AUC comprises six independent, historically black institutions located on contiguous campuses: CAU; Morehouse, Morris Brown, and Spelman Colleges; the Morehouse School of Medicine; and the Interdenominational Theological Seminary. Undergraduates in the AU Center have the opportunity to cross register, thus giving them a wider selection of curricula and degree programs.

CAU serves over 4,000 students representing 50 countries and nearly every state in the nation. More than 250 full time faculty teach and mentor the 2,800 undergraduate and 1,200 graduate students. Located in Atlanta, Georgia, the CAU campus is five minutes from the downtown business and recreational district. This residential campus covers 67 acres.

CURRICULUM and FACULTY DEVELOPMENT

Environmental Science Curriculum Development Activities

Under the lead of Clark Atlanta University, eleven environmental science modules are being developed in conjunction with Central State University (Ohio) and Alabama A&M University. There are nine instructors involved in developing the modules.

A module is one theme or pertinent issue in environmental science. The responsible institution and the themes of our eleven modules are:

Clark Atlanta University:

1. Estuaries;
2. Oceans
3. Hazardous Materials/Wastes;
4. Pollution Prevention;
5. Methods/Pollution Detection.

- CAU has established linkages with Atlanta Metropolitan College (a junior college), Morehouse, Morris Brown and Spelman Colleges
- Environmental curricula will be implemented in the natural and social sciences.
- Dr. Jatinder Singh was recruited in the area of engineering.
- Dr. Man Sharma conducted a training workshop in the use of Integrated Computerized Instruction Systems (ICISS) for environmental science teaching. Workshop participants included faculty from Alabama A&M University and Central State University.
- Drs. Adeyami and Wilson attended the TELI Program at Tufts University.
- Faculty and staff were part of the wastewater treatment and environmental safety training team at the El Tabbin Institute of Metallurgical Studies (TIMS) in Cairo, Egypt.
- One faculty member will be attending the Water Resources Conference in Denver, Colorado July 13-17, 1992.
- Faculty members participated in Consortium sponsored conferences and workshops. In addition, faculty members participated in the EMPAC and EMCOM Summer programs and conducted research at federal agencies and national laboratories.

RECRUITMENT AND RETENTION

Undergraduate Research Experiences Program (UREP)

The retention and mentoring program for undergraduate students is facilitated by the large number of environmentally-related projects being conducted by faculty and research scientists at CAU. Stipends and fellowships were provided for undergraduates to work as research assistants to faculty who also served as mentors and role models. UREP has been very effective and will be expanded during the second year. Some of the undergraduate students will, in turn, be assigned as mentors to the elementary and secondary school students in an after-school program to be initiated in the second year.

OUTREACH ACTIVITIES

Several pre-freshman and secondary school programs continue to be conducted by CAU during Summer to introduce students to the emerging career opportunities in environmental technology and waste management. These include:

- The Health Careers Summer Program
- The Howard Hughes Scholars Program
- The Minority High School Students Research Apprenticeship Program
- The Natural Sciences and Engineering Advancement Program
- The Pre-Enrollment Engineering Program
- The Research Careers for Minority Scholars in Geosciences Program
- The Rowland Scholars Program
- The Summer Science, Engineering, and Mathematics Institute
- The Young Scholars Program

The Saturday Science Academy

The Saturday Science Academy continues to serve students in grades 3-8. In year two, enrollment increased and program activities expanded and now include an environmental component.

The Clark Atlanta University/Oglethorpe Elementary School After School Energy and Environmental Science Program

An Energy and Environmental Science Program was developed to provide hands-on science learning experiences, introduce energy and environmental concepts, and to provide a follow-on to the Oglethorpe Elementary School After School Math/Science Program.

A combination of 30 fourth and fifth graders participated in this program. Pre and post tests were administered as part of our continuing program assessment activities. Based upon the results of our evaluation, curricula is being expanded to complement the needs and interests of the students and the program will now be expanded to cover the entire academic year.

The Department of Energy signed an MOU with Oglethorpe Elementary School and Clark Atlanta University. Oglethorpe's Principal, teachers and students attended the formal signing ceremony in Washington D.C. .

In-Service Training Programs In Science, Mathematics, and Computer Science For Teachers

The goals of the CAU program for K-12 teachers are to:

- introduce new curriculum materials and technological advances, including computer software and interactive video;
- describe effective teaching strategies appropriate for specific topics and learners; and
- integrate community resources into science and mathematics education.

This program was designed to upgrade teaching skills, provide resources for teachers who needed to improve their pedagogical skills, and help them overcome the fear and anxiety of teaching science and math.

This program was modeled after the In-Service Space Science Education Program for K-12 teachers, adding an "environmental theme." The environmental teaching materials were collected from various sources such as EPA's "Lets Recycle", Project Pride, Tennessee Valley Authority's The Energy Sourcebook.

FLORIDA A&M UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Florida A&M University (FAMU) was designated a land grant institution and later became a university. It is a full and equal partner in the nine-institution State University System. Although traditionally black, the University seeks qualified students from all racial, ethnic, religious, and national groups.

FAMU's primary goals have been to promote academic excellence and to improve the quality of life for those it serve. Toward this end, FAMU recognizes the critical need for expertise to address the crises in environmental restoration and waste management. FAMU, therefore, will make efforts to address this problem by developing highly skilled technologists who will be responsible for the continuous efficient operation and management of facilities and systems designed control and/or contain hazardous materials.

PROGRAM HIGHLIGHTS

As we approach the end of our second year of operation of the HBCU/MI Hazardous Materials and Waste Management Consortium, Florida A&M University has achieved the following major accomplishments as listed in its initial proposed milestones.

Curriculum Development

UNDERGRADUATE

- **Environmental Science Courses**
Approximately 300 students enrolled in environmental science courses, as electives during the Fall Semester, 1991, and Spring Semester, 1992. The courses included, but not limited to:
 - AGG 4411: Global Food/Agricultural Analysis (3)
 - ARC 3374: Site Planning (3)
 - ENV 4330: Hazardous Waste Management
 - PCB 3033: Introduction to Ecology (3)
- **Civil Engineering Technology with an option in Environmental Restoration**
Currently, eight (8) students are seeking a degree in Civil Engineering Technology with a new option in Environmental Restoration. The option curriculum is

a total of 23 semester hours (6 hours - Research) that includes such courses as Elements of Environmental Restoration, Environmental Regulations and Regulatory Agencies, Principles of Environmental Health, and Transportation of Hazardous Materials.

- **Environmental Toxicology**
A new degree program in Environmental Toxicology is in the preliminary planning process.

GRADUATE

- **Master of Science in Agricultural Sciences with an option in Environmental Sciences**
An option in the Environmental Sciences, Master of Science in Agricultural Sciences, has attracted five (5) new graduate students. The option includes courses such as Environmental Biology, Environmental Chemistry, and Research in Environmental Sciences for a total of 23 semester hours.
- **Ph.D., Environmental Toxicology**
Four (4) students are currently enrolled in the PhD Environmental Toxicology program..
- **Master of Science in Environmental Sciences**
An interdisciplinary degree, Master of Science in Environmental Sciences, has been developed and submitted for approval. The degree program will include 48 semester credit hours.
- **Master of Science in Environmental Studies**
A graduate degree in Environmental Studies has also been developed and submitted for approval. The Environmental studies program will include 36 credit hours.

Faculty Development

- **Meetings, Workshops, Seminars and Conferences**

71st Activity Transportation Board Meeting
Washington, DC
January 12- 16, 1992
Sponsored by the US Department of Transportation

Workshop on the Infusion of Environmental
Issues in Curricula
Tallahassee, FL
January 20-21, 1992
Sponsored by HBCU/MI Consortium/FAMU

Environmental Safety and Awareness Workshop
for Certification
Tallahassee, FL
January 23, 1992
Sponsored by HBCU/MI Consortium/FAMU

Workshop on Hazardous Waste and Site Cleanup:
Role of Academic Institutions
Daytona Beach, FL
January 198-31, 1992
Sponsored by Bethune-Cookman College/EPA

Environmental Safety and Awareness Workshop
for Certification
Tallahassee, FL
January 31, 1992
Sponsored by HBCU/MI Consortium/FAMU

American Association for the Advancement of
Science (AAAS)
Washington, DC
February 8-29, 1992
Sponsored by AAAS/Basic Technologies International

Community Outreach Orientation and Planning
Workshop
Radon Gas Seminar for Certification
Atlanta, GA
March 8-14, 1992
Sponsored by National Association of Minority
Contractors/EPA

Environmental Issues and Challenges for Academic
Institutions: A Conference and Workshop
Orlando, FL
Sponsored by University of Central Florida/EPA

Global Proposition Station
Tallahassee, FL
April 14, 1992
Sponsored by HBCU/MI Consortium/FAMU

National Organization for the Professional
Advancement
of Black Chemists and Chemical Engineers
(NOBCCChE)
Conference
New Orleans, LA
April 20-24, 1992
Sponsored by NOBCCChE

West Florida Shelf Workshop
St. Petersburg, FL
May 6-8, 1992
Sponsored by Florida Dept. of Natural
Resources/National
Oceanic and atmospheric Administration/EPA

1992 Environmental Resources Conference
Orlando, FL
May 20-21, 1992
Sponsored by Center for Training, Research and
Education for Environmental Occupations, Univ. of FL

Outreach

- **KIMS Program**

On May 2, 1992, we completed the first series of sessions for our KIMS Program which is designed to enhance the math, science and reading skills of children grades K through 3rd. Beginning on October 19, 1991 a total of twenty-two (22) Saturday sessions were presented. The enrollment was 55 with the average class attendance being 40. All students were given a pretest upon entering the program. A post-test was given at end of the program which students showed significant improvements in mastering the required skills in each subject area. Some of the Lab experiments and field trips included:

- Visit to FAMU Entomology lab to learn about insects and their environment
- Five Senses Experiment
- States of Matter Experiment
- Environmental Seminar (Speaker Dr. Woody Wise, Professor of Geology, Florida State University) which cover ocean exploration and fossils
- Tree/Plant Lab (Study of parts of trees, made peanut butter from peanuts)

The KIMS Program resumed in the Fall of 1992.

- **FAMU Students Environmental Issues Awareness Seminar**

Mr. Jeff Carlen presented a seminar on environmental topics related to civil engineering technology on April 14, 1992.

- **Summer Camp for Careers in Agriculture and Environmental Sciences**

High school students (9th through 12th grade) are exposed to career opportunities in agricultural and environmental sciences through mentors from government and corporations. The summer camp was held from June 22-26, 1992 at Florida A&M University. Commitments for funds and/or staff support have already been received from USDA Agencies, US Department of Interior and Gold Kist. We expect approximately 100 students to participate in the program.

- **Area Middle/High School Career Day Activities**

Staff from the Environmental Sciences Program participated in the following middle and high school career day activities

March 27, 1992 - Cobb Middle School,
Tallahassee, FL

May 1, 1992 - Cairo High School, Cairo, GA

- **High School Visitations from FAMU/CESTA**

April 3, 1992 - Central High School, Athens, GA

April 15, 1992 - Cairo High School, Cairo, GA

As a result, five students from Cairo, GA have already been enrolled at FAMU, and selected to major in Agriculture and Pharmacy Programs with options in Environmental Sciences.

- **Elementary/Secondary Educators Advisory Committee for Environmental Sciences**

This committee has been organized and comprises 12 elementary/secondary science and math teachers and counselors who serve as a liaison between the Office of Environmental Sciences and students, other faculty and the community to improve the awareness of environmental issues in the schools and communities. This committee also provides input to the Environmental Sciences Office regarding the kinds of seminars/workshops and in-service training institutes that would improve the awareness initiatives from state and local levels, developing curricula that could be infused into current programs, etc. A

proposal has been written and submitted to the Florida Institute of Oceanography for Research Vessel Time at Long Key during the first week of August, 1992, that will involve this committee.

Meetings held: **April 3, 1992, 4:00 PM**
 May 15, 1992, 4:00 PM

- **NOBCCChE Conference Participation**

Florida A&M University Environmental Sciences Office sponsored two students from Cairo High School and their Counselor to attend the NOBCCChE Conference which was held in New Orleans, LA on April 21-2, 1992. One student participated in the Science Fair. The title of his project was "The Effects of Material Thickness on Fly Wheel Spin Velocity."

- **The FAMU "Panhandle Center of Excellence" for math, science, computer and technology**

The Panhandle Center of Excellence presented a workshop, "Science in the Marketplace" on April 4, 1992, presented for high school science, math and computer teachers. The Environmental Sciences Office sponsored the Facilitator, Dr. Florence Korchins, and two high school teachers to participate in the workshop.

On June 29-July 2, 1992, the Panhandle Center for Excellence presented an additional workshop "Integrating Biotechnology in the Physical Sciences." The Environmental Sciences Office made provisions to sponsor one school teacher and purchased two electrophoresis gel apparatus kits that were used during the workshop and given to teachers to take back to the classroom.

Brochure

The first draft of the FAMU Environmental Sciences program brochure was completed and submitted to the printers July, 1992.

Environmentally Related Proposals

Engineering Utilization of Residue ASH from Municipal Waste Incinerators: Granting Agency, EPA; PI, Dr. T. Fadoira; \$259,806

Development of a Prototype Knowledge-Based Expert Modeling Process (Adaptable Local Evaluative Risk Tool (ALERT)) submitted by Dr. Charles C. Kidd and Dr. Charles Wright

Water Quality submitted by Dr. Cassel Gardner

EMCOM Fellowships

Two students received EMCOM fellowships for the period January 1 - August 31, 1992

National Minority Environmental Career Conference

March 21-24, 1992, Atlanta, Georgia

Environmental Careers Organization

Three students enrolled in the Environmental Sciences program were selected to participate in this conference.

TECHNOLOGY TRANSFER COMMITTEE

The HBCU/MI Technology Transfer Committee, under the leadership of Dr. Charles C. Kidd, Chairman, met in Tampa, FL and Oak Ridge, TN to plan the first of four (4) regional technology transfer forums. The first forum was held July 8-11, 1992, in Oak Ridge, TN. A brochure was given to potential participants, (i.e., historically underutilized businesses (HUB's), major contractors, national laboratories, government agencies). Also, sponsors, facilitators, and guest speakers were identified.

The Technology Transfer Committee members are:

Dr. Charles C. Kidd, Chairman, FAMU
Dr. Eugene Adams, Tuskegee University
Dr. Sonny Bolls, Jackson State University
Dr. Robert Ford, Southern University
Dr. Jeanette Jones, Alabama A&M
Dr. John Williams, Prairie View A&M University
Dr. Ali Ebadian, Florida International University
Mr. Terry Weaver, Martin Marietta Energy Systems, Inc.

DUAL ENROLLMENT PROGRAM

Fifteen 10th through 12th graders enrolled at FAMU during the Fall Semester, 1991 and Spring Semester, 1992. The high school students registered for classes that will strengthen their academic preparation for college.

FLORIDA INTERNATIONAL UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Florida International University, a member of the State University System of Florida, is a comprehensive, doctoral granting, public, multi-campus institution offering a broad array of undergraduate, graduate and professional programs. FIU was established in 1965, and classes began in September 1972, with approximately 6,000 students enrolled in upper-division and graduate programs - the largest opening enrollment in the history of American higher education. The University has two campuses, University Park in southwest Dade County and the North Miami Campus on Biscayne Bay, and two academic centers that serve Broward County, in Davie and downtown Fort Lauderdale.

During the 1990-91 academic year, the School of Engineering graduated more Hispanic engineers than any other engineering school in the nation. Additionally, each of the six engineering programs (civil, computer, electrical, environmental, industrial and mechanical) in the School of Engineering ranks in the top ten in numbers of Hispanic students enrolled within the respective engineering disciplines. The School of Engineering is currently ranked fourth in the nation in Hispanic engineering student enrollment for both the undergraduate and graduate levels.

PROGRAM HIGHLIGHTS

Curriculum Development

FIU, led by the Mechanical Engineering Department of the College of Engineering and Design, has developed a two-pronged attack in the area of Curriculum Development.

- As part of the required core course curriculum for all entering freshmen, the University provided academic departments with the tools to develop courses on subjects concerning World Prospects and Issues. This area was an ideal setting in which a course on Environmental Restoration/Waste Management could be developed and offered. Initially developed by the College of Engineering and Design, the courser would be expanded to include impact from the biological and physical sciences.

- The second prong was the development of a Hazardous Waste Management option (HWM) within the Mechanical Engineering program and the development of a Bachelors and Master's degree program in Biochemical Engineering emphasizing the ER/WM area. Plans were being developed to define the HWM option using courses from the Mechanical Engineering program and the Environmental Engineering program, and Senior Design projects directed specifically towards ER/WM.

Faculty Development

In the area of Faculty Development, FIU strives to increase the number of faculty members working in the environmental area by developing BS and MS degree programs in Biomedical Engineering and by hiring additional faculty for the Environmental Engineering program.

- The Mechanical Engineering Department, through its ME Seminar Program had invited guest lecturers from the Westinghouse Savannah Research Laboratory to speak on radiation waste water processing. It was hoped that contact with ORNL guest lecturers and intradepartmental contacts with the Biology, Chemistry, Physics, Environmental Studies and Environmental Engineering Departments, the Drinking Water Research Center, FAU/FIU Joint Research Center and the Department of Environmental Resources Management (DERM) would lead to a lecture series that would emphasize the ER/WM area. Such lectures would be geared not only to faculty and students, but to the entire university community.;
- It was envisioned that part of the educational process in the Elementary Education/Junior and Senior High School Education programs would be ER/WM awareness. By training future teachers, we are hopeful that ER/WM knowledge and awareness would be conveyed to our future school children. One of our goals would involve the College of Education at FIU in the ER/WM awareness program.

Recruitment and Retention

FIU and the College of Engineering and Design took roles in attracting minority students very seriously. FIU established the largest minority student population in the Florida State University System (SUS) with over 53% minority enrollment (blacks and Hispanics). This included the largest Hispanic student population in the State University

System. One of the reasons for these demographics was FIU's location within an urban setting: Metropolitan Dade County. The latest census figures showed that the county's population was composed of 50% Hispanics and 20% Blacks.

The College, in general, and the Mechanical Engineering Department in particular, recruited extensively from the "feeder" system of the surrounding community colleges. In fact, Miami-Dade Community College (MDCC) provided FIU with most of its transfer students. MDCC registered over 120,000 students, which was the most of any Community College in the nation. Additionally, the large number of minority students attending MDCC provided fertile ground from which to recruit.

Outreach

FIU and the College of Engineering and Design have been involved in several programs to attract minority students into the engineering and science fields.

- **FLAME - FLORIDA ACTION FOR MINORITIES IN ENGINEERING**

FLAME joint program between the DADE County Public School System and FIU was designed specifically for minority high school students. In order to make the program effective and practical, Miami Coral Park Senior High School was chosen as the engineering magnet center because of its proximity to the main campus of FIU. Students were selected from various schools throughout Dade County and offered the opportunity to transfer to Miami Coral Park Senior High School to participate in the program.

FLAME started with a residential summer program at FIU. This "Full Immersion Summer Program" lasted three weeks and was designed for students that entered the tenth grade. During the regular academic year, participants took Introduction to Engineering and Critical Thinking Skills besides their regular math, science and English high school courses. The following summer, students participated in the "Engineering Summer Institute" which was also a three-week residential program. In their eleventh grade, students attended FIU every day of the week for two class periods and took Applied Mathematics and Applied Engineering Principles besides their regular load. During the next summer program, students participate six weeks in the "Executive Internship Summer Program," in which they were placed at engineering or engineering related companies. During

their senior year, students took six credits of dual enrollment courses at FIU and also Applied Mathematics II and Applied Engineering Principles II.

- **MINORITY BIOMEDICAL RESEARCH PROGRAM (MBRP)**

The Minority Biomedical Research Program and the High School Apprentice Program was funded by the National Institutes of Health since 1985. These student funded programs stimulated participation in faculty research and also stimulated interest in research careers.

The Minority Biomedical Research Program received funding from the National Institutes of Health, in a set-aside assistance program for minority educational institutions. The program funded student participation in faculty research as an attempt to stimulate their interest in pursuing a career in Bio-medicine. The students' exposure to the latest in biomedical research allowed them to successfully continue with a career in medicine or medical research. The program currently have the participation of 8 senior research faculty, 9 graduate and 13 undergraduate biomedical students.

- **STUDENT ACHIEVERS IN THE BLACK LIFE EXPERIENCE (SABLE)**

The SABLE program was a cooperative venture between Florida International University, the Dade County Public School System, and a variety of community agencies businesses and organizations. In 1984, the Florida Department of Education's College Reachout Program funded SABLE to provide educational motivation and preparation to African American high school students and to assist parent s in completing the college admission and financial aid processes. High school students who participated in SABLE would experience a variety of college activities and have the opportunity to participate in FIU's Partners in Progress (PIP) Program.

- **PARTNERS IN PROGRESS (PIP)**

The Partners in Progress Program is a cooperative effort between Florida International University and the Dade County Public School System. Its objective was to increase the representation of African Americans and other minorities in

Florida's public colleges and universities. This was accomplished by providing instruction to tenth graders in math and English, and by providing scholarship opportunities to attend FIU.

In PIP-I, participating tenth graders received intensive math and English instruction to prepare for college entrance exams. Workshops on preparing for college was also provided. Only participants of PIP-I could advance to the PIP-II segment. In PIP-II, participants received a scholarship to attend college level classes at FIU during the summer. Additionally, PIP-II participants who were admitted to FIU were awarded four-year tuition scholarships.

- **THE ACADEMIC OPPORTUNITY PROGRAM (AOP)**

Academic success was the foundation on which the Academic Opportunity Program was based. Since 1988, talented students of African American descent, who have the potential for academic success, have been recruited to remain in South Florida for their higher education. Opportunity to complete for a scholarship was measured by the following criteria: of African descent; receive a recommendation from the school principal; US citizen or permanent resident; minimum 3.0 cumulative GPA; have a record of school and community involvement; and achieve an acceptance score on either the SAT or ACT entrance examinations. Program components include full tuition awards to those students who have submitted the Financial aid Form (FAF), financial aid information and counseling for parents and students, and required attendance at the residential summer and non-residential fall "Orientation for Students of African Descent."

- **PROJECT SECOND STEP**

Project "second Step" is a pilot program sponsored jointly by Florida International University and the Dade County School System. Its primary objective was to provide a specific group of adults with sufficient motivation and background to assist them in passing the SAT (Scholastic Aptitude Test), thereby permitting them to enroll in the University as students of engineering. Project "Second Step" was designed to interest and attract students who have never completed high school; persons in possession of High School Diplomas; and adults who would either like to return to school or begin academic studies at the college level in order to pursue a career in engineering. The curriculum was designed to give students intensive training in Mathematics, English, Science

and Computer Literacy. At least one day a week was designated for students to engage in hands-on experiences in laboratory-type situations at the University.

- **RECYCLING PROGRAM**

Florida International University has long provided the local community with a centralized location for disposing of recyclable paper and newsprint. FIU participated in an intense recycling program that has a strong affect each student, faculty and staff member within its campuses. All university offices were required to separate recyclable paper and to place them in special receptacles which were picked up each week. At all eating areas/vending machine areas special containers provided for the disposal of aluminum drink cans. The philosophy which have taken hold at FIU can be summed up by the words in our recycling program: First Reduce - and then Reuse - and finally Recycle.

HAMPTON UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Hampton University is a privately endowed, co-educational, nonsectarian institution of higher education. The University is organized into three colleges: Hampton Institute, the undergraduate college; the Graduate College and the College of Continuing Education. The School of Pure and Applied Sciences participates in a number of consortial and cooperative agreements, among them the Southeastern Universities Research Association (SURA). SURA is dedicated to the development of the management of large-scale scientific projects that largely fall within the framework of the physical and engineering sciences. Several major biomedical projects, however, are being considered by the organization.

The ER/WM program at Hampton draws from the institutional infrastructure, the large minority student population, and the experience with the various special projects. Environmental issues will be incorporated into existing courses in chemistry, biology, engineering and marine sciences.

PROGRAM HIGHLIGHTS

Year Two of the HBCU/MI Environmental Technology program at Hampton University has focused on the following program objectives:

- curriculum development and refinement;
- faculty development
- student training
- outreach activities

Curriculum Development

As reported in the Year One Annual Report, during the first year of the project, an undergraduate curriculum module was developed and implemented, allowing the infusion of environmental science courses in existing courses in biological sciences, chemistry, and marine science.

During year two, curriculum development focused on graduate level courses for students in the departments of biological sciences, chemistry and marine science. Several graduate level courses have been developed to allow students in these three areas to pursue a degree in their respective disciplines with an emphasis on environmental science. In all cases, students will be required to complete a set of core courses in

their area, and in addition to these courses, take at least four recommended environmental science courses. Also, students who take the environmental science option will be required to conduct their MS thesis research and write the thesis on an environmental problem. An example of the graduate module for the department of chemistry is shown below.

The Environmental Chemistry course was taught during the Fall semester, and the Environmental Toxicology course was taught during the Spring, 1992 semester.

Faculty Development

Since Year One report was submitted in June 1991, the following faculty development activities have been undertaken:

- two faculty members and one graduate student attended a *conference on health effects of toxic substances* in Atlanta on September 26-28, 1991;
- one faculty member attended a *workshop on Quality Assurance/Quality Control* organized by EPA in cooperation with the American Chemical Society in Washington, DC on July 8-14, 1991;
- one faculty member attended a *short course on Toxicology for Chemists* arranged by the American Chemical Society in Clear Water, Florida, November 12-14, 1991.

Recruitment and Retention

Undergraduate Scholarship Program

- Three students, one from each of the departments of chemistry, engineering, and marine science, were given tuition scholarships under the HBCU/MI Environmental Technology Consortium. Each of these students was assigned to a faculty mentor under whom the student carried out research on an environmental problem. Students participating in this program are expected to carry out research; prepare research reports at the end of each semester; attend other scholarly activities held on campus, such as seminars; and actively prepare to enter graduate school upon completion of their baccalaureate program at Hampton.

The Environmental Management Career Opportunities for Minorities (EMCOM) Program

- Thus far, three Hampton University students have participated in the EMCOM Program. Two of the students attended summer internship at the Lawrence Livermore National Laboratory in Lawrence California during 1991 Summer session. The third student will do her internship at the Brookhaven National Laboratory this summer. All EMCOM students, like the scholarship students discussed above, are assigned to mentors under whom they do research on campus during the academic year.

Outreach/Precollege Activities

- Precollege Analytical Chemistry Program
 - Hampton University is one of the first group of five HBCUs/MIs selected two years ago to implement the Environmental Management for Precollege Analytical Chemistry (EMPAC). Program planning and student selection have now been completed for the initial implementation of the program starting on June 15, 1992. Twelve high school students and two high school teachers will be involved. Project activities include:
 - lectures in analytical chemistry;
 - laboratory activities;
 - field trips;
 - sample collection; and
 - the attendance of seminars and other scholarly activities conducted on campus during the summer.

Conference on the Black Family

- For the last fourteen years, Hampton University has held an annual conference focused on issues affecting the black family. Hosted by the School of pure and Applied Sciences this year, the them of the conference was: **Science and Technology in the Twenty-first Century: How will African Americans Fare?** One of the events of the conference, which involved precollege students, was co-sponsored by the HBCU/MI Technology Consortium. Approximately five hundred students attended the special luncheon science forum.

Recycling

A recycling program was implemented on a pilot scale at Hampton University last year. This program was expanded in January to include a wider segment of the university community and also to make it a more comprehensive program in terms of the items recycled. One unique feature of the program is its paper pelletization component. All paper collected is taken to the steam plant facility where it is processed into pellets. These pellets are then used as fuel in the steam plant. The recycling of this natural resource in this way reduces steam plant operating costs by 15-20%.

FUTURE PLANS

During the next twelve months, we expect to accomplish the following:

- Refinement of the master of science curricula in chemistry, biology, and marine science, including the addition of a new course in Public Policy (see attached list of environmental science courses for graduate students).
- Increase the number of students pursuing degree programs in environmental science, both at the undergraduate and graduate levels. The level of support available for undergraduate students will be increased, thereby attracting more students into the field. Also, in order to ensure that students receive the proper training and remain in the field, a mentor program will be established. All participating students will be assigned to a mentor under whom they will carry out their research. Even though under the current system students are assigned to faculty members to guide them in research, these faculty members are not given the proper recognition by awarding them release time or some remuneration for the effort they put in the program. Under the proposed plan, participating faculty members will be awarded an incentive in the form of a small stipend.
- Completion of the establishment of recycling programs in all departments at the university. The pilot program established last year has targeted a few selected areas on campus. During the next project period, the program will be expanded to include virtually all departments and other units at the university.

- Extension of our program into the local community colleges. This is a component of our program for which very little progress has been made. We hope to begin developing cooperative projects with Thomas Nelson Community College, focusing on curriculum development.
- New faculty hires: Plans are under way to hire a new faculty member with expertise in environmental/analytical chemistry. We hope to identify someone with teaching and research experience in the atmospheric, land and water environments.
- The EMPAC Program discussed above will be implemented during the 1992 summer session. We hope to derive some

recommendations from this program, especially as it relates to the utilization of the resources available at Hampton University to impact precollege programs. This experience will serve as a model in this regard.
- Other project activities will continue as outlined in the original proposal.

HOWARD UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Howard University is a co-educational private institution of higher learning located in the northwestern section of Washington, DC. The University consists of eighteen schools and colleges: The Graduate School of Arts and Sciences, the Schools of Architecture and Planning, Business and Public Administration, Communications, Continuing Education, Divinity, Education, Engineering, Human Ecology, Law, and Social Work; the Colleges of Allied Health Sciences, Dentistry, Fine Arts, Liberal Arts, Medicine, Nursing, and Pharmacy and Pharmaceutical Sciences.

PROGRAM HIGHLIGHTS

Per the activities outlined in the proposal, Howard has conducted its activities for the grant in the areas of curriculum, faculty development, outreach and minority retention. Curriculum and faculty development activities have been conducted as extensions of the Great Lakes and Mid-Atlantic Hazardous Substance Research Center - an U.S. EPA Superfund Center serving regions 3 and 5. Outreach and minority retention efforts were, for the most part, conducted as collaborative efforts with school-wide or campus-wide programs.

Curriculum and Faculty Development

In May, an announcement was advertised in the University's Weekly Newsletter, the "Capstone". The announcement sought proposals for initiating research in the environmental technology and waste management area and for developing undergraduate courses on environmental issues. As indicated, the proposals are due by May 20, 1992 and the announcement of the award will be made by May 26, 1992.

The criteria for evaluation of research proposals received was scientific merit, relevance to the objectives of the grant, adequacy of facilities to do work, potential for strengthening by educating students in environmental engineering and science; and qualifications of the investigator.

The research initiative awards are expected to include initiation of collaborative research with a DOE national laboratory, faculty at Howard or another University. Each recipient is also to develop a plan for leveraging

support for this effort to obtain additional funding in the environmental technology and waste management area.

The results of the curriculum development project will provide a course syllabus, a detailed outline for each lecture, suggested outside classroom activities, required and recommended reading, and a summary of the process required for the course adoption as an elective or required course for selected majors. The investigators also will serve as team organizers and lead instructors for the initial course offering projected for the 1993-94 academic year.

Outreach and Minority Retention

During the 1992 summer, four outreach and/or bridge programs will be conducted under the auspices of faculty and staff in the School of Engineering and one by the Upward Bound Program at Howard University. Generally, these programs are designed to increase the interest and enrollment of minority students in engineering and science through curriculum enrichment presentations, to provide engineering related experiences for students through projects and field trips and to provide teacher training workshops for mathematics and science teachers and counselors. Table 1 gives information on each of these programs.

Financial resources will be provided to support:

- **PREFACE**

The activities for participants of the PREFACE program will include a lecture on environmental ethics, a tour of the Blue Plains Wastewater Treatment Facility and several student projects as an introduction to environmental engineering. Additional lectures will be provided to the PREFACE participants during the Fall 1992 semester.

- **Science and Engineering Summer Academy for Teachers**

A presentation on environmental issues is planned for the Science and Engineering Summer Academy for Teachers. The presentation will include a discussion on global environmental problems and careers in the environmental management industry. Teachers will be asked to develop a teaching module based upon the lecture and references provided.

- **METCON Engineering Science and Career Orientation**

METCON (District of Columbia Metropolitan Consortium for Minorities in Engineering) is an organization which serves as

a network for the delivery of technical information and technology-oriented resources to junior and senior public schools. Currently there are eight junior high and eleven high schools in the network. During the academic year, each school maintains a METCON Club which organizes events. In September 1992, proposals related to environmental issues will be accepted for projects the Club would like conduct during the 1992-93 academic year. It is anticipated that three proposals will be funded.

- **Upward Bound Programs**

Students participating in the Upward Bound Program will be asked to select projects that they will complete during the six week program. Lecture material and several projects addressing environmental issues such as hazardous waste management, treatment and disposal, global warming, and acid rain will be given.

Other Activities

During the first year, the Student Chapter of the American Society of Civil Engineers implemented a recycling program in the Engineering School (L.K. Downing Hall). The project provided containers for recycling white paper, glass, aluminum cans and plastic containers. An information poster showing why recycling is important was also prepared. As a result of this, and other efforts, the Student Chapter was selected as the "Outstanding Howard University Engineering Student Organization" and received honorable mention from ASCE's parent society. In collaboration with the University's Recycling Coordinator and Waste Management, a summer intern will be hired to expand the campus-wide recycling program to include glass, aluminum cans, and plastic containers.

In the area of faculty development, Dr. John Rier of the Department of Botany is being sponsored to attend the Hazardous Waste Research Conference, June 1-2, 1992 in Boulder, Colorado. Of particular interest to Dr. Rier, a botanist, was the session on "The Role of Vegetation in Site Remediation." Also, Dr. Lorraine N. Fleming is being sponsored to a Conference on "Women in Engineering."

Summary

All proposed second year activities have been completed or are underway. The third year activities as delineated in the original proposal are realistic and will provide for the appropriate continuation of the first year activities.

TABLE 1

**SUMMER PROGRAMS
SCHOOL OF ENGINEERING
HOWARD UNIVERSITY**

PROGRAM TITLE: PREFACE Freshman Students Fall 1992	PROGRAM COORDINATOR: Dr. Carmen Cannon Telephone: (202) 806-6638
PROGRAM DESCRIPTION: By the end of the program, it is expected that participants will have acquired: <ol style="list-style-type: none"> (1) awareness of the requirements and rewards of the engineering profession; (2) a level of personal growth and maturity that will facilitate a smooth transition to college life; (3) a working knowledge of campus resources; and (4) proficiency to earn above-average grades during their freshman year. 	
PROGRAM TITLE: SCIENCE AND ENGINEERING SUMMER ACADEMY FOR TEACHERS Middle School Teachers	PROGRAM COORDINATOR: Mr. Melvin Thompson Telephone: (202) 806-5077
PROGRAM DESCRIPTION: The program will support and enrich science teaching in middle and junior high schools so that educators become more knowledgeable and resourceful in teaching minority youth principles and applications of science, engineering and technology.	
PROGRAM TITLE: ARMED FORCES ORIENTATION TO ENGINEERING CAREERS (AFOTEC) 11th and 12th Grade Students	PROGRAM COORDINATOR: Ms. Lawanda Peace Telephone: (202) 806-6638
PROGRAM DESCRIPTION: The program consists of engineering-oriented discussions and lectures, laboratory experiments, career counseling, field trips, and recreational activities.	
PROGRAM TITLE: METCON ENGINEERING SCIENCE CAREER ORIENTATION Engineering School Workshops: August 2 and August 9 (Tentative Dates) 11th and 12th Grade Students	PROGRAM COORDINATOR: Ms. Lawanda Peace Telephone: (202) 806-6638
PROGRAM DESCRIPTION: Primarily an off-campus program at Engineering/Science Facilities, METCON provides students with technical work experience. Students receive exposure to the day-to-day experiences of scientists and engineers.	
PROGRAM TITLE: UPWARD BOUND 11th and 12th Grade Students	PROGRAM COORDINATOR: Mr. Joe Bell Telephone: (202) 806-5702
PROGRAM DESCRIPTION: Exposes students to various aspects of science and engineering.	

JACKSON STATE UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Jackson State University (JSU) is the fourth largest state supported university in Mississippi. It is located in Jackson, the capital of Mississippi and the geographic center and major metropolitan area of the state. JSU has evolved into a comprehensive urban university with a cosmopolitan faculty which support its mission of providing higher educational opportunities to persons from deprived circumstances, promoting outreach and awareness programs for the surrounding community, and participating in meaningful local, national and international research endeavors.

PROGRAM HIGHLIGHTS

Jackson State University maintains an extensive and growing commitment to utilizing its expertise in the identification and resolution of the Environmental Restoration/Waste Management (ER/WM) problems and issues as they relate to its surrounding community in particular, and the United States in general. In this regard, JSU has maintained and fostered cooperative relationships with businesses, industry, national laboratories, and majority universities within the state and throughout the country. Moreover, JSU is committed to the idea of increasing the number of minorities in ER/WM through a continuation of proposed projects as indicated in the HBCU/MI Consortium Proposal.

Program Management

- The clerical person has been replaced with a research assistant. This person has also assumed the responsibilities of one of the activity coordinators.

Faculty Development

- The focus of the faculty development component is to increase professional enrichment, develop faculty track and attain laboratory appointments, thus resulting in greater faculty leadership for research, teaching and public service.
- The faculty track in which two (2) undergraduate students are being supported is ongoing. One student, Charlie Clay, has completed his B.S. degree and is about to enter graduate

school in the area of Industrial Hygiene. These students are receiving "hands-on" experience while working with precollege students and faculty members.

- Four faculty and staff members involved in environmental restoration/waste management (ER/WM) received support to attend professional conferences, meetings and seminars, thus, enhancing their capabilities to teach and perform research at a higher level of professionalism.

Curriculum Development

- Jackson State University is in the process of training faculty and staff members at Hinds and Colhoma Junior/Community College in hazardous materials. The program is being installed at Hinds Community College.
- The Master's Degree Program in Hazardous Waste Management is in the process of being submitted to the Board for approval.
- The division of Continuing Education is working with the Department of Technology and Industrial Arts to develop certification classes in workers-right-to-know.

Models for Minority Recruitment and Retention Component

- This program was targeted for developing a more aware student at an early age in science related areas. This program has been modified by reducing the number of students who participate from thirty-six to twenty-five and grade levels 5th - 8th with an average science grade of B+. By having less students, the faculty can spend more contact time with each student to assure quality and success.
- Students participating in the summer program will be representing four Mississippi School districts (Jackson, Madison County, Vicksburg-Warren and Hinds county public schools. Students in the Academy of Science Engineering and Technology Program (ASET) will be interacting with JSU faculty and students and secondary educators from approximately eight different schools.

The classes for the summer program have been structured to include sessions in the following areas:

- General Science
 - Earth Science
 - Technology Demonstrations
 - Uplift Sessions
 - Computer Math
 - Field Trips
-
- The Saturday Academy sessions were held during the spring semester. The participants were those students that were involved in the Summer ASET Program. During the eight Saturday sessions, students were introduced to the following techniques in math:
 - Introduction to Computers and Science Projects in Mathematics. Fun activities in Mathematics. (Wk 1)
 - Mathematical "Algebra Tutorial for Lotus Spreadsheet." (Wk 2)
 - Introduction to Matrices and their applications (Wk 3)
 - The Fibonacci Sequence and applications. Using matrix products to produce the sequence. (Wk 4)
 - Introduction to "Mathematica," and "Mathematics with Basic matrix Applications." (Wk 5)
 - Introduction to "Derive," and "Derive with Basic Matrix Applications." (Wk 6)
 - "Fun with calculators while learning" in the following areas: Natural Science, Industrial Arts, General Education, Language Arts, Abbreviations, and Social Science. (Wk 7)
 - Counseling and motivating topics such as "How to study Mathematics", "How to take Mathematics exams," "Valuing time," and "Consumer economics." (Wk 8)

- Students were also given advanced lessons in Chemical Education for Public Understanding (CEPUP). These sessions included lessons in the following:
 - How Toxic is Toxic
 - Body parts affected by sniffing household toxic chemicals
 - Disposal methods for household toxic waste
 - How to read an MSDS
 - Prevention is the best treatment
- Environmental Safety Clubs were established at eight secondary schools. Students from various schools submitted proposals to aid in the establishment of these clubs.

The projects ranged from recycling programs to mini gardens. Faculty members visited several of the schools and found their progress active, visible and working well. All clubs were organized prior to the end of the spring semester.

Impact from this program has been enormous based on the number of students involved as well as their peers and families.

Corporate Affiliate Component

JSU faculty is continuing in the training of industry personnel throughout the state of Mississippi. JSU hazardous materials program in conjunction with the Continuous Education Department trained over 400 people in workers-right-to-know. This training was done for the Mississippi Highway Patrols, fire departments across Mississippi, and university workers.

Mr. Barry Nichols visited the JSU campus and agreed to provide JSU with computers and other equipment, faculty positions and student co-op opportunities. Mr. Ralph Peterson, CEO of CH₂M Hill has made a commitment to train one of our faculty members in the use of Geographic Information Systems.

NEW MEXICO HIGHLANDS UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Established by the Territorial Legislature of New Mexico as one of the first institutions of higher education in the State, Highlands began as New Mexico Normal School. To reflect the expanding importance of the institution to the higher education mission of the state, the school's name was changed by the state legislature in 1941 to New Mexico Highlands University (NMHU), a name derived from the terrain of northern New Mexico.

PROGRAM HIGHLIGHTS

The Environmental Technology and Waste Management Program was emplaced at New Mexico Highlands University in order to assist the Environmental Science Discipline to position itself so that it will be able to help resolve the planet's environmental crisis. The discipline is accomplishing this objective by:

- Revising its B.S. curriculum so that its graduates will be better prepared to deal with environmental problems;
- Establishing an M.S. curriculum in Environmental Science;
- Building a strong Environmental Science discipline equipment infrastructure including an environmental science computer lab;
- Developing a comprehensive outreach program;
- Hire new faculty to support the implementation of the revised curriculum;
- Providing the faculty with the opportunity to attend workshops and conferences for the purpose of faculty development;
- Establishing a scholarship and recruitment program for undergraduates;
- Providing students the opportunity to obtain employment and research opportunities in the environmental science field;

- Establishing new consortium affiliations in environmental science;
- Developing environmental science oriented linkages with community college consortiums.

Curriculum Revision

The Environmental Science division has been very successful in revising its curriculum. An Environmental Science Curriculum Committee has been meeting every week, since the beginning of the academic year, in order to develop a more relevant curriculum to meet current needs in the field.

The Committee contracted the services of Dr. Lorraine Heartfield of B and H Environmental Services Inc., in order to determine what type of course work that students needed in order to successfully compete for jobs in the environmental science field. Dr. Heartfield conducted an extensive survey of private businesses and governmental agencies and was able to obtain from them valuable information regarding curriculum requirements. Her report is included in Appendix I of this document.

The Environmental Science Discipline as a result of Dr. Heartfield's report and other research work, has generated an "Action Plan for the Revision of the Environmental Science Program Curricula" which was submitted to University officers and committees in Fall, 1992.

The Environmental Science Discipline recognizes that the new breed of environmental science workers must have a sound background in many different disciplines and the new curriculum reflects this philosophy. The environmental science student will be required to take extensive coursework in chemistry, biology, geology, physics, and mathematics and computer science.

Students were able to enroll in some of the new courses in the Fall Semester 1992 despite the fact that the revised curriculum has not been officially approved by the University.

• **M.S. Degree**

The Environmental Science Discipline has had a long term objective of developing a M.S. program in Environmental Science at New Mexico Highlands University. It did not believe that it would be able to obtain an official approval for one until

the late 1990's. However, because of the Committee's curriculum revision efforts during the 1991-92 academic year, Dr. Gilbert Rivera, the Vice President for Academic Affairs, has suggested that we immediately develop the M.S. curriculum as an extension of the B.S. program. The Committee commenced work on this project in Fall, 1992.

- **Environmental Science Equipment Infrastructure**

The Environmental Science Discipline's equipment infrastructure, prior to the initiation of the Environmental Technology and Waste Management program at New Mexico Highlands University was extremely weak. However, the Environmental Technology and Waste Management Committee was able to vastly improve the infrastructure during the 1991-92 academic year. The Committee is currently in the process of purchasing approximately \$30,000 worth of equipment that will be used for instructional purposes. In addition, it is in the process of developing an environmental science computer lab. The Geology Discipline has donated one of its labs in order to house the computer hardware.

The lab will contain 12 IBM compatible 486 computers, printers, digitizers, scanner, etc. Students will be introduced to many different environmental science related computer programs in the lab including those dealing with ground water, atmospheric and geographic information system modeling. The student will also be able to do word processing, spreadsheets, and statistical analysis work on the computers.

Outreach Program

- The Environmental Science discipline is developing an extensive outreach program. It is using SWOOPE, the Eagle Peak Camp, Project Learning Tree, Project Wild and other programs in order to accomplish this objective.
- SWOOPE (Students Watching Over Our Planet Earth) is a K-12 Environmental Science Program developed at Los Alamos National Laboratory. Dr. Robert Lessard is a coordinator for the program in northern New Mexico. During the 1991-92 academic year, Dr. Lessard and an environmental science student, Edward A. Martinez, worked with 27 teachers and their students in their school to help implement the program in this region. A

list of the SWOOPE teach and their school is included in Appendix III.

- Dr. Kenneth Bentson is a principal organizer of the Eagle Peak Camp for Summer, 1992. The two (2) week camp recruited approximately thirty Hispanic and Indian students to teach them about natural and cultural resource management and environmental professions. It was held in the Sangre De Cristo Mountains of northern New Mexico.
- Dr. Gerald Jacobi is an instructor in the Project Learning Tree and Project Wild Programs. He provides K-12 teachers in northern New Mexico with environmental information and instructs them on how they can teach environmentally related subjects in the classroom.
- In addition to the above, the Environmental Science Discipline is building an outreach vehicle into its curriculum. It has developed a course, the Environmental Scientist and Public Relations, which all environmental science students will be required to take. The course will allow the students to work with K-12 teachers and students, as well as with government officials and private environmental organizations on environmentally related projects.

Faculty Development

- The environmental science faculty have been given the opportunity to attend numerous workshops and conferences in order to become more effective instructors of the courses in the revised environmental science curriculum. The faculty reported that the meetings have been excellent and that the information and new techniques derived from them will enhance the effectiveness of the new environmental science curriculum.
- **New Faculty**

The Environmental Science Committee realized, from the research that it conducted on curriculum development, that students should have a strong background in environmental law and regulations. As a result of this, it has incorporated several classes dealing with these subjects into the new curriculum and hired an environmental lawyer, Dr. Stuart Nicholson, to teach these courses.

Recruitment and Retention

Student Recruitment and Scholarship Programs

There are currently 67 majors in the old environmental science program. Students will be recruited for the new program when it receives official approval. The plan for the recruitment program was developed in Fall 1992 together with a plan for the distribution of scholarships.

- **Student Employment and Research**

- The environmental science faculty believes that it is important to have undergraduate students participate in research projects early in their careers. It has been somewhat successful in providing the students with research opportunities.
- Three environmental science students are currently worked at DOE labs in both New Mexico and Colorado through the EMCOM Program. Dr. Gerald Jacobi hired several students to assist him in water quality work that he contracted from such agencies as the U.S. Forest Service, EPA, ED, etc. Additionally, a student worked with the U.S. Forest Service in Colorado. And finally, Dr. Lessard worked with an environmental science student on a global climate change project in the San Juan Basin of New Mexico.
- In addition to the above activities, it should be mentioned that five (5) undergraduate environmental science students were given the opportunity to present posters, based on their research, at the Second Engineering and Technology Conference on Waste Management and Environmental Restoration. It proved to be a very valuable experience for them.

- **New Consortium Affiliation**

New Mexico Highlands University has recently been given the opportunity to help develop a new consortium dealing with Water Resources and Management. The lead institutions for the consortium are Virginia State and Colorado State Universities. If the consortium is successfully established it should serve as an valuable asset in helping the Environmental Science Discipline to grow and prosper.

- **Linkages with Community College Consortiums**

The Environmental Science Discipline attended, as an observer, the PETE Community College Conferences. It is also in the process of forming an affiliation with a five (5) member community consortium in northern New Mexico, which is developing a common environmental technology program.

1992-93 WORKPLAN

The Environmental Science Disciplines workplan, for 1992-93 include the following activities:

- Complete the revision of the undergraduate curriculum and secure official approval for its implementation;
- Develop and secure approval of a M.S. program in environmental science;
- Continue to build the environmental science infrastructure by securing grants;
- Continue to strengthen the discipline's outreach program. There is a possibility that Dr. Vincente Llamas will be awarded a \$5,000,000 grant to improve science and math education in northern New Mexico. The expansion of the SWOOPE program is an important part of the proposal;
- Continue faculty development activities by allowing them to attend more workshops and conferences;
- Establish strong recruitment and scholarship programs in order to assure the success of the new curriculum;
- Continue to seek ways by which more undergraduate students can become involved in research projects;
- Help develop the Water Resource and Management Consortium;
- Continue to build ties with community college consortiums that are developing environmental technology programs.

NORTH CAROLINA A&T UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

North Carolina Agricultural and Technical State University is one of sixteen public senior institutions of the University of North Carolina System. This predominantly black institution offers baccalaureate degrees in the School of Agriculture, College of Arts and Sciences, School of Business and Economics School of Education, School of Technology, School of Engineering, and the School of Nursing. Master's level degrees are awarded in all of the Schools/Colleges except the School of Technology and the School of Nursing.

The objective of this project is to enhance students' awareness of environmental science and engineering issues, and to increase the number of trained minorities in environmental restoration and waste management (ER/WM). In the second year, the faculty and students at North Carolina A&T State University made significant progress in completing the planned tasks in all areas of the project.

The faculty at North Carolina A&T State University are committed to protecting the environment and to training the minorities in ER/WM. More undergraduate and graduate student scholarships have been awarded and more faculty and students have participated in the project.

PROGRAM HIGHLIGHTS

The objective of this project is to enhance students' awareness of environmental science and engineering issues, and to increase the number of trained minorities in environmental restoration and waste management (ER/WM). This is an interdisciplinary approach that includes the Civil and Chemical Engineering Departments in the School of Engineering, the Department of Plant Science (Earth and Environmental Science Program) in the School of Agriculture, the Department of Construction Management and Safety (Occupational Safety Program) in the School of Technology, and the Department of Chemistry in the College of Arts and Sciences.

Program Management

- Dr. Shouu-Yuh Chang attended the Consortium Steering Committee annual meeting, and Council of Presidents annual meeting on November 1-5, in El Paso, Texas. He attended the Consortium Steering Committee annual program review and presented A&T's annual report on December 12-13, 1991 in Atlanta, GA.

- Dr. Chang coordinated the EMCOM faculty, fellowship and student scholarship applications at NCAT State University. Seven student and two faculty applications were processed.
- Dr. Shoou-Yuh Chang attended a planning meeting with Mr. Weaver on December 27, 1991 in Oak Ridge, TN. The purpose of this planning meeting was to discuss partnerships between North Carolina A&T State University and Martin Marietta Systems on environmental restoration/waste management (ER/WM). Since this was the first planning meeting, the emphasis of the discussions was on the exchange of ideas and the setting of an agenda for the long-term collaborations between NCAT and Martin Marietta Systems.
- Dr. Shoou-Yuh Chang presented NCAT's Institutional Capabilities summary to the OAR/MAI Workgroup. Three faculty members were identified and included in the areas of Ozone/Carbon Monoxide, Acid Toxins, and Radioactive Waste. They are Dr. Keith Schimmel from Chemical Engineering, Dr. Jothi Kumar from Chemistry, and Dr. Shoou-Yuh Chang from Civil Engineering
- Dr. Shoou-Yuh Chang prepared and submitted NCAT's institutional demographics and photographs as requested by Headquarters. Dr. Chang also prepared and submitted the Institutional Capabilities Profile Summary as requested by the Graduate Education and Research Standing Committee headed by Dr. Jeanette Jones.
- Dr. Shoou-Yuh Chang and a graduate student Ms. Amy Long attended the Consortium signing ceremony on February 27 in Atlanta, GA.
- Dr. Shoou-Yuh Chang attended the National Congress Joint Working Committee Meeting, April 20-21, 1992, in Phoenix, AZ. He participated in the Minority Outreach and Pre-College Education Working Committee meeting. He also attended the HBCU/MI Pre-college and Outreach Standing Committee and Steering Committee meeting April 21-22 at the same place. He presented NCAT's pre-college activities at the standing committee meeting.

Faculty and Curriculum Development

- Drs. Gary Spring and Shoou-Yuh Chang attended the "Seventh International Conference on Solid Waste Management &

Secondary Materials" conference, December 10-12, 1991 in Philadelphia, Pennsylvania.

- Dr. Dilip Shah visited EPA on December 19-20 to discuss the safety and health issues to be incorporated in the safety and health courses.
- Dr. Dilip Shah with Ms. Ruth Clifton attended the "First Annual Eastern North Carolina Environmental Conference", November 20-21, 1991 in Greenville, North Carolina. He presented a paper entitled "Hazardous Chemicals Right to Know Standards".
- Dr. Dilip Shah attended the American Industrial Hygiene Association Annual Conference March 12-13, at Research Triangle Park, NC. He discussed with Dr. Oppold, NC Department of Labor, NCAT's participation in the Regional OSHA Training Institute Education Center activities.
- Dr. Dilip Shah attended the 1992 Federal Environmental Restoration Conference and Exhibition, April 15-18, in Vienna, VA.
- Dr. G. B. Reddy attended a course on Safety and Health Training for Hazardous Waste Site Personnel, March 30 to April 1, in Chapel Hill, NC.
- Drs. Shouu-Yuh Chang, Dilip Shah, Godfrey Uzochukwu, Jothi Kumar, and Ms. Maxine Moore attended the Waste Management and Environmental Restoration Conference in San Juan, PR. Dr. Shah coordinated the student poster presentations for the conference. The following papers were presented at the conference:

"Musts for LUSTS: EPA Regulations" by Dr. Dilip Shah

"Solid Waste Management Through Production of Alternative Fuel" by Dr. Jothi Kumar, Shahbazi and R. Mathew

"Application of Air Monitoring Techniques for Waste Management/Environmental Restoration" by Ruth Clifton and Dilip Shah

"Methods of Waste Site Selection and Disposal" by Godfrey Uzochukwu

"Use and Selection of Personal Protective Equipment" by Dilip Shah and Ruth Clifton

"Job-Seeking Skills" by Maxine R. Moore

- Dr. Shamsuddin Ilias presented a paper entitled "Characterization of the Topopah Spring and Tiva Canyon Tuffs at Yucca Mountain: Effective Diffusivities and Pore Properties" at the 3rd Annual International Conference on High Level Radioactive Waste Management, April 12-16, in Las Vegas, NV. He received \$500 from MIRT-ORAU and \$660 from this HBCU/MI project.
- Dr. Shoou-Yuh Chang coordinated the environmental research proposal as a part of a research proposal submitted to the Department of Defense entitled "Enhancing the Educational and Research Experience for Minorities" on January 7, 1992. The overall budget is over 12 million dollars for three years while the environmental research budget is 2.88 million dollars for three years. Drs. Shoou-Yuh Chang, Vinayak Kabadli, David Klett, Angela Clark, Keith Schimmel, and Emmanuel Nzewi developed a proposal in the environmental area.
- Dr. Keith Schimmel received an Environmental Management Career Opportunities for Minorities (EMCOM) fellowship for the 1991 summer. He spent 10 weeks at the Idaho National Engineering Laboratory working on the modeling of in situ bioremediation. Because of his excellent performance at the Lab, he received a subcontract from EG&G, Idaho to conduct a research project entitled "Scaling In Situ Bioremediation Problems by Application of Multi-phase, Multi-component Transport Theory". The duration of the project is March 1, 1992 to February 28, 1993 with funding of \$40,000.
- Dr. Abolghasem Shahbazi from the Department of Plant Science & Technology was awarded a summer fellowship in the EMCOM program. He was assigned to National Renewable Energy Laboratory this summer to conduct curriculum development and research activities in environmental management. Dr. S. Y. Chang worked at Sandia National Laboratories under the DOE Science and Technology Alliance Program to conduct curriculum development and research activity in radioactive management and disposal.
- Dr. Schimmel reports that the Biochemical Engineering development program went well. The project includes curriculum design, course design, acquisition of instructional materials and lab supplies, faculty development and student recruitment. The program has been funded by the North

Carolina Biotechnology Center at \$25,000. The following two courses will be developed:

- **CHEN 615 Bioprocess Dynamics and Control**

A first course in the principles of process control applied to bioprocesses. The dynamics and control of bioprocess systems, controllers, sensors, and final control elements. Time and frequency-domain characterizations of these subsystems are developed and employed in stability analysis of closed control loops. More modern techniques of control are introduced briefly, along with principles of sampled-data analysis and digital control techniques. Another goal is to acquire a working knowledge of process instrumentation during the laboratory period.

- **CHEN 625 Biochemical Engineering Downstream Processing**

A first course in the product recovery techniques used in the downstream steps of biochemical processes and bioprocess economics. Separation processes to be studied will include extraction, membrane separations, electrophoresis, chromatography, centrifugation, and sedimentation. Combinations of these processes include a look at how bioproduct regulations affect process economics. The design of a biochemical process will further demonstrate bioprocess economics. The practical understanding of membrane separations and chromatography will be accomplished through laboratory experiments.

The following courses were developed by Dr. Uzochukwu and submitted to the University Senate for approval.

- **EASC 699 Environmental Problems**

Multi-disciplinary examination of environmental problems and application of appropriate techniques of analysis to the problems. Team taught by faculty and other professionals involved in teaching and research.

- **EASC 444 Environmental Science Seminar**

Group discussions, reports, and guest lectures on current environmental issues.

- Dr. Shoou-Yuh Chang with the help of graduate and undergraduate students (Murali Dodaniri, Zhi Li, Gregory Mackin, and Linwood Peele) is developing two user-friendly computer programs. The programs with manuals were used by students enrolled in CIEN 410 Water and Wastewater Engineering in the spring semester 1992.

- Dr. Shoou-Yuh Chang prepared Environmental Engineering Lab Plan, Manual, and Environmental Engineering course materials

for the ABET visit, October 6-8, 1991. Based on the assessment of the accreditation team, we had an excellent visit.

Recruitment and Retention

Dr. Shouu-Yuh Chang processed the EMCOM Research Assistance Allowance for Vardry Austin, Linwood Peele, and Vella Strickland.

Dr. Godfrey Uzochukwu prepared and distributed the HBCU/MI ET/WM scholarship application forms to all Schools and Departments at the end of January. Twenty Five Students applied. Eleven scholarships (\$700 to \$1000 each) were awarded to students from the Departments of Chemical Engineering, Civil Engineering, Accounting, Economics, Chemistry, Plant Science, Animal Science, and Construction Management and Safety. The GPA's of these students are between 2.8 and 4.0.

Dr. Dilip Shah coordinated the Student Poster Presentation for the 2nd Waste Management and Environmental Restoration Conference held at San Juan, PR, April 9-11, 1992. He also conducted the A&T student poster competition. Seven students were selected and each presented a poster paper at the above conference. The titles and presenters are:

- "The Study of Below Regulatory Concern Waste" by Vardry Austin
- "Bedrock and Soil Properties in Selected North Carolina Counties and Implications for Waste Disposal" by Staci Kyle
- "A Way to Contain Gaseous Effluents in Industrial Air Pollution" by Randall Leathers
- "Recycling and Dechlorination of Used Oil Products to Reduce Waste and Air Contamination" by Bernadette Murphy
- "Bioconversion of Food Wastes to Ethanol" by Anand Padmanabhan
- "Preventing Resin Pellet Loss" by John Scales
- "The Necessity for Waste Minimization and The Role of Process Waste Assessments" by Vella Strickland

Three students attended the 1992 Federal Environmental Restoration Conference and Exhibition, April 15-18, in Vienna, VA.

Dr. Dilip Shah conducted a workshop on "Career Opportunities in Environmental Technology and Waste Management" on April 28, 1992 at A&T campus. Eighteen students attended the workshop. Luncheon for 28 students and speakers was provided (\$161 from the HBCU/MI project).

Ms. Burma Reed, a student from the Department of Chemistry, attended the 19th Annual NOBCCChE meeting, April 20-22, in New Orleans, LA. Fourteen students attended this meeting, and funding for them was obtained from other sources. (\$886.38 from the HBCU/MI project).

Outreach

Dr. Chang updated the 1990-1991 K-12 program and outreach activities at North Carolina A&T State University and sent the information to Mr. Richard Bright and Dr. Ray Finch.

Dr. Uzochukwu from the Department of Plant Science attended the Explorer Post Plan for Boy Scouts of America meeting on November 7, 1991 at North Carolina A&T State University. He made a presentation to about twenty high/middle school student explorers about academic/career opportunities in ER/WM.

Dr. Dilip T. Shah, Mr. Wayne Simpson, and Consultant Ms. Ruth Clifton conducted a 24-hr Haz-Mat training course for the NCAT Hazardous Material Response Team at North Carolina A&T State University on November 13-15, 1991. The training included: Applicable Standards, Hazard Recognition, Potential Health Hazards, Monitoring Equipment and Demonstration, Emergency Response Plan, Safe Work Practices, Decontamination, Personal Protective Equipment Wear & Use, Incident Control Command System, Tank, Drum Repair, Spill Control and Containment, and Dress Rehearsal.

Dr. Shouu-Yuh Chang presented a talk on "Waste Treatment" at the 1991 Fall Science Symposium for high school science teachers in the Greensboro area on December 7, 1991.

Dr. Jothi Kumar from Chemistry prepared the "Honors Analytical Chemistry Program" proposal, and it was sent to Pre-College Standing Committee on December 15, 1991.

NCAT State University's pre-college science, mathematics, and technology program received a \$50,000 grant from the Smith Reynolds Foundation of Winston-Salem in January. Dr. Vallie Guthrie, director of the program indicated that 438 students from 17 Piedmont middle, junior and senior high schools participate in the program. This grant will be used to support the program's Saturday Academy and the Summer Science and Mathematics Camp.

Dr. Chang and Dr. Uzochukwu attended the Community Outreach workshop, February 28-29, in Washington D. C. Dr. Uzochukwu organized

the HBCU/MI Environmental Technology/Waste Management Consortium - Development of An Outreach Plan in Environmental Restoration & Waste Management for Use in Minority Communities. Participating faculty were Drs. S. Y. Chang, A. Clark, V. Guthrie, P. Hunter, J. Kumar, and D. Shah. Discussions included the following topics: Development of Community/Industry Linkages on Environmental Problems, A&T's Environmental Management Capabilities, Environmental Workshops for K-12 Teachers, Students, and Community Groups, and the Infusion of Environmental Science into Science Education Curriculum.

Dr. Shoou-Yuh Chang, MATHCOUNTS Chairman for the PENC, North Piedmont Chapter, organized the 1992 MATHCOUNTS. This year 175 students from 35 middle schools competed on February 21, 1992. The goals for MATHCOUNTS were: 1) to increase students' motivation to excel in math by giving recognition to outstanding math students, 2) to educate the public about the importance of mathematics and the role math-oriented jobs play in our technological society, and 3) to help strengthen math curricula in our schools.

Dr. Schimmel organized a seminar on "Bioremediation of Hazardous Waste sites" on October 31, 1991. The speaker was Dr. Terry Donaldson from Oak Ridge National Laboratory. Ten faculty and 18 students from the departments of Biology, Chemistry, Chemical Engineering, Civil Engineering, Construction Management and Safety, and Plant Science attended the lunch before the seminar. The seminar was an overview of bioremediation work that has been performed at the Oak Ridge National Laboratory. Fifty faculty, graduate students, and undergraduate students attended the seminar in McNair Auditorium.

Dr. Jothi Kumar is a founding member of the Guilford Environmental Coalition. Thirty-one people signed up to be on the structuring committee. The Mission of the Guilford Environmental Coalition is: 1) to enhance communication among individuals, decision makers, and organizations with environmental concerns, 2) to provide an open forum for discussion of environmental issues, 3) to provide mechanisms for advanced study of environmental issues and for dissemination of information to the community and government officials, 4) to involve citizens in environmental planning and decision-making processes, and when necessary, to use the information acquired in its studies to affect environmental decisions. Dr. Kumar is a member of the Air Quality Task Force and the Education Task Force.

The following activities were conducted by the Greensboro Area Mathematics and Science Education Center (GAMSEC). GAMSEC is a cooperative center between North Carolina A&T State University and University of North Carolina at Greensboro with Dr. Vallie Guthrie from A&T as the Director of the Center. These activities are supported by others.

The purpose of the GAMSEC Teacher Training program is to increase the quantity of qualified mathematics and science teachers in the state of North Carolina. GAMSEC offered courses, workshops, and seminars with hands-on activities and manipulatives; fellowships in courses, and summer institutes for elementary, middle and high school teachers. GAMSEC served more than 900 teachers in 1991-92. The GAMSEC Teacher Training Program has received funding for stipends, tuition, and materials from the Title II/Eisenhower Grants, The North Carolina Biotechnology Center, The State Department of Public Instruction, The GLAXO Foundation, The Microelectronics Center of North Carolina, The Department of Energy, The North Carolina Mining Commission, Department of Education and Schools/School Systems.

PRE-COLLEGE

The Pre-college Program is designed to increase the number of minority and female students who complete high school with preparation and motivation to enter a college/university and major in a science or mathematics-based field of study. The Pre-College Program operates for 12 months each academic year. The pre-college program presently enrolls 452 students (grades 6-12) in its Saturday Academy. Many of these students are also enrolled in the daily academic enrichment program and the summer scholars program. These students receive instruction in science, mathematics, communications and personal enrichment. The services to students include:

- **The Saturday Science and Mathematics Academy**
a 15-20 week period to further develop skills in mathematics, science and communication (oral and written), science research, science projects, problem solving and computer science.
- **Summer Science and Mathematics Program**
a five-week session of math/science projects, computer programming, problem solving exercises, accelerated communication courses and a science/technology field trip.
- **Math/Science Competitions**
Math/Science Day, NC State Science Fair, NC Math Contest, International Chemistry Olympiad Examination and Program, 14 Science Project Assistance Sessions, Future Problem Solving Program, etc.
- **Academic Chapters for Excellence (AACE)**
Student leadership skills developed through Pre-College Program Clubs

- **Academic enrichment tutoring** by professionals, peers, university students, and community members.
- **Independent study groups** to help students study and learn together, building peer academic support groups.
- **Role model speakers and field trips** to expose students to the world of people and work.
- **Academic, university, and career counseling** to guide students toward educational and career objectives.
- **Pre-college Testing Program.** The Educational Testing Service has designated the pre-college program at A&T as the regional testing center for SAT and Achievement Testing.
- **The PSAT** was administered to 117 pre-college students in 1990-91. Over 125 pre-college students will take the SAT in 1991-92. The testing cost was funded by the Science and Technology Alliance grant.

Other Programs

On March 6, 1992, the UNC Board of Governors unanimously approved President C. D. Spangler's recommendation for the initiation of Ph.D.'s in the Departments of Electrical and Mechanical Engineering at North Carolina A&T State University. A&T now becomes the first HBCU in North Carolina to be granted Ph.D. authorization in engineering and becomes only the second HBCU in this nation to possess the doctoral charter in engineering.

Summary and Conclusions

During the second year, the faculty and students at North Carolina A&T State University continued to make significant progress in completing the planned tasks in all areas of the project. The major accomplishments were many.

In the curriculum and faculty development areas, courses in the Department of Civil Engineering were evaluated and modified for the accreditation visit from the ABET Accreditation Team. Five faculty attended the 1992 Waste Management Conference, and four presented papers at the conference. Several faculty members presented papers and attended various conferences to enrich their curriculum and research capabilities in ER/WM.

In the recruitment and retention area, the EMCOM Research Assistance Allowance was processed for three students. The scholarship applications forms were distributed. Seven students were selected from the poster competition at NCAT and presented posters at the 2nd Waste Management and Environmental Restoration Conference. Three students attended the 1992 Federal Environmental Restoration Conference and Exhibition. A student workshop on "Career Opportunities in Environmental Technology and Waste Management" was conducted. Fourteen students attended the 19th annual NOBCCChE meeting.

In the outreach area, the NCAT K-12 program and outreach activities were updated. The Explorer Post Plan for the Boy Scouts of America meeting was attended. A 24-hr Haz-Mat training course for the NC A&T Hazardous Material Response Team was conducted and the Community Outreach workshop was attended. A \$50,000 grant was received by NCAT's pre-college science, mathematics and technology program. MATHCOUNTS for the PENC, was organized. The faculty at North Carolina A&T State University is committed to protecting the environment and to training the minorities in ER/WM. More undergraduate and graduate student scholarships have been awarded, and more faculty and students have participated in the project.

NORTHERN ARIZONA UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

NAU has evolved from a four-year, degree-conferring college to its present status as one of the three universities in the Arizona University System. The University offers a number of academic degrees at the undergraduate, Master's and Ph.D. levels. By virtue of its geographic location, NAU is uniquely suited to provide higher education opportunities for American Indians by serving several tribal nations. A stated mission of the University is to provide national leadership in minority education, particularly for American Indians. In addition, the University has been experiencing a continuous growth in the enrollment of Hispanic students.

PROGRAM HIGHLIGHTS

In this report, we present major and minor projects and activities that directly or indirectly received support from the DOE funding. Please note that we did not list attendance of NAU personnel at the various Consortium meetings.

The projects/activities are categorized according to major support categories:

- Curriculum and Faculty Development,
- Outreach, and
- Recruitment and Retention.

Under each of these categories, we listed activities and projects. Under each activity or project, we listed significant outcomes or details that we thought were important (e.g. number of participants in teacher enhancement projects).

It is our recommendation that the Consortium quickly develop a reporting system that is a judicious blending of the Milestone Log format and a table or matrix format with "cells" suitable for listing significant outcomes in "bullet" form. If such a reporting system were used for monthly reports, the "turn-around" time for major report production should be substantially reduced. At the home university, the reports could be quickly "cut and pasted" into the annual report and updated with significant outcomes that occurred since the respective monthly report were filed. For Headquarters, rapid cut and paste jobs within a support category and across universities could provide coherent categories of lists of significant outcomes for DOE and Congressional personnel.

We have some NAU personnel who are interested in the information management systems for consortial reporting. There are certainly others in our member institutions. Perhaps, we should devote a working session to an analysis of reporting issues and the potential for E-Mail reporting by common forms. We realize these discussions have been started, but communication is an essential (and at this time cumbersome) part of a functional consortium, particularly in regards to accruing increased and sustained funding.

Curriculum and Faculty Development

- **Conferences**

- **Community College Network Conference**

- November 22 & 23 -- First Conference for Community College Faculty, including NAU and New Mexico Highlands faculty. Forty participants attended, representing 20 community colleges.

- **Community College Faculty Enhancement Conference**

- April 10-11 -- Second community college conference. This conference focused on faculty development by offering computer networking and grants writing workshops. Held at Maricopa Community College District Office; 38 participants, representing community colleges and NAU.

- **Planning for a conference on How to Conduct Research in National Parks in an Environmentally Sound Manner begun 1/92.**

- Faculty and topics for conference have been chosen.
 - Three planning session have been held with National Park Service personnel.
 - Conference took place Fall, 1992.

- **Interdisciplinary Team Research**

- **Long-term Monitoring of Oak Creek**

- February -- Start date of the Oak Creek Watershed Research Project in cooperation with the State Department of Environmental Quality and the Northern Arizona Council of Governments and the Environmental Protection Agency. Phase I is a collection and evaluation of all previous studies and development of a monitoring and research plan. First Phase May, 1992.

- **Water Quality Assessment at Hopi Reservation**

- Began a water quality study for the Hopi Tribe of springs and other water sources. This project is funded by the EPA and supports American Indian Students. This grant was made

possible by NAU faculty initiating and assisting the Hopi Tribe to gain separate-state status. Project involves four faculty and 10 Native American students.

- **Non-Point Source Pollution Assessment on Hopi Reservation**
This work is in the planning stages. A team of NAU faculty and Tribal personnel have visited Washington, D.C. to discuss project.
- **In cooperation with the U.S. Forest Service, Arizona Department of Environmental Quality, EPA, and Phoenix Cement,**
Dr. Richard Foust has led the planning for a project to monitor air quality in Sycamore Canyon, a wilderness area in the Coconino National Forest. Project is now ongoing.
- **Submitted three faculty applications for summer lab placements to**
Associated Western Universities--one for the DOE/HBCU/MI Consortium funded position and two to the regular AWU coordinated program.
- **Received two U.S. Forest Service Grants for monitoring snow sublimation**
Support of an ongoing project on sublimation of snow at 7,000 on the Flagstaff area. Project involves Dr. Charles Avery, Professor of Forestry; Dr. Lee Dexter, Associate Professor of Geography; and Dr. Robert Wehr, Assistant Professor of Computer Science. This project of monitoring snow level and determination of sublimation is providing the answer to the lack of correlation of snow pack in the U.S. Forests in Northern Arizona on the water run-off into the desert areas adjacent to Phoenix, Arizona.

Lecture Series

- Three lectures have been sponsored by DOE funding.
- In March, Dr. Jani Ingram visited from INEL. Dr. Ingram is Navajo. He had several discussions with student groups in addition to his primary scientific lecture.
- A faculty committee worked during the Spring of 1992 to establish a list of speakers and develop a substantive Lecture Series that focused on environmental sciences. This series began Fall 1992.

Undergraduate Courses

- Hydrology sequence (Three-course sequence)
Two new courses, one revised course
Scheduled for Fall 1992
- Environmental Engineering Courses
Air Quality Engineering -- fall 1992
Waste Systems Design Engineering -- spring 1993
- Revision of Introduction to Environmental Sciences
Implemented the revised Environmental Science 101 Lab
developed in 1991 under the DOE grant.
- Bioremediation Course
Implemented Spring 1992
- Instituted revised Environmental Chemistry course
A greatly revised course in Environmental Chemistry (25
students, juniors and seniors) initiated under the DOE
grant was started by Dr. Richard Foust, Professor of
Chemistry.
- On-campus Planning Conference for Environmental Science for
next five years
 - On January 29, 1992, NAU held a full-day planning session
at which time we worked on planning for Environmental
Science/Studies/Education/Engineering for the next five
years. Twenty eight faculty, representing Biological
Sciences, Chemistry, Geology, Quaternary Studies,
Forestry, Geography, Engineering, and Environmental
Science participated. An action plan was established for
the next year of the DOE grant.
- Development of Inventory of All Environmental Program at NAU
and of faculty expertise in Environmental Disciplines
This was published in late spring, 1992.
- Development of Undergraduate Environmental Education and
Liberal Studies courses, began 2/92
A committee was formed; committee has faculty
representatives from Education, Engineering, Forestry,
Biology, and Geology.

The committee submitted a proposal to NSF for course
and curriculum development and has issued a preliminary
report to the President of NAU (late April 1992).

- Invited State Senator, Karen English, to lecture in Environmental Science Courses.

Undergraduate Research and Other Activities

- Placement of three EMCOM students into research laboratories to prepare them for their 1992 summer research at DOE Lab. Advertised and selected 10 undergraduate students to carry out research under the direction of eight different faculty representing five different academic departments.

Five students are Native American and one is Hispanic.

- Initiated a new Environmental Science and Engineer Student Professional Club, which has been meeting twice monthly.
- Began planning with Sue Lowery, Director of the Resource Center for Environmental Education for Coconino County to develop cooperative programs to involve our undergraduate students with public schools in Flagstaff.
- Completed the student paper competition contest for the DOE-sponsored meeting in San Juan, in April. Twelve papers were received and reviewed. Mr. Robert Smith was chosen as the winner. He and the runner-up, Ms. Gina Ruttenberg, were sent to this meeting in Boise in August, 1992.

Faculty Development and Hiring

- Placement of faculty and minority students in DOE labs for summer 1992, began 11/91
- Search for New Director of Environmental Sciences Program. An offer has been made and we are awaiting acceptance.
- Hiring of New Environmental Engineering Faculty
 - Search process began 3/92
- Institute Study/Planning Group On-Campus for Global Climate Change Research Program
- Dr. Paul Rowland, Assistant Professor of Education, presented a paper and participated in a symposium at the annual meeting of the North American Association for Environmental Education.

- Dr. Scott Anderson, Assistant Professor of Environmental Science and Quaternary Studies, gave the following four presentations:
 - Climate and Environmental Change on the Colorado Plateau -- Flagstaff Festival of Science
 - Biogeography, Disturbance and climate change recorded from Giant Sequoia Groves -- NAU Department of Biological Science Seminar
 - Climate and Vegetation change in the Sierra Nevada, California -- at meeting of the Geological Society of the Americas
 - Climatic Extremes of the Last 2000 Years as Reflected in Pollen Records -- at the Los Angeles County Museum of Natural History
- Dr. Scott Anderson attended an HBCU/MI Geoscience Working Group at the GSA meeting in San Diego, California. Dr. Anderson arranged this meeting.
- Initiated discussions with the Council of Energy Resource Tribes to develop a cooperative program with CERT, NAU, Haskell Junior College (an American Indian college in Kansas), and Associated Western Universities for DOE Labs.
- Ten faculty from NAU attended a meeting with the Arizona State Department of Environmental Quality Meeting to begin a dialogue for cooperative projects.

Other Faculty Activities

- Dr. Richard Foust served as a reviewer of proposals for Associated Western Universities for the EMPAC program to establish additional high school analytical chemistry programs. As a follow-up to the meeting in Salt Lake City, he was asked to do site visits at the University of Washington and the University of Arizona.
- Dr. Scott Anderson attended the American Society of Limnologists and Oceanographers to present a technical research paper.

- Began first of bi-weekly meetings of the HBCU/MI Faculty Advisory Committee
- Dr. Merton Richards, Professor of Forestry, and Dr. Paul Rowland, Assistant Professor of Education, attended and participated in the MINI-Summit on Environmental Education in Arizona
- Completed, transmitted, and sent Research Vision Statement relating to plans to develop NAU as The Environmental University in the Southwest with Centers of Excellence in Ecology and Environmental Education.
- Participation in Quality Education for Minority Network Activities.
 - Dr. Henry O. Hooper, President Eugene M. Hughes, Dr. Jay Tashiro and Dr. Diane Ebert-May attended the Quality Education for Minorities - Math, Science, and Engineering Network (QEM/MSE) Meeting, representing the Consortium at the Second Annual Planning Meeting.
- Drs. Richard Foust and Harold Speidel were selected to participate in a three-month training program in Egypt funded by EPA and arranged through the Consortium Headquarters.
- Formation of Environmental Instruction Committee
 - This university-wide committee was formed in March and charged with an examination of environmental education, broadly defined, in the various colleges of the university.
 - A proposal was developed and submitted to a joint NSF-NEH-FIPSE initiative; the proposal requests funding for a suite of introductory environmental studies courses (request = \$555,000).
 - One important committee focus was preservice and inservice teacher education in environmental science.
- Initiatives with Energy and Environmental Companies
 - Laurence Gishey and Ivan Sidney, both from the NAU Office of Native American Programs, began work with a variety of companies to devise a program for recruitment and retention of American Indian students.
 - An Alliance has been formed with 25 corporation and National Laboratories, each of which has operations on or

near Native American Reservations in the Four Corners Region of the Southwest.

- The Alliance representatives will meet at NAU on June 10, 1992.

OUTREACH

- Household Hazardous Waste Project
 - Dr. Scott Anderson and Mr. Bill Auberle have met with representatives from Flagstaff Public Schools, the Flagstaff Fire Department, the City Administration Offices, representatives of Coconino County, and representatives of the NAU Recycling Program.
 - A Hazardous Waste Collecting Project has been planned.
 - Project is planned for 1992-1993 Academic Year, with NAU students providing the major education collection "labor force".
- K-12 Outreach - All of the following programs are partially supported by the DOE grant and contain environmental education components
 - Enviro Links

Two faculty attended the AAAS program on Community Outreach and Planning Workshop on Environmental-Links -- Dr. Diane Ebert-May and Dr. Lynda Hatch.
 - Student Science Training Programs
 - NSF Young Scholars (high school students).-- 35 students (25 minority students) from across the United States will participate in a research internship project sponsored during the summer 1992.
 - Nizhoni-Upward Bound Program.-- NAU's Science and Math Learning Center personnel helped develop an environmental science curriculum for a project that served 130 Native American High School students. Program is sponsored by Student Services. This program was held summer, 1992 .

- Teacher Networked Teams (NSF and BIA)
 - Obtained funding from NSF and the Bureau of Indian Affairs for Environmental Summer Workshop and academic year pre- and post-workshops beginning summer, 1992. NSF support is for 20 teachers and BIA support for an additional 20 teachers. This program involves a team of at least three teachers from an individual school.
 - Held workshop on January 24-25, 1992, February 14-15 & 28-29, April 3-4, May 1-2. TNT workshops attended by 28 teachers and one principal as part of a Teacher Enhancement for teachers of grades K-6. Seven schools with high minority enrollments were recruited into this program. Each school sent four teachers.
- Arizona Science and Environmental Education Development (K-8 teachers)
 - Held orientation workshop for 27 K-8 teachers on April 10-11.
 - Five-week summer institute began June 1992.
 - Summer institute has environmental research and curriculum development components.
- Saturdays of Science (K-12 students)
 - April 4, held a Saturday of Science in Environmental Science Program for 24 Native American Students from the Navajo Reservation Schools. April 30, held a "Thursday" of Science for 31 Hopi middle school students.
- TEAMS/JETS Competition
- Development of summer science/math/engineering program for high school students. (CERT program for 1993, and Coop program with Student Services, 1992). Beginning 12/92.
- Several faculty participated in demonstrations and tours for the general public in the Flagstaff Festival of Science.
- In November, Science and Mathematics Learning Center sponsored a pilot teacher in-service workshop in Environmental Science for 20 teachers from schools serving large numbers of

minority students, primarily in reservation, or near-reservation, schools.

- **Horizons - University Publications Fall 1992**
 - We devoted an entire issue to environmental issues and environmental science.

RECRUITMENT AND RETENTION

- **Minority Honors Study Group**
 - During spring 1992, Dr. Jay Tashiro and three graduate assistants (two of whom are minorities) developed and implemented a minority student "Honors Study Group", helping minority students form an academic-social study group in the sciences, mathematics, and engineering. Both undergraduates and graduates were served.
- **High school student recruitment in Environmental Engineering**
 - Appointment of Undergraduate Research Participants. Began 11/91.
 - Appointment of University-wide Coordinating Committee for Retention and Recruitment of American Indians.
 - Initiate Student Chapter of Air and Waste Management Association.
- **Appointment of a University Coordinating Committee on Retention and Recruitment of Native Americans**
 - Formed in April.
 - Focuses on recruitment and retention issues for Native American students who express interest in mathematics and the sciences.

PRAIRIE VIEW A&M UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

The Departments of Biology and Chemistry have focused upon a review of existing traditional courses as well as the possibility of adding new courses to the curriculum. The Department of Biology has revitalized its Master of Science Program in Environmental Toxicology and is actively recruiting students for inclusion in the Program. Fellowship Support for two students in Environmental Toxicology has been secured from the Lone Star Steel Company. The Department of Chemistry has continued its review of Analytical Chemistry and Physical Chemistry courses for infusion of more environmentally relevant topics. The Department of Chemistry will present its request for re-establishment of the Senior Thesis requirement during the 1992-93 academic year.

One faculty member from each of the four departments has been provided released time to lead the curriculum development effort in his department. The faculty committee has continued its review of the current Environmental Toxicology program in the Department of Biology. There is a strong desire by Engineering faculty to have an environmental program housed in the College of Engineering and Architecture. A proposal for implementation/reconfiguration of Environmental Programs at the University will be submitted to the Vice President for Academic Affairs during the 1992-93 academic year.

The following schedule of curriculum development activities were initiated and/or completed during the past year:

- Initiated review of graduate program in environmental toxicology
- Continued development of environmental laboratory experiments for existing courses
- Continued Environmental Seminar Program
- Initiated design of new environmental courses for submission to Coordinating Board for Approval.

Faculty Development

A primary concern of the University is development of its faculty. The University will pursue a two-pronged approach to development of faculty with teaching and research interest in environmental restoration and waste management.

- **New faculty members were recruited in Civil Engineering and Chemical Engineering**

- Dr. Alberto Passos joined the faculty of the Department of Civil Engineering. Dr. Passos received the doctorate in 1991 from the University of Texas at Austin. His main research interests are in the areas of biological processes in waste management, pollution transport, and modeling and simulation of transport.
- Dr. J. F. Gabitto joined the faculty in the Department of Chemical Engineering. Dr. Gabitto received the doctorate in chemical engineering from the University of Buenos Aires. His main research interests are in transport phenomena in porous media, non-linear dynamics, reactive distillation, and numerical and applied mathematics.
- Five faculty members, along with five students, attended the Consortium sponsored "Conference on Health Effects of Toxic Substances and Contingency Planning" on September 26-27, 1991 in Atlanta, GA.
- Two students, Andrea Ashley and Nora Savage, attended the Ground Water Symposium at Lamar University on April 1-3, 1992 with Dr. Hylton McWhinney. The students presented a poster entitled "The Chemistry of Stabilized Cr^{3+} , Hg^{2+} and Pb^{2+} in Cement."
- A total of nineteen Chemistry and Chemical Engineering Students attended the National Convention of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers in New Orleans on April 21-24, 1992.
- Prairie View students will be part of the research team which will perform a \$2.4 million research project for the Department of Defense to gain a better understanding of the factors that control biodegradation of military toxic wastes.
- Nora Savage, a Senior Chemical Engineering student and EMCOM Scholar, presented a paper on Medical Waste Disposal at the Puerto Rico Environmental Conference. She has been accepted for graduate study at the University of Wisconsin.
- Faculty members have been encouraged to seek research funding in environmental areas. The University has provided seed funding for environmentally related research projects. Additional funds for support of environmental projects has been secured from external agencies by faculty

in science, engineering, and agriculture. A \$487,256 grant was received by faculty in the Department of Chemistry for purchase of an X-ray photoelectron spectrometer and installation of a building-wide local area network. These facilities will enhance the University's ability to respond to solicitations for conduct of environmental research.

- The Steering Committee will seek to initiate more Industry/University Collaborative Programs and to utilize existing corporate in-house training programs to strengthen the engineering and science faculties' interest in environmental fields. The existing Memorandum of Understanding with the DOE Pacific Northwest Laboratory has provided an opportunity for faculty to become involved in supported research projects. Dr. Larry Cole, Associate Professor of Chemistry, again spent the summer at Oak Ridge National Laboratory in an environmentally oriented research project. The 1992 Summer Project Team included two students from Prairie View.

Outreach/Precollege

Prairie View A&M University will continue to develop Summer Enrichment Programs for precollege minority students and their teachers. The proposed activities for these programs are consistent with the ER/WM Consortium goals and objectives and are also consistent with program development and enhancement activities already underway and on-going since 1984 in our University.

- **Refinement of Summer Enrichment Design**
Summer Enrichment Projects focusing on basic science, mathematics, and engineering skills necessary for success in all related environmental fields have been supported. These programs are being conducted by the Department of Biology and the College of Engineering and Architecture. A total of forty students (25 in Engineering and 15 in Biology) were supported in summer enrichment programs.
- **Continued Development of Analytical Chemistry Workshop**
The Department of Chemistry has submitted a proposal for conducting a Precollege Analytical Chemistry Workshop during the 1993 summer session.
- **Development of Secondary School Teacher Workshop**
During the summer of 1992, the University conducted a Workshop for the Enhancement of Secondary School Science Teachers. Twenty teachers from local school districts were selected

to participate in a three-week program designed to enhance their proficiency in science and mathematics content areas through activities including formal course work, hands-on laboratory exercises, computer-based studies, and field studies. Many examples were taken from the environmental arena to develop increased awareness among teachers. Follow-up activities will be conducted during the academic year to ensure the transfer of materials from the enhancement workshop to the classroom and to develop a network of interacting peers among the teachers for the purpose of sharing ideas and continuing the learning and developmental processes that were initiated at the workshop.

Follow-Up Activities during the Summer:

- Refinement of Summer Enrichment Program Design
- Follow-up Activities with Program Participants
- Evaluation of Summer Enrichment Program

Safety and Health Training

- **Design FETN Training Program**

Prairie View A&M University has a long history of involvement with small farmers and small businesses in Texas. There is a significant need for safety and health education in the small business workplace and on the farm. The University has initiated a program to provide occupational health and safety training and education designed to address the need for hazardous communication programs, including employee training and the safe handling and storage of materials on the farm and in the workplace. The second year activities have continued to focus on getting University facilities up to standards and getting personnel involved in safety concerns. The Inventory of University chemicals and other hazardous materials has been completed and Material Safety Data Sheets for these items have been printed from the Aldrich MSDS CD-ROM package.

- **Develop Local Emergency Response Plan for the University**

The University has joined the Fire & Emergency Television Network and is currently receiving programming by satellite from this network.. A full schedule of training programs for University personnel and local fire fighters and other emergency personnel is being developed.

SOUTHERN UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Southern University and A&M College at Baton Rouge, LA, the largest historically black college and university among the 117 in America, is one of three state higher education systems in Baton Rouge, LA. Southern University is composed of three campuses in Baton Rouge, New Orleans and Shreveport. Southern was established and recognized by the federal government as a Land Grant institution under the Federal Act of 1890.

Southern's academic organization consists of the Colleges of Agriculture and Home Economics, Arts and Humanities, Business Education, Engineering and Sciences, the Junior Division, School of Architecture, Public Policy and Urban Affairs, Nursing, and the graduate school.

Serving as an important educational, cultural, political, and industrial center for south Louisiana, Southern University strives to exemplify the highest qualities expected of an institution of higher learning. While the University commits itself to teaching, research, and service, it has never, during its 109-year history, abandoned its primary purpose or mission of serving the educational needs of persons of all ages of the state, nation, and the world through quality academic offerings.

PROGRAM HIGHLIGHTS

Southern University's second year of the HBCU/MI ER/WM program has focused on accomplishing objectives in the following categories:

- Program Management
- Curriculum Enhancement
- Faculty Development
- Outreach Activities
- Recruitment, Retention, and Internships

Program Management

- **ET/WM Advisory Council** is composed of representatives from the university, industry, government, and both elementary and secondary school systems. The Council's major function is to provide insight and guidance in the implementation of the ET/WM program. Additional members have been chosen to participate on

the ET/WM Advisory Council from the following areas: Public Policy, Law School, University Chancellor's Office and the Laboratory School.

- ET/WM staff participated in the December Steering Committee Meeting in Atlanta. Dr. Ford presented the annual report for the Southern University Program. Dr. Nasrat Naqui attended to gain insight into the Consortium structure in that she will assume the role as program director for the faculty development and curriculum enhancement segments of the ET/WM program.
- Several new members came on board the ET/WM Advisory Council in November 1991.; namely, Mrs. Mattie Spears, principal of the Laboratory School, and Loretta Burke, Principal of Progress Elementary. A special attendant at the November meeting was Yolanda George of AAS, who made a presentation on the new Enviro-Links program and the Community Learning Center concept. Also interacting with the Council at this meeting was Dean Rose Duhon of the College of Education and Dr. Press Robinson, Assistant to the Vice Chancellor for Academic Affairs.
- The focal point of the Council's February meeting was the organization of an ET/WM Pre-College Consortium. This Pre-College Consortium is an effort to establish a partnership between those elementary, middle, and high schools that have been selected to comprise the consortium. This partnership will provide a vehicle by which the ET/WM program can positively impact the science programs at the pre-college consortium schools. Among the goals of the consortium are the following:
 - to lend academic support through the provision of both the educational resources and trained educators to build upon existing science programs and the development of new ones to foster environmental education.
 - to promote a cadre of role models and mentors as well as an area for the consortium schools and their faculty to interact with minority professionals in scientific and technical fields.
 - to initiate programs and provide the financial resources to attract students into technical fields with a specific directive towards environmental careers.

- The ET/WM Advisory Council met in March to draft an agenda and plan the first meeting of the ET/WM Pre-College Consortium which was held on March 17, 1992.

Faculty Development

- **Environmental Conference: "Solid Waste Dilemma: An agenda for Action."**
 - The ET/WM program, in conjunction with the Louisiana Department of Environmental Quality, East Baton Rouge Parish Recycling office, and Waste Management of North America, sponsored a university-based Environmental Conference on Saturday, March 28, 1992.
 - The conference dealt with issues regarding the Solid Waste Dilemma from both a local and national perspective. Conference participants included persons from local and state government, regulatory agencies, industry, and the university.
 - The topics presented during the conference included the following: Louisiana Perspective on Solid Waste Management, Waste Minimization, Recycling, Incineration, the Use of Land fills for Waste Disposal and the Various Land fills in East Baton Rouge Parish, Composting, Household Hazardous Waste, Environmental Responsibilities and the Role of Minority Communities and Institutions, Outreach in Environmental Restoration and Waste Management to Minority Communities, and the Southern University Recycling Program.
- Joan Miller, Acting Program Manager from AWU and Dr. Ruth Yaffe, from San Jose State University visited the Southern University Campus on May 24, 1992. The purpose of the visit was to confer with EMPAC faculty mentors and related ET/WM staff. Discussions centered on issues of student and high school teacher recruitment and general program plans for summer implementation. Additionally, EMCOM student proteges and faculty mentors participated in EMCOM discussions with Miller.
- The ET/WM staff participated in a fact finding meeting geared toward Environmental Equity in Louisiana. The initial session was held on February 19, 1992 and continued on February 20, 1992 at Louisiana State University. Issues discussed at the meeting included: identification of predominant environmental problems in

minority communities, environmental policies and practices in government and industry; and how they affect quality of experiences such as health, education, and well-being.

- **Alliance for Environmental Education Board of Directors Meeting:** The Southern University Center for Energy and Environmental Studies participated in the first Louisiana based board meeting of the Alliance for Environmental Education on February 10-11, 1992 at Louisiana State University. Dr. Ford made a presentation describing the environmental education effort at the Southern University Center which included many of the activities sponsored and administered through the four ET/WM program areas.
- Southern University has participated in a workshop co-sponsored by Bethune-Cookman College and the US EPA. The workshop was held during January 29-31, 1992 in Daytona Beach, Florida and dealt with the role of academic institutions in addressing problems as well as career and grant opportunities in the environmental field. The intent of the workshop was to get academic institutions involved in environmental education, research and policy decision-making process.
 - Dr. Robert L. Ford presented an overview of Southern University's Center for Energy Environmental Studies' activities, served as panelist to discuss the role of academic institutions in hazardous waste and site clean-up, and facilitated a small-group discussion. Drs. Nasrat Naqui (ETWM Faculty and Curriculum develop coordinator) and Talmadge Bursh also represented Southern University at the workshop.
- The ET/WM program initiated its Spring semester **Environmental Luncheon Series** on March 11, 1992. The Environmental Luncheon series provided an arena for the discussion of diverse Environmental topics that are local, national, and global in scope. The featured speaker for the first luncheon was Dan Carter, the Manager for Environmental Compliance and Evaluation at Westinghouse Hanford; the topic was "Environmental Remediation at the Hanford Site."
- The ET/WM program held a Seminar/Presentation on The Second Environmental Brown Bag Luncheon Program on April 15, 1992. Participants discussed Environmental Racism. Twenty-five (25) Faculty, staff, and students attended. The speaker was Dr. Florence Robinson, Professor, Department of Biology, Southern University

Curriculum Enhancement

- The Coordinator for Curriculum Enhancement and Faculty Development for the ET/WM program attended a Recycling Planners meeting at the University of New Orleans, Louisiana. The meeting was sponsored by the Louisiana Department of Environmental Quality. Seminar topics of particular ET/WM interest included: Perspectives in Recycling Internationally, Minority Outreach Programs, University Recycling, and Recycling and Energy Conservation.
- Two ET/WM staff members attended the Third Annual Women in Science Conference in Oak Ridge, Tennessee on March 5-6, 1992. The staff members were Dr. Nusrat Naqvi, Coordinator for the Curriculum Enhancement and Faculty Development Program and Malissa Bethly, a math/computer science major who serves as a clerical assistant for the ET/WM staff. Among the ET/WM related activities in which participants engaged included:
 - student paper/poster session regarding Environmental Research
 - Environmental Career Opportunities for women scientists
 - field visit to the Environmental Sciences Division of Oak Ridge National Laboratory
- The ET/WM staff were co-writers of a proposal submitted to the National Science Foundation requesting funding for a Summer Science Camp for middle school students. The proposed summer camp will be a 4-week half day non-residential program which will be composed of multi-disciplinary experiences to enhance science learning. The following are components of the program: chemistry and environmental science with an associated lab-component, computer science, engineering, math, computer usage, and communication skills.
- The ET/WM program coordinator, Karen Stephens, with the support of the ET/WM staff, has completed a proposal for submission to EPA under its Environmental Education Grants program. The title of the proposed program is "Enhancing Science Instruction Through Experimental Environmental Science;" and proposes a three-week summer science institute for twenty (20) upper elementary and middle school teachers in the Greater Baton Rouge metropolitan area.

Recruitment and Retention

- The Southern University ET/WM program held its ET/WM Student Paper/Poster Competition on Wednesday, February 22, 1992. The winner of the competition was Mr. Charles Bethley, an ET/WM CMCOM Scholar, and a senior enrolled in the University's dual Chemistry/Chemical Engineering program. The title of Mr. Bethley's winning paper is "Soil Characterization Study Relevant to Contaminant Migration." Mr. Bethley has also been chosen by the Environmental Careers Organization to attend the National Minority Environmental Career Conference in March of this year.
- The first meeting of the ET/WM Pre-College Consortium was held March 17, 1992. Attendees included principals and designated consortium representatives from schools nominated to comprise the consortium. The consortium schools, the principal and the consortium representatives are listed below:

School	Principal	Representative
Banks Elementary	Donald Dixon	Edith Smith
Capitol High	Lloyd Norwood	Willie Shorter
Crestworth Middle	Allen Spears	Sue Williams
Dalton Elementary	Alberta Jones	Gloria Murillo
Glen Oaks Middle	Darryl Hill	Clair Glasper
Harding Elementary	Katie Smith	Claudia Henderson
McKinley High	Charlie Thomas	Francis Slack
North Highlands Elem	Diane Aelire	Daphne Henderson
Progress Elementary	Loretta Burke	Veronica Watson
Ryan Elementary	Wilmer Jones	Lucille Yingling
Southern University Lab	Mattie Spears	Jonnalyn Nunnery

- College Career Day in Science and Technology was held on April 30, 1992. This was a joint cooperative venture between the Student Affiliate of the American Chemical Society, ET/WM and area industrial sponsors. There were 75 participants from area high schools. The program featured workshops, science demonstrations, forums, and industrial exhibits. The ET/WM program presented a \$500 scholarship to a senior from Glen Oaks High School in Baton Rouge, LA.

Outreach

- The first Recycling Advisory Committee meeting was held on Wednesday, March 13, 1992. The meeting featured a presentation

on Recycling and Waste Minimization by Waste Management of Baton Rouge. The focal point of the meeting was the organization of a workplan for implementation of the pilot program in the Science Complex. A faculty coordinator was designated, and two student co-coordinators who will be responsible for developing the final proposal soliciting funding for the program initiation.

- The ET/WM project director and steering committee member, Dr. Robert L. Ford in conjunction with AAAS staff submitted a proposal to EPA, entitled "Outreach in Environmental Restoration and Waste Management to Minority Communities." If funded, this Environmental Education Grant will be a consortium-wide effort to produce training materials for the Enviro-Links community initiative and to train precollege teachers, community-based organization members and college students to provide environmental education outreach to communities served by consortium member institutions.
- The ET/WM program, in conjunction with the Louisiana Department of Environmental Quality, East Baton Rouge Parish Recycling office, and Waste Management of North America sponsored a university-based Environmental Conference on Saturday, March 28, 1992. The title of the conference was "Solid Waste Dilemma: An agenda for Action." The conference dealt with issues regarding the Solid Waste Dilemma from both a local and national perspective. Conference participants included persons from local and state government, regulatory agencies, industry, and the university. The topics presented during the conference included the following: Louisiana Perspective on Solid Waste Management, Waste Minimization, Recycling, Incineration, the Use of Land Fills for Waste Disposal and the Various Land fills in East Baton Rouge Parish, Composting, Household Hazardous Waste, Environmental Responsibilities and the Role of Minority Communities and Institutions, Outreach in Environmental Restoration and Waste Management to Minority Communities, and the Southern University Recycling Program.
- The ET/WM and MUTECH programs, in conjunction with the Greater Baton Rouge Chapter of the National Organization for the Advancement of Black Chemists and Chemical Engineers (NOBCCChE) sponsored the first preliminary session of a Science Quiz Bowl in New Orleans, LA on Saturday, March 21, 1992. This preliminary competition was divided into two levels; Junior (grades 7-9) and Senior (grades 10-12), and featured approximately 9 teams that competed for first, second, and third place in these categories. The winners of this first semi-

final competition competed in the final competition that was held during the National NOBCCChE conference April 20-24, 1992 in New Orleans.

- The third program of the Race to Save the Planet seminar series was held on Tuesday, March 24, 1992. The title of this session was "Do We Really Want to Live This Way," and dealt with human activity and its relationship to the pollution of the air and water.
- The Community Learning Center is in its third week of operation and is housed at the University Laboratory School. In addition to teaching basic skills in computer usage, the ET/WM staff plans to incorporate Environmental education materials into the program for both student participants and parents. Currently the Center serves students K-2 daily between 4 pm and 5 pm, and grades 5-6 between 5 pm and 6 pm. The Center is operated by Patricia Ross, a computer literacy instructor at the laboratory school. Mrs. Ross is assisted by an undergraduate computer science major.
- **NOBCCChE National Conference** was held on April 20-24, 1992. 300 Professional scientists and engineers attended. More than 150 technical papers were presented. Three Environmental Technical sessions out of twenty total technical sessions were held, with twenty environmental related papers being presented. An Environmental Equity Symposium was hosted by CEES staff and included Warren Banks, Special Assistant to the EPA Administrator; Dan Borne, President of the Louisiana Chemical Association among a distinguished panel. The Symposium focused on recommendations from the recently released Draft EPA Environmental Equity Report.
 - 28 High/Middle School participants in the NOBCCChE National Science Fair and Quiz Bowl sponsored by ET/WM.
 - Four Quiz Bowl teams sponsored; two junior and two senior bowl teams; senior level team from Port Allen High School won 3rd place in National Quiz Bowl competition.
 - Sixteen Baton Rouge area students sponsored in science fair competition. Two of these were first place winners (one junior and one senior), two were second and third place winners, one junior and one senior, respectively.
 - Total ET/WM cost \$2,800.00 through corporate sponsorship.

- **Benefits:** Students interacted with minority scientists nationwide and gained expertise in oral presentation skills.

Earth Day Celebration co-sponsored by Southern University - CEES, Biology Department, Gulf Coast Tenant Organization, Southern Organizing Committee for Economic and Social Justice and the Louisiana Environmental Action Network.

- April 26-May 1, 1992, 1992
- **Title:** Saving an Endangered Species; Us
- Kick-off activities featured Rev. Dr. Benjamin Chavis as Principal Speaker and CEES Director as Master of Ceremony.
- ET/WM Project Coordinator served on Earth Day Planning Committee.
- Activities included student technical presentations, poster session, essay competition, and Earth Day Parade.
- *ECONET* - an Environmental Information Network by Kimberly McNeal, ET/WM Administrative Assistant, Senior Computer Science Major.
- *Soil Characterization Studies Relevant to Contaminant Migration at Pacific Northwest Laboratory Site* by Charles Bethley, EMCOM Scholar.
- On March 16, 1992, a Community Learning established by the Center for Energy and Environmental Studies became operational at Southern University Laboratory School. Dr. Press Robinson, Associate Vice Chancellor for Academic Affairs and the former president of the East Baton Rouge Parish School Board, conducted the initiation in the use of computers from 4-6 pm Monday through Friday. Dr. Nusrat Naqvi is serving as the coordinator, and Mrs. Patricia Ross as the instructor. The CLC constitutes an Outreach component of the ET/WM project.
- ET/WM provided co-sponsorship with several industrial sponsors for a **High School Career Day**, on April 30, 1992. ET/WM provided two \$500 scholarships.

PROJECTS UNDER CONSIDERATION FOR PLANNING AND IMPLEMENTATION

- **START Retreat** - A conference co-sponsored jointly by ET/WM and the Louisiana State Department of Education for 150 teachers statewide; emphasized curriculum enhancement and innovative methodologies and resource for science instruction.
- **Saturday Science Academy** - a joint project between the College of Education's National Youth Sports Program and ET/WM; a proposed weekly Saturday Academy utilizing Environmental Science modules to teach math and science beginning June 6, 1992.
- **Second Annual Summer Science Institute**, which started June 14, 1992.
- **Middle School SSI** - targeting fifteen middle school students from first generation college attending families; starting date June, 1992 for a 3-week, half day session
- **Community Learning Center** - on-going through Summer, 1992
 - summer session to begin June 8, 1992
- ET/WM to provide **Environmental Science Instruction** to SEA teacher institute
- **Summer Environmental Luncheon Series** convened June, 1992
- **Science and Engineering Alliance Teacher Institute**
 - teacher participants selected
 - Environmental Science/Chemistry curriculum development underway
- **EMPAC**
- **Pre-College Consortium**
 - essay contest complete; winning paper selected
 - student winners and awards/stipends were presented at Annual CEES Awards Program
 - ET/WM sponsored participants to the Jefferson Project Summer Enrichment Program

TEXAS A&I UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Texas A&I University is a part of the Texas A&M University System. TA&I's enrollment is approximately 5,900 students with Hispanic students comprising 57% of that figure and Black students making up about 4% of the student body. TA&I is the only predominantly Hispanic university in the U.S. with both engineering and agricultural colleges. There are two important sources of knowledge and expertise in the areas of environmental studies. The Colleges of Arts and Sciences, Education, Business Administration, and Graduate Studies make up the traditional areas of study and each of these have faculty and programs relating to environmental studies. College I, a non-traditional unit, serves the general undergraduate population and offers developmental courses and services.

The College of Engineering has a newly approved graduate (MS) program in Environmental Engineering that is interdisciplinary in scope with emphasis in air, water, hazardous/solid waste, product or employee safety. The program provides a way for degree holders in other engineering disciplines and the physical sciences to become better candidates for employment, of for currently employed professionals to upgrade their skills and knowledge in environmental concerns.

PROGRAM HIGHLIGHTS

This report documents the contributions of Texas A&I University (TA&IU) to the HBCU/MI Environmental Technology/Waste Management Consortium for the second fiscal year October 1, 1991 through September 30, 1992. This report includes seven (7) months actual activities.

Significant progress was made on TA&IU's objectives for the consortium during the year. Many of TA&IU's activities take place during the summer. The report is divided by the objectives of:

- Curriculum & Faculty development,
- Teacher Training Interaction w/2-Year and 4-year Colleges, and
- Outreach for Recruitment and Retention of Minorities.

Curriculum Development

Curriculum development and/or improvement for several graduate environmental engineering courses began during the summer.

- Mr. Rod Larson is developing the curriculum for Advanced Employee Health and Safety Design and further improve the curriculum for the Toxicology, Industrial Hygiene, and Product Safety Design courses.
- The further development of the curriculum for Solid/Hazardous Waste design was done by Dr. Ray N. Finch during the summer of 1992.
- A new course for Environmental Measurements is being jointly developed by Dr. Andrew Ernest, Mr. Rod Larson and Mrs. Denise Nutt.

Faculty Development

- The Environmental Engineering program recruited two new faculty during the 1992 academic year.
 - Mr. Rod Larson, a professor of toxicology and industrial hygiene, began in September 1991.
 - Dr.. Andrew Ernest, a professor of waste water treatment and water modeling began in January, 1992.
 - A third new faculty member is currently being recruited and should begin in September 1992. This new position will be responsible for teaching and research in air pollution control.
- The Technology Transfer Conference in Oak Ridge on July 8 through 10 was attended by Mr. Rod Larson. Planning was coordinated at this workshop for a future regional Technology Transfer Conference in South Texas.
- Dr. Ray N. Finch attended a workshop on environmental laws and regulations in Houston, Texas on May 13-15, 1992.

Minority Student Recruitment and Retention

Mr. Rod Larson coordinated a Junior College Bridge program on May 28 & 29, 1992. The program focused on second year science and pre-engineering students at various regional junior colleges in South Texas. Program content related to science majors included an overview of degree areas such as biology, chemistry, physics and geology. For engineering, the program provided an opportunity to become more aware of various aspects of engineering, such as environmental, chemical, civil, electrical, industrial, etc.. In addition to information on these types of degree areas, the program also provided insight into careers that can result from such degrees.

A total of twenty students have been awarded HBCU/MI scholarships through Texas A&I University during the 1991-92 academic year. These science and engineering students have performed well both in the classroom and in their environmental awareness projects participation.

The Honors Analytical Chemistry Program began classes during the summer of 1992. Dr. Mauro Castro is the mentor for this program which brings 20 high school students to the TA&IU campus for 8 weeks to learn quantitative analytical chemistry skills. Dr. Castro engaged two high school science teachers to work with the students in this program.

An Upward Bound program was held on TA&IU campus on February 15, 1992. Approximately 100 students in grades 8 through 12 and several teachers attended.

A JETS (Junior Engineers Technical Society - sponsored by TSPE) Testing and Competition Conference was held at TA&IU campus on March 3, 1992. Approximately 200 students in grades 9 through 12 took part in science, engineering, and math testing and competitions. Competitions included the Bridge "Truss Bust", the Egg Drop Contest, Soap Box Derby, etc.

Mr. Larson was a presenter at a South Texas Magnet school workshop on February 21, 1992 in Merida (between Harlingen and McAllen, Texas). A total of 60 eleventh grade students in groups of 20 students per session were given an overview of environmental engineering. The presentation discussed how the environmental health and science programs relate to the; the academic training involved and how to begin to prepare for a career related to environmental engineering; and the types of opportunities available to individuals with an education of this type.

Dr. Tom McGehee, Geosciences Department, and the student chapter of AIME constructed an environmental ground water display at the TA&IU library. This display will be used for outreach education in conjunction with the Texas Water Commission in the South Texas area.

Mr. Rod Larson, Denise Nutt, and others contributed to Highlands High School Science Workshop in San Antonio, Texas on June 8 - 12, 1992. Mr. Larson presented information on Toxicology, recombinant DNA, and Occupational Health. Ms. Nutt will be presenting information on analytical methods related to atomic absorption, electrophoresis, and gas chromatography. She will also be providing hands-on training on the operation of a gas chromatograph owned by the high school to applicable faculty. On June 12, students and faculty were given additional presentations in various laboratories at the Texas A&I University Campus.

A partnership has been established between Texas A&I University and the H.M. King High School. It is called Future Brahms Investigating Science. It meets every other month and involves 100 high school and elementary school students working together on science projects.

Dr. Patrick Carriere and several students are conducting a paper recycling program on the TA&IU campus.

Outreach Activities

- Mrs. Jo Ann Denkeler coordinated a television conference on Environmental Liability, Laws and Regulations in November, 1991. Ten people were in attendance including two local guest speakers.
- Mrs. Jorja Kimball attended the Rio Grande Valley Science Teacher Conference in McAllen, Texas in March for the counselors and teachers. This was a joint project between TA&IU, the Consortium, and Texas A&M University.
- A Science Teacher Workshop was held on the Texas A&I University campus on May 16. Five local school districts are participating with approximately 30 science teachers attending.
- The "Physics is Fun" program continues to be an outstanding success. approximately four workshops and 3,000 students have been involved so far this year. A method of tracking these students is being worked out with the schools.

- An Engineering Open House was held at TA&IU on February 8, 1992 for 80 students in the sixth through twelfth grades. These students toured the Environmental Engineering laboratories.
- Dr. Tom McGehee in conjunction with the student chapter of AIME at TA&IU is conducting a Geoscience program called "Rock Hounds" involving rock collecting. This program involves several levels of schools in south Texas. Approximately 400 students are involved.
- The Texas A&I Prep program was conducted for three weeks during the summer of 1992. This program enrolled approximately 60 high achieving students from grades 7 - 11 with an interest in learning about engineering and science professions. The objective of this program was to develop student's abstract reasoning and problem solving skills. Courses and topics which comprise the academic component include: Logic and Its Application to Mathematics, Introduction to Engineering, and Computer Science. As part of the program, the students performed some laboratory experiments in environmental science, hydraulics, soil mechanics, and robotics. Additionally, career opportunity presentations were made by faculty members and professional engineers from private industry.

TEXAS SOUTHERN UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Texas Southern University (TSU) is the oldest state supported institution of higher education in Houston, Texas. TSU is a comprehensive, historically black, urban university which was founded in 1927 and established as a state supported university in 1947. The mission of the University supports teaching, research, and public service. Texas Southern University offers courses through its four schools and three colleges leading to more than seventy undergraduate degree programs and more than thirty masters and doctoral degree programs.

Instructional and research objectives are achieved through faculty members in the seven schools and colleges. Sixty percent of the faculty members hold doctoral degrees and provide support for the seventy-six undergraduate and thirty-five graduate and professional academic programs offered to some 10,300 students.

The current profile of the student population, as of Spring 1991, shows an enrollment of forty-six percent male and fifty-four percent female, eighty percent of which are undergraduate students with the remaining twenty percent enrolled as graduate students. Texas Southern University is one of the most integrated institutions in the State of Texas, in terms of the student enrollment, faculty, and staff. Approximately seventy-five percent of the students are black of non-Hispanic origin; sixteen percent are foreign nationals; five percent Hispanics; three percent white of non-Hispanic origin; and one percent are Asians, American Indians, or Alaskan Natives.

In the area of science and technology, degrees are offered in biology, chemistry, computer science, mathematics, physics, pharmacy, health science, environmental technology and industrial technology. The University has developed significant programming in the area of environmental science and research. A major goal of such is to train scientists, in state-of-the-art research methods, who can ultimately discover solutions to the complex problems resulting from the imprudent actions of man on the natural environment.

RESEARCH INTEREST

Texas Southern University has a strong record of success in implementing grants and contracts awarded by the National Aeronautics and Space Administration, the Department of Defense, the National Science Foundation, the Department of Energy, the Environmental Protection

Agency, the Department of Housing and Urban Development, the National Institute of Health, and private foundations that focus on basic and applied research. Many efforts have been designed to promote and support the University's goals/objectives that through research and education in environmental science a contribution can be made toward the reduction and/or eradication of the harmful pollutants that threaten natural resources and the State's agricultural base. Further, Texas Southern University envisions that these efforts will give impetus to clean up efforts and ultimately to the elimination of hazardous waste dumps and other polluting sites which infest urban neighborhoods.

Texas Southern University is currently engaged in a significant number of on-going research and training programs in science, mathematics, and education. Some of these on-going studies include:

- coal liquefaction and related environmental effects;
- the development and conservation of Wadi El Raiyan Western, Egypt Desert;
- diverse environmental health issues;
- the production of molecular oxygen for jet propulsion in outer space;
- laser induced fluorescence;
- analysis of toxic elements and compounds in a closed environment;
- the study of waste water contaminants;
- the transport of heavy metals in the waste water process;
- receptor-bound toxicants as biomarkers for human exposure to environmental pollutants;
- the development of a radioreceptor assay to detect and measure environmental pollutants (insecticides) in the blood of exposed individuals;
- environmental analysis for civil and environmental engineering technology;
- community planning and development;
- catalytic conversion of coal to liquid fuels;

- an enumerative investigation on the species found in hydrocarbon compounds;
- an analysis of the affects of isolated hydrocarbons on vehicle exhaust pollution.

PROGRAM HIGHLIGHTS

Faculty and Curriculum Development

Texas Southern University is proposing to offer a Ph.D. program in environmental science that is unique to the State of Texas. The proposed program will be interdisciplinary and research oriented for the purpose of preparing scientist who are capable of studying the complex mechanisms by which pollutants act in the physical and living environments, the impact of pollutants on the environment and the effectiveness of policymaking, planning and the regulation of environmental resources by public and private agencies. This Ph.D. degree program is being proposed to help alleviate a national and local shortage of researchers in environmental science at a time when many major pollution sites have been identified in Texas an in other localities, and the threat of further damage to the air, water, soil, and biota appears to be imminent. Hence, Texas Southern University plans to address the need for qualified environmentalists who are prepared to study environmental problems from the perspective of a generalist. Program content will include environmental biology, environmental chemistry, environmental toxicology and environmental policy. Graduates will receive interdisciplinary training in these four most important disciplines of environmental studies.

Texas Southern University is planning to expand its environmental science program to encompass specific areas that are appropriate to the University mission. These areas will include:

- Summer program for high school students
- Tutorials in biology, and chemistry for college students
- Saturday tutorials for grades 10-12
- Motivational seminars by environmental scientists
- Field trips to industrial sites and universities for on site exposure to role models
- Preceptorships in research laboratories for advanced students

- Planning of symposia for high school and college students
- Tracking of students from grades K-12, college, and/or graduate school

In addition to developing curriculum materials as enrichment for science majors, the institution plans to develop a clearinghouse on data and materials related to effective graduate and undergraduate environmental science instruction.

Recruitment and Retention

During the academic year, tutorials were offered for the basic science courses to reinforce the students' academic preparations. The tutorials were offered beginning with the first year participants and extending through each succeeding year. An average of 50 to 60 students continue to be tutored weekly, many of whom seek tutorial assistance two or more times weekly. As a result of these and other efforts, students have increased understanding and interest in the science curriculums and have demonstrated measurable improvement in their coursework.

Funds are currently available in the HBCU/MI Consortium grant for student scholarships.

TSU ENVIRONMENTAL PROGRAMS

- **Environmental Health Club**

The Environmental Health Club is a Texas Southern University student organization working toward environmental change through education, awareness, and concrete action. Last year, club members planned a tree planting and recycling effort to celebrate the twentieth anniversary of Earth Day. As a result of these efforts, the Environment Health Club students were presented with a monetary award from the National Wildlife Federation. The Environmental Health Club continues to work on projects benefiting the campus and the surrounding community as well.

- **College Wide Recycling Program**

Community outreach and education were the two main thrusts of the 1991 recycling project initiated by the Environmental Health Club. While expanding on the existing campus-based recycling program, which won them one of the "Cool It!" merit awards in 1990, the students wanted to increase the community awareness around recycling while bridging some gaps between the campus and its neighboring community. As a result of the club's recycling initiatives,

the Environmental Health Club students serve as representatives of their district at the City of Houston's' recycling committee hearings and they monitor the progress of the program and the participation level in their community.

CURRICULUM DEVELOPMENT

Texas Southern University Environmental Health students participated in the following class field trips:

- Department of Solid Waste Management** (Fall 1990 and 1991)

Visited sanitary landfills, transfer stations, recycling centers, and departmental administration for a course in Solid Waste Management.

- BFI** (Spring 1991)

Visited medical waste management for a course in Hazardous Waste Management

- Anheuser Busch Brewery** (Spring 1991)

Visited all fermentation processes for a course in environmental microbiology.

- Harris County Mosquito Control** (Spring 1991)

Visited mosquito control lab and attended lecture on control strategy of St. Louis Encephalitis and yellow fever for a course in Insect and Vector Control.

- Houston Waste Water Treatment Plant** (Spring 1990)

Visited biological/chemical and physical treatment processes of municipal sewage for a course in sewage treatment and disposal.

- Air Pollution Control Division of Houston Health Department**

Studied monitoring for priority pollutants and administration for a course in air pollution and control.

- Private Environmental Lab** (Fall 1990)

Learned to appreciate entrepreneurial consultancy in environmental health and contract lab analysis of water, waste water, and asbestos for a course in environmental chemistry.

- Visited external sites** (Environmental majors)

The Environmental Career Conference (Washington, DC.; Atlanta, GA; and Oakland, CA

•**Agency for Toxic Substances and Disease Registry**
Environmental Contamination Conference, Atlanta, GA, 1990

•**Health Risk Assessment**, Atlanta, GA, 1991.

OUTREACH

SEC² -AP²

The Science and Engineering Career Awareness and College Preparatory Program (SEC² -AP²) has been operating for over a decade. The program was designed to prepare talented secondary students, especially talented minority students, for studying one of the physical sciences, computer science, or engineering at the university level. Seventh graders are selected based on grades and teacher recommendations. There are four levels of academic preparation during a six week summer workshop, including personal and career development sessions. The four instructional components by level include:

- Level 1:** Chemistry, Drafting, Computer Science (MS-DOS and popular MS-DOS-based software), Mathematics (Introductory Algebra), Reading/Study Skills, and Physics.
- Level 2:** Computer Science (UNIX), Drafting, Electronics, Mathematics (Intermediate Algebra and Geometry), Personal Growth and Development, and English Composition.
- Level 3:** Chemistry (college level), Computer Science (PASCAL programming), Mathematics (trigonometry), English Composition/Speech, SAT Review, and Physics (college level).
- Level 4:** Chemistry (college level), Computer Science (PASCAL programming), Mathematics (introductory calculus), Space Science, and Physics (college level).

By the completion of Level 4, students have computer programming skills in two computer languages (PASCAL and C) and are familiar with both the MS-DOS and UNIX operating systems. In addition, they are familiar with some of the software packages commonly utilized in business, industry, and science.

School Partnerships

Texas Southern University has formed articulation agreements with Houston Community College and twelve other community colleges in Texas. Through such agreements, students are encouraged to transfer and pursue majors in environmental science and other related fields. Plans were made to design a collaborative partnership with the Houston Independent School

District (HISD). The University has had a formal agreement with HISD to assume an educational leadership role in one HISD elementary school. Students will benefit from the expertise of professional faculty from liberal arts, sciences, and professional colleges; the physical resources of a college campus; the support of college student mentors and role models; and the leadership of the two institutions in creating a network of social services for the students, families, and community served.

Careers in Science

The Careers in Science project is another partnership between Texas Southern University and four elementary schools of the Houston Independent School District. The long term goal is to increase the number of ethnic minority students and women choosing careers in science (including environmental science) during the early school years. This effort is based on four premises:

- There is a direct positive correlation between pupil achievement in science and teacher commitment and content competence in science.
- Staff development is a viable tool for increasing the science competence of teachers who serve students in grades K-3.
- Maintaining high interest and raising performance levels in science during the early years alters the trend of lowered performance, generally evident by grade 3.
- Sustaining pupils' achievement in science at the elementary level is a foundation for increasing the pool of students who ultimately choose science careers.

TUSKEGEE UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Tuskegee University is a comprehensive university with strong research and teaching programs in scientific and technical areas. Currently, the university has an enrollment of 3,700 students. Tuskegee has enrolled more than 63,000 students during its 110 years of service. Undergraduate instruction at Tuskegee is organized under seven major areas: College of Arts and Sciences, School of Agriculture and Home Economics, Business, Education, Engineering and Architecture, Nursing, and Allied Health and Veterinary Medicine.

Graduate education leading to the Master's degree is offered in five of the seven major areas: College of Arts and Sciences, School of Agriculture and Home Economics, Business, Education, Engineering and Architecture, Nursing and Allied Health, and Veterinary Medicine.

Program areas of strength include engineering, chemistry, biology, physics, veterinary medicine, plant and soil sciences, environmental sciences, animal sciences, food and nutritional sciences. Strong programs in economics, business, and computer sciences complement the engineering and science disciplines.

Because of its collaborative, multi-disciplinary approach to research, Tuskegee is well suited to participate in research projects and training programs involving environmental restoration and other aspects of waste management. In its extensive animal research programs, Tuskegee is prepared to investigate the biological and behavioral aspects that accompany human exposure to pollutants.

PROGRAM HIGHLIGHTS

The campus-wide committee, Tuskegee University Environmental Technology and Waste Management Team (TEWT) is organized into five committees: Outreach, Undergraduate Education, Curriculum Development, Speakers Forum, and Recycling. An executive committee is made up of each committee chair, the Tuskegee University member of the consortium steering committee, and the project administrative assistant. These committees and TEWT meet monthly. TEWT membership includes faculty and staff from the following units: curriculum development, science education, biology, chemistry, agricultural sciences, veterinary medicine, chemical engineering, mechanical engineering, aerospace science engineering, electrical engineering, nursing, and business.

This report summarizes the activities of Tuskegee University HBCU/MI Environmental Technology and Waste Management Consortium for the fiscal year October 1, 1991 - September 30, 1992.

Curriculum and Faculty Development

- Tuskegee University has established a Hazardous Waste Management committee which, during the summer months, began to develop strategies and procedures on how to deal with hazardous waste materials.
- The university will be hiring an IPA from the Environmental Protection Agency to work with our Environmental Technology and Waste Management Team (TEWT).
- Faculty members, along with students in some cases, attended the following meetings, workshops, and/or seminars:
 - Waste Management and Technical Workshop at New Mexico Highlands University, September 1992
 - Graduate Education and Research Committee meeting at Florida Atlantic University, Miami February, 1992
 - Federal Reserve Bank Conference in Atlanta, GA in March 1992 which focused on environmental issues, pollution and resource management
 - Technology Transfer Committee meeting at HAZWRAP Offices, Oak Ridge, TN, January 1992. Plans were initiated for the committee to host a technology transfer symposium to involve universities, small minority businesses, governmental agencies and corporate bodies.
 - Steering Committee Program Review Meeting, Clark Atlanta University, January 1992
 - Contacts were established in December 1991 with the National Air and Radiation Environmental Laboratory (EPA), Montgomery, AL and with ADEM, Montgomery, AL. Both have agreed to make their staffs and laboratory facilities available to assist in program development
 - Joint Presidents' Council and Steering Committee meeting, UTEP, El Paso, TX, November 1991

- Two faculty members will incorporate the software, The "Exploring Chemistry" Series into the teaching of General Chemistry. Faculty members involved in this curriculum development feel that this series is a very powerful teaching tool.
- A symposium on the "Storage and Disposal of Laboratory Chemicals" has been rescheduled for summer 1992. Faculty members and speakers from large chemical companies will be involved.
- P. S. Gill continues to build on his expertise in hazardous waste management. This summer he and W. Lester coordinated the development of the hazardous waste management program which has been established at Tuskegee University.

Outreach

Tuskegee University offers the largest variety of precollege programs found at any school of its size as part of a comprehensive effort to identify, motivate, and prepare high school students to consider engineering and science careers. Some of the outreach programs described below have been in operation for 10-15 years. The combined programs served approximately 350 students during the 1991-92 school year. The Schools of Engineering and Architecture and the College of Arts and Sciences provide these precollege enrichment opportunities. Major funding for these programs was provided by a number of private sector corporations and the federal government, i.e., General Electric, AICOA, BP America, and NASA. Consortium dollars have allowed for the expansion and sometimes continuation of these efforts. These programs have been a powerful recruiting tool for the School of Engineering in particular. Of the 209 engineering freshmen, approximately half participated in one or more of these precollege programs. Faculty attribute the success of these programs to the skills building and motivational experiences provided which, moreover, may well be responsible for these students completing their course work in eight semesters and their increased likelihood to attend graduate school.

Programs in the School of Engineering and Architecture

- **The Saturday Science Academy**

This program has been operating for nearly five years and has been used by the university to recruit high school students into pre-engineering and other science programs. In 1991 the program served over 100 students. The students meet weekly from

September to May, 11:00 to noon. Tutorials are conducted by selected faculty and upper class students. Students who perform well in this program are chosen to participate in one of the programs listed below.

- **Research Apprenticeship for Disadvantaged High Schoolers (RADHS) and The Minority Introduction to Engineers (MITE)**

These are programs available to students who have completed their high school junior year. Two one-week MITE sessions are designed to expose students to various aspects of engineering and college life. The main features of the program are lectures and laboratory demonstrations by engineering faculty and alumni. RADHS is a residential, eight-week programming and computer-aided design. Seminars, guest lectures, field trips, and career counseling were additional features of RADHS. Each participant receives a \$1,000.00 stipend. Most students are from rural school systems and may not have had an opportunity to participate in this type of science enrichment.

- **Freshman Accelerated Start-Up and Training for Retention in Engineering Curricula (FASTREC)**

An eight-week summer program offered every year for high school graduates who are about to enter college. The students pursue an intensive program of study in English, Mathematics, and Engineering Graphics or Computer Programming.

- **Pre-Freshman Enrichment Program (PREP) I and II**

The pre-freshman Enrichment Programs I and II are four-day summer programs offered to sophomores and juniors from local high schools. As with other programs, they are recruited from the Saturday Science Academy Sessions.

PREP I and II offer instruction in mathematics, chemistry, physics, and engineering graphics. Laboratory sessions with tutorial support provide students with experience in experimentation, report writing, and problem solving. Student/faculty interaction provide opportunities for guidance in career selection. Guest lectures from alumni expand students' perceptions of career opportunities, especially regarding potential for women and opportunities to integrate multiple careers such as law and public administration with an engineering base.

Other Pre-College Programs

- **REACH-OUT (The Research Education Apprenticeship in Career Health Opportunities for University Training).**

This precollege program, administered by the College of Arts and

Sciences, serves from 20 to 25 eleventh and twelfth grade students annually. It was developed for high school students interested in biomedical sciences and the health professions. The emphasis is on research training and attempts to provide an opportunity for economically deprived youth to become aware of careers in biomedical research. Students are assigned for a seven-week period to a research faculty member to work on a specific research assignment. They are responsible for a final oral and written report of their summer research. This program is a major recruitment tool for the department of biology.

- **Space Grant Program**

Space Grant funds are shared jointly by the Schools of Agriculture and Home Economics and Engineering and Architecture. Space grant activities in Agriculture and Home Economics included visits by over 650 high school students and other interested parties to the Tuskegee/NASA Sweet potato Project. In the School of Engineering, these funds have been used to support lecture expenses, student stipends, and overnight trips to the NASA/Marshall Space Flight Center, Huntsville, AL.

During 1991, two additional opportunities arose for Tuskegee to motivate and inspire young people to consider science as a career. The School of Agriculture and Home Economics was selected by the Carnegie Science Center, Pittsburgh, PA to set up an exhibit on hydroponics using the sweet potato as a part of an expanded museum. Secondly, Kurtis Productions, Chicago, IL used our sweet potato research and researchers as part of their new television series -- "New Explorers". The primary goal of these programs is to capture a science story in a manner that is interesting to young people.

The Director of the Pre-College Programs in the School of Engineering credits the increased interest of minority students in graduate studies to these programs. Graduate program enrollment (MS) increased from 29 to 51 between the 1990-91 and 1991-92 school years. African American enrollment increased from eight to thirty-six.

Community Outreach

- **K-12 Outreach**

The curriculum guides in physical science and biology, inclusive of a solid waste curriculum supplement, were completed. Implementation of these guides will begin in the Fiscal Year 1992-1993.

The K-12 Outreach program continues to develop in science with courses in high school science to include hazardous waste components related to environmental and health issues.

Conferences were held with 7th and 8th grade Integrated Science Teachers. Workshops were conducted for all high school science teachers.

Four schools in Macon County have subscribed to the Integrated Science Program - CCET - at the University of Alabama for Fiscal Year 1992-93. Four teachers and 120 students enrolled for Integrated Science 7 and the same number for Integrated Science 8.

- **Water Quality Program**

The Water Testing Program implemented by the School of Agriculture and Home Economics (partially funded by the consortium) conducts water testing program for nitrates, lead, and iron for private wells and community water systems. In FY 92, approximately 500 samples of water from all over the state of Alabama were collected and tested. Graduate and undergraduate students in agriculture participated in the collection and testing of water samples. Pesticide testing in private wells is underway in two counties and the program is expected to extend to other counties in FY 93. Five meetings were conducted in the five rural counties to inform county agents and community leaders about pesticide and hazardous waste disposal.

UNIVERSITY OF TEXAS AT EL PASO

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

The University of Texas at El Paso, a component of the University of Texas System, is a comprehensive urban university with an enrollment of 16,520 students, 86 percent of whom are from the local area. El Paso is a rapidly growing community located in the center of the U.S.-Mexico border with a population of 550,000, over 70 percent of whom are Hispanic. Juarez, Mexico, El Paso's twin city, has a population estimated at 1.5 million, creating a metropolitan area of over 2 million inhabitants.

Almost 60 percent of the students at UTEP are Hispanic, making the University the largest Hispanic-majority educational institution in the continental United States. Moreover, it is estimated that at least 75 percent of students at UTEP are the first in their families to ever attend college. These characteristics make UTEP an ideal setting for developing programs that will guide Hispanic students into courses of study that lead to careers in environment-related fields.

DOE INFRASTRUCTURE AND MUTEK PROGAMS AT UTEP

The DOE-sponsored Infrastructure Program was established at the University of Texas at El Paso in October of 1987. The purpose of the program is to build the infrastructure required for the University's growing role as a regional center for energy and environment-related research and outreach activities. Important in this effort is the need to strengthen the University's ability to compete successfully for sponsored programs at both the state and national levels. Equally important is the desire to provide opportunities for students to participate in energy and environment-related programs.

Notable among the accomplishments to date as a result of the program are over \$4.5 million dollars in new, sponsored energy and environment research and outreach projects and the establishment of the UTEP Energy Center. Results include the opening of three satellite Energy Center offices; the establishment of the Center for Environmental Resource Management as an adjunct to the Energy Center; a new emphasis on wind and solar energy research; an MOA with Sandia National Laboratories; and a major expansion of outreach and retention programs with an energy/environmental emphasis.

PROGRAM HIGHLIGHTS

The ET/WM Program at UTEP is also operated in conjunction with the University's DOE-sponsored MUTECH program. The MUTECH program has many of the same objectives as the Environmental Technology program except that it focuses on developing the human resources needed to meet the energy supply challenges of the next decades. Funds from the MUTECH program are also used to provide partial support for the bridge program with El Paso Community College, the speakers program, and research assistantships in the energy area.

The Infrastructure Support Program has enabled the University to obtain energy and environment-related research grants and contracts that provide a broad base of opportunities for students in the ET/WM and MUTECH programs. The three programs operate in a synergistic manner providing results much greater than could be obtained by any one program alone.

The Environmental Technology and Waste Management Program (ET/WM) was established at the University of Texas at El Paso (UTEP) in October of 1990, with actual implementation beginning in January of 1991. The purpose of the program is to increase the number of engineers, scientists, technicians, and other professionals who are trained to address the nation's environmental restoration and waste management challenges. In order to achieve this objective, UTEP has implemented an integrated cluster of activities that serve as building blocks to form a progressive educational pipeline. The principal program elements are summarized as follows:

- Target students in grades 8 through 10 via a summer science/engineering institute to guide them into the University's technical programs.
- Provide support for the bridge program between UTEP and the El Paso Community College.
- Implement a comprehensive retention program to ensure that students remain in school and successfully pursue technical courses of study.
- Identify outstanding students and provide direct support for them to work on environment-related research programs in science and engineering at UTEP.
- Identify appropriate students and work to place them at DOE laboratories during the summer via the EMCOM program.

- Implement a role model speakers program to sensitize students to critical issues and to make them aware of environment-related career opportunities.

Each activity represents an important building block in a progressive effort to increase the human resources needed to meet the environmental challenges of the next decades. In addition, UTEP's ET/WM Program is working to develop appropriate curricula and provide faculty development opportunities to ensure that faculty will be able to provide students with the best education possible. Activities related to these objectives include:

- Environmental in-service training for area public school science and math teachers in conjunction with the Mayor's Environmental Roundtable, the El Paso City-County Health Unit, and UTEP's Energy Education Outreach Program.
- Support for faculty to participate in environment-related workshops, conferences, seminars, and other development activities.

Finally, program funds are being used to support a recycling project started in UTEP's College of Engineering and now being expanded campus-wide.

All program activities are coordinated by UTEP's interdisciplinary Center for Environmental Resource Management and operated in conjunction with the DOE-sponsored MUTECH and Energy Research Infrastructure Programs at the University.

Program highlights as they relate to the second year Milestone Log follow:

Program Management

- **Provide Program Personnel**

Co-principal investigators for the program are Dr. Stephen Riter, Dean of the College of Engineering and Director of the Center for Environmental Resource Management, and C. Wesley Leonard, Director of the Energy Center and Associate Director of the Center for Environmental Resource Management. The Steering Committee member is Dr. Charles Turner, Chairman of the Department of Civil Engineering. Dr. Diana Natalicio, President of the University, also serves as head of the

Consortium's Council of Presidents. Support for the above personnel, as well as for an administrative assistant, is provided through University matching funds.

Program funds are used to support an Outreach Coordinator on a 25 percent time basis. The Outreach Coordinator, Mr. Manuel Pacillas, a UTEP graduate, provides staff support for the Summer Science/Engineering Institute, the community college bridge program, the role model speakers program, and the SUCCESS retention program. He is also involved in a number of other related outreach and retention efforts. In addition, program funds are used to support two graduate students and one undergraduate student to work on the speakers program, the recycling program and on outreach/retention efforts.

Curriculum and Faculty Development

- **Provide Consortium support for faculty to participate in development activities, short courses workshops**

Dr. Peter Golding, Associate Professor in the Department of Mechanical and Industrial Engineering, has been provided support to develop a new interdisciplinary environmental course that addresses the concerns of environmental restoration and waste management. This new course will look at issues such as environmental policy analysis and risk assessment, toxicology, allied health and industrial hygiene, environmental remediation, and hazardous materials management, from a technical, as well as a social and ethical viewpoint. Dr. Golding is also conducting a University-wide review and analysis of the various curricula and course descriptions in order to determine the existing amount and quality of attention given to environmental issues. He is using this data to provide information to the University on how to infuse the existing curriculum with environmental topics. The University core curriculum committee is discussing approval of this new course, which would be added to the core curriculum. Dr. Golding participated in the HBCU/MI Curriculum Development Workshop at Jackson State University, in Jackson, Mississippi, on June 5-7, 1991, and is chairman of an ad hoc committee that is advising the core curriculum committee on how best to infuse environmental concerns into the University proposed core curriculum.

The University is continuing with its plan to conduct an EPA-approved course on hazardous materials handling and safety during the 1992-1993 academic year. Two faculty members are

certified to teach the course. This activity will be conducted in conjunction with the Southwest Center for Environmental Research and Policy, a consortium of several southwestern U.S. and Mexican universities that focus on border-related environmental issues.

- **Provide Consortium support to recruit new environmental faculty**

This activity will be deferred until an appropriate line is available in the University's budget.

- **Provide role model speakers and travel opportunities for faculty and students in the environmental area**

- The first speaker was Dr. Diana Natalicio, President of the University of Texas at El Paso. Dr. Natalicio spoke on the role of the university in addressing the energy and environmental problems that challenge the region and the nation. She also spoke of the need for students who are studying science and engineering to develop the verbal skills that will enable them to be effective in communicating their ideas to non-technical sectors of the community.
- The second speaker was Dr. Kurt Hohenemser, Professor Emeritus of Mechanical Engineering at Washington University. Dr. Hohenemser spoke on developments in rotor blade technology for wind generators. Dr. Hohenemser was especially appropriate for the many students who are working as research assistants on wind energy projects at the university.
- The third speaker was Hector Villa, a UTEP graduate who heads the El Paso Regional Office of the Texas Water Commission. Mr. Villa spoke about the environmental impact of the free trade agreement on the border region. He discussed the need for a more comprehensive Integrated Environmental Plan for the Border than the one proposed by EPA and SEDUE.
- The fourth speaker was Dr. Laurance Nickey, Director of the El Paso City/County Health Department. Dr. Nickey presented a lecture on border environmental issues. He spoke about the relationship of environmental problems to border health problems and explained how, for example,

lack of sewage treatment and potable water promotes the spread of diseases such as cholera and hepatitis.

- The fifth speaker was Michael Shepard of the Rocky Mountain Institute. Mr. Shepard spoke about the potential for saving energy through national policy changes and the implications for national security that could result from these changes. He also gave specific advice on how individuals could save energy in their own homes and businesses.
- The sixth speaker was Dr. Andrew Swift, Assistant Dean for Research and Director of the Solar Pond Project at the University of Texas at El Paso. Dr. Swift spoke of the environmental constraints for energy utilization.
- The final speaker for FY 92 was Dr. Frederick Pohland of the University of Pittsburgh. Dr. Pohland's lecture was titled "Fundamental Principles and Practical Implications of Controlled Landfills for Waste Management and in situ Stabilization." The main emphasis of the lecture was on reducing the stabilization period of a controlled landfill by recirculation of the liquid leachates.
- Program funds have been used to support travel by University faculty to environment-related professional meetings, conferences, and to government agencies, such as EPA, to discuss UTEP environmental research programs.

Recruitment and Retention

- **Conduct a summer science/engineering institute with an environmental focus for students in grades 8 through 10**

The summer/science engineering institute is designed to introduce high potential students from grades 8 through 10 to environment and engineering careers, and is the longest running pre-college program offered by the University. During the summer of 1991, the Institute brought 315 students to the UTEP campus to participate in various activities, laboratories, competitions, and field trips. The program is comprised of three, two-week sessions and is conducted by faculty and undergraduate engineering and science students. The objective of the program is to motivate and inform students about the possibilities that exist when selecting a technical career track.

Utilizing a "high touch + high tech = new interest" formula, the Institute introduces young students to the world of technical careers through participatory activities. Innovations for the summer of 1991 included sections on urban planning and alternative energy. Over 320 students participated in this program during the summer of 1992.

- **Provide research opportunities and direct support for minority students in environmental studies**

One of the most critical elements of the ET/WM program at UTEP is support for students to work as research assistants on environment related projects. Most students at UTEP must work to supplement their income in order to remain in school. These students are frequently forced to take off-campus jobs totally unrelated to their studies. Research stipends thus provide both needed financial support and also exposure to actual environment-related projects. The experience at UTEP has demonstrated that the one-to-one relationship between student and professor is the single major factor in stimulating students to continue their education. All students at UTEP who have been provided research stipends are either progressing satisfactorily as undergraduates, are enrolled in graduate school, or have graduated and are appropriately employed. Stipend students report that their work on research projects is helpful in their classroom work, as well. Frequently, problems encountered and principles used in research projects are ones that are later studied in the classroom. This "real world" experience makes the academic work much easier to understand and comprehend.

Two of the students who received Consortium support during the past year have been awarded EMCOM Fellowships through the Associated Western Universities (AWU), and two have graduated and are employed. Another, Melida Gutierrez, received her Ph.D. in Environmental Engineering/Geology in the summer of 1992.

The two who have EMCOM fellowships are Ana Maria Castillo who will work at Pacific Northwest Laboratories, and Adriana Ybarra who will work at the National Renewable Energy Laboratory (NREL) during this summer. The two who have graduated are Alfredo Magallanes who has accepted a position with the Department of Sanitation of the City of Los Angeles and Mike Paganini who is employed by JBL in Northridge, California.

- **Implement a comprehensive minority retention program for science/engineering students**

The Engineering SUCCESS Program is designed to help incoming freshmen make the critical transition into technical studies at the University. This program is particularly important given the nature of the student body at UTEP--a commuter campus with a 65 percent minority population, most of whom are the first in their family to attend a university. It is against this backdrop that the Engineering SUCCESS Program is set. The program comprises:

- **Summer Engineering Orientation** - This program begins with a two-day residential experience for incoming students. For the participants, this is a unique opportunity to experience the full range of campus activities and may be the only time during their academic career that they will be completely away from their home environment and its responsibilities. The objective of the orientation is to begin forming interdependent communities of engineering students. In addition to team building activities, the students are tested and then advised for classes on the basis of their scores by faculty and upper-division engineering students.
- **Summer Engineering Enrichment Experience (SEEE)** - Following advising, the students participate in a six-week intensive enrichment experience designed to bridge the academic and sociological gap between their high school/home experience and the university environment. The program, which runs five hours per day, five days per week, consists of college math, engineering design, and academic gamesmanship. Instructors and team leaders are drawn from the faculty and the engineering student organizations. Since appropriate math placement in the initial semester of engineering studies is critical to student success, participants take the placement examinations once more at the end of the program. Each student's fall course schedule is then determined on the basis of the final test scores. As a result of the program, 62 percent of the participants have placed into a math course at least one level higher than their initial exam indicated. Currently, the initial two cohort groups are being studied to correlate final placement

against a number of variables including number and type of high school courses, high school, and socioeconomic factors.

- **Introduction to Engineering** - The initial cohort group of students was placed into an interdisciplinary Introduction to Engineering course that, in addition to engineering fundamentals, involved students in a range of activities designed to give them a clear picture of the opportunities that exist and the background required for each engineering field. An additional course objective was the development of study, personal, and presentation skills. The advent of this introductory course has caused the College to reevaluate its entry level curriculum. As a result, a team of faculty members is in the process of designing a new, two-part fundamentals of engineering course sequence that delivers both technical and personal development material.
- **Academic Workshops and Tutoring** - A series of workshops paralleling Calculus I were piloted on a sign-up basis. Conducted by upper-division engineering students, the workshops developed the mathematical concepts presented in the classroom and facilitated student study teams. The 29 students who participated and missed less than three workshops achieved grades of 3.0/4 or above. The workshop format generated a great deal of interest in the Math Department.
- **Academic and Personal Advising** - The students who participated in the SEEE were clustered into their math and engineering classes to foster team-building. The course schedule and an action plan were developed by each student with the assistance of faculty and upper-division peer counselors.

• **Results**

The average GPA for the students ($n = 107$) who have gone through the program is 3.02 ($1\sim = 1.01$, $1\sim+ = 0.25$) versus an average GPA of 2.34 for non-program students.

More importantly than the preliminary results, systemic changes are occurring as a result of the initial activities:

- Space has been allocated for a student study center--the Engineering Excellence Study Center (EESC). The EESC is centrally located next door to the Dean's office and serves as a hub for undergraduate activities, including academic workshops, tutoring, professional development programming, engineering, and technical reference materials. Over three-fourths of the services (e.g. tutoring, faculty assistance, and peer advising) offered through the facility are done on a voluntary basis by engineering faculty and student engineering honor societies.
- The College is in the process of crafting a comprehensive "Fundamentals of Engineering" course modeled on the Introduction to Engineering course offered to the SUCCESS participants. In addition to engineering design, the course will teach computer problem solving and field experiences aimed at heightening awareness of career options. Study skills will be incorporated into the course. The course is expected to be a two-semester (8 credit hours) sequence and will replace the current disciplinary introductory courses and FORTRAN.
- The College of Engineering and the Math Department are working closely together to develop workshop content for calculus and precalculus, how the workshops will be attached to a course, measurements and grading, etc.
- The College has introduced Peer Advising/Counseling to all the incoming freshmen. While some mechanical problems still exist (e.g. peer advisors not being informed of prerequisite changes or waivers), the system appears to be sound.
- The College is examining the efficacy of offering an engineering specific orientation to all incoming freshmen.
- The College will introduce a new student classification that gives students well-defined benchmarks. The classification will identify students as pre-engineers, lower division engineers, and discipline-specific engineers (e.g. mechanical, electrical, etc.). Each division will have its own prescriptive set of activities that support

advancement to the next benchmark. Additionally, the system will promote timely intervention and measurement.

Eighty two students are participating in the SUCCESS program during the current academic year. Approximately 100 new participants were added during the summer of 1992.

- **Provide mentors for students in the minority retention program**

The Consortium is currently providing support for one graduate student to work as a mentor for the undergraduates. This student serves as a peer mentor who tutors and encourages undergraduates in the program to remain in school and successfully pursue their courses of study. The student mentor also works on the role model speaker's program.

Outreach

- **Provide partial support for an outreach coordinator to assist in the implementation of outreach/retention activities**

Mr. Manuel Pacillas, Director of Engineering Programs, serves as outreach coordinator for the program on a 25 percent time basis. He is responsible for the summer science/engineering institute, the SUCCESS retention program, the community college bridge, and the role model speakers program. In addition to these responsibilities, Mr. Pacillas also administers the programs described below which operate as adjuncts to the Consortium-sponsored activities:

- **Engineering Mini-Camp** - Targeted at high potential, disadvantaged youths, the Engineering Mini-Camp brings students to the UTEP campus for design-oriented activities. In addition to introducing the students to engineering, environment, energy, and scientific careers, students are advised of the educational requirements for entry into engineering studies. Participants are linked to undergraduate engineering students who act as role models during this critical and formative time in their lives. With the aim of developing a sense of possibility, students are introduced to engineering challenges through activities ranging from creating innovative low-tech solutions, such as solar ovens,

to high-tech computer-aided manufacturing. The 1991 Mini-Camp included three more sessions than previous years' and involved 140 seventh grade students.

- **Parent's Brown Bag Forums** - Recognizing the important role informed parents play in guiding students into technical fields, a series of lunch-time information sessions (conducted in English and Spanish) are offered to the parents of middle and high school students. Information is provided on the selection of high school courses, entrance examinations, paying for college, selecting a university, and career options. During the current year, the Parents program, which is conducted by undergraduate engineering students, has been taken to off-campus sites throughout the El Paso metropolitan area in an effort to reach a larger audience.
- **Science Fair Partners** - In partnership with the Ysleta and Socorro Independent School Districts, the Science Fair Partners program sends undergraduate engineering and science majors to area high schools to work closely with students in the selection, design, research, and construction of science fair projects. This activity affords UTEP students the opportunity to develop and practice newly learned academic skills, while creating a social bridge to higher education for young students. Science coordinators and instructors have attributed the growth of engineering and energy/environmental projects to the Science Fair Partners program.
- **Promotion and Awareness of Careers in Engineering/Science (PACE)** - PACE is a Saturday program offered at middle schools in the disadvantaged, primarily Hispanic parts of El Paso County by the Mexican American Engineering Society - Student Chapter. Designed as an early intervention program, PACE demonstrates for young students the opportunities an education will afford them and serves as a springboard for introducing students to the Engineering Mini-Camp and summer science/engineering institute.
- **Enhance the existing bridge program with El Paso Community College by providing support for bridge students in the environmental area**

Twenty seven El Paso Community College students enrolled at UTEP for the 1991 Summer session through the

summer bridge program. One student dropped in the second week of classes and the remaining twenty-six successfully completed the Summer session. Of the twenty-six students who graduated from the summer bridge program, sixteen students are engineering majors, and ten are science majors. Through summer bridge program grants, twelve students participated in work related to their field during the summer session. Of these students, six are science majors and the other six are engineering majors. Twenty-two of the Bridge students are currently enrolled at UTEP, while the other four are still at El Paso Community College working to complete their eligibility for transfer. Summer Bridge students now enrolled at UTEP include: Sonja Bonham, Elizabeth Casas, Maria Castillo, Ana Lourdes L. Cenicerros, Robert Louis Cervantes, Marlo Chavez Jr., Oscar A. Contreras, Lourdes Fernandez, Jerry Flores, Sandra Dawn Goldsmith, Elizabeth Lares, Leticia Monsivais, Aura G. Mora, Patricia Perez, Daniel Polanco, Monica Irene Prieto, Sebastian Quijano, Sandra Ramirez, Patricia A. Robali, Diana Lynn Roddy, Veronica Salgado, and Xavier V. Torres.

- **Develop and provide an environment-oriented in-service training for public school teachers in conjunction with other local programs**

A highly acclaimed environmental curriculum for the El Paso Public Schools, entitled "Living on the Desert: Conserving our Natural Resources," has been developed using other funding sources. The curriculum is designed to inspire children to conserve, appreciate, and protect the environment in which El Paso is located. UTEP is providing the lead in a joint effort to use this material to teach the teachers to teach the children about environmental concerns.

Program staff is working with the Education Subcommittee of the Mayor's Environmental Roundtable to conduct a mass in-service workshop and environmental seminar for area math and science teachers in mid October, 1992. The event will be held on the UTEP campus, and it is designed as a day-long event which will entitle participants to career ladder advanced academic training credits. Speakers will be nationally prominent celebrities active in environmental causes, including the actor Dennis Weaver, and local and regional experts who can address issues relating to education and environmental concerns.

- **Support and enhance university recycling efforts**

The Consortium is providing support for an undergraduate student to develop and implement a recycling program in the College of Engineering, which is to be used as a model for a University-wide program. Recycling containers have been placed in central areas in all departments in the College of Engineering, and collection of cardboard, white paper, computer papers, and aluminum has been underway for the past year.

It is clear that the ET/WM Program is having a very significant impact at UTEP. There is a growing list of accomplishments that have come about as a direct result of the support provided by the program. There are numerous students involved in environment-related research and outreach/retention projects. Moreover, these projects are producing results that may provide solutions to the environmental challenges of the future. Most importantly, the human resources are being developed that will provide the scientists and engineers to meet the growing demand in this critical area. Especially important are the educational opportunities being afforded to Hispanic youth, who represent one of the most underrepresented, but fastest growing segments of the U.S. population. Bringing this population into the mainstream is vitally important in the Southwest border region in which UTEP is located. The ET/WM Program is providing the resources that are making our continued success in these endeavors possible. We are grateful for the support provided to this point, and we look forward to reporting on further progress in the future.

XAVIER UNIVERSITY

1991-1992

ANNUAL PERFORMANCE REPORT

INTRODUCTION

Xavier University is an historically black, liberal arts university composed of a College of Arts and Sciences, a College of Pharmacy, and a Graduate School. In the last 10 years, Xavier has had a dramatic increase in the number of students interested in the sciences and is now a leader in the education of minority youth in the fields of science and engineering.

The University is currently composed of three academic divisions: The College of Arts and Sciences, the Graduate School, and the College of Pharmacy. The University's current enrollment is 2,600 which includes 90% from the black population and 10% from other ethnic groups.

PROGRAM HIGHLIGHTS

The Center for Environmental Programs (CEP) has been established to develop an environmental education program. The CEP's mission is multifaceted:

- to promote environmental literacy among university and precollege students;
- to establish pre-professional programs that help train environmental experts;
- to promote environmental careers and graduate education in environmental restoration and management areas among African-American youth;
- to facilitate faculty/student research efforts in the areas of environmental technology and waste management; and
- to network with others to provide information and education to the community, in a variety of cultural contexts, through community awareness seminars and workshops.

In meeting this mission through its various programs, the CEP affords the student the ability to think both critically and creatively, to develop a system of personal values, and to understand the psychological, social, economic, and political forces which move and shape the environment in which the student lives.

Program Management

The administrative component of the second year of the ER/WM Program at Xavier was focused upon completing the development of an infrastructure for management of environmental programs. An effective and efficient administrative structure is now in place that concentrates on program development, precollege and community outreach networking, encouragement of environmental research and training development among the faculty, and environmental curriculum enhancement in the areas of environmental restoration and waste management.

The administrative structure, which is housed in the CEP includes a Director, a Program Assistant, and several student assistants. The CEP maintains an Advisory Board which consists of a total of 16 faculty from the departments of Chemistry, Biology, Philosophy, English, Economics & Business Administration, Political Science, Sociology, Religious Studies, Library Administration, and the College of Pharmacy. This Advisory Board was instrumental in setting the basic framework for tasks to be implemented during the first year of DOE funding. In 1991-92 the Advisory Board met a total of five (5) times to advise on direction of the CEP, recommend program development activities, and provide guidance to the Director on specific issues.

During 1991-92 the CEP published a total of six (6) newsletters that were circulated to Xavier faculty and research staff, local environmental groups and governmental agencies, and to other member institutions of the HBCU/MI Consortium. These newsletters ("Xavier EnviroNews") were published in December 1991, January 1992, March 1992, April 1992, June 1992, and August 1992. The circulation of each issue of this newsletter presently exceeds 500 copies.

The CEP Director spent a significant portion of his time during 1991-1992 investigating and seeking additional support to supplement US DOE funding for environmental restoration and waste management program activities. For example, a proposal was submitted to the US Environmental Protection agency and funded in the form of a cooperative agreement between Xavier University and the EPA's Gulf Breeze Environmental Research Laboratory to enhance environmental education at Xavier. As part of this agreement, four scholarships will be made available for Xavier Juniors to become involved in environmental research. This research will include work with a faculty mentor at Xavier and a summer research experience at the Gulf Breeze EPA Laboratory in Florida. This funding will serve as matching funds to our 1992-93 DOE request.

Recruitment and Retention

• Precollege Programs

The Xavier University Center for Environmental Programs has begun a long-term networking effort with Orleans Parish District schools to enhance environmental education at the precollege level. In order to promote Xavier's intentions in reaching out to local schools the CEP hosted the visit of Dr. Jack Vallentyne, also known as "Johnny Biosphere," from the Department of Fisheries & Oceans, Environment Canada, Burlington, Ontario, Canada in February 1992. Dr. Vallentyne visited three New Orleans Parish Schools to talk to students. These schools included Livingston Middle School, Lusher Elementary, and Williams Middle School. Dr. Vallentyne uses "Johnny Biosphere" as part of a carefully considered mission: making himself conspicuous to help spread the message that humans must adopt new ways of thinking and acting if the biosphere - the thin layer of land, air, and water inhabited by all living things - is to continue to support life.

Xavier University has been focusing upon the precollege student for a number of years and processes a long and successful history of linkage to minority high school students through its Summer Science Academy. Each year Xavier conducts a summer bridge program entitled SOAR (Stress On Analytical Reasoning), a cooperative effort of many departments on campus, that offers a variety of precollege programs to high school juniors and seniors interested in everything from humanities, to science, to computers. Other problem-solving based programs in the Summer Science Academy help younger students prepare for their first high school chemistry, biology, and algebra courses. There are a total of six of these summer programs which together constitute an educational pathway leading into one of Xavier's undergraduate science programs, and terminating when students obtain a science-related degree from Xavier.

The CEP is working with summer program faculty to investigate an acceptable mechanism for establishing an environmental studies emphasis in those summer programs that already exist at Xavier. Although present summer program syllabi include a small amount of exposure to environmental issues, discussions are now focused upon investigating how more environmental emphasis might be included. Plans were implemented in 1991-92 to infuse environmental components into existing summer programs and to set goals for recruiting students into ER/WM careers. For example, in the Summer 1992 EXCEL Program, several environmental field trips have been scheduled for the student participants and there has been an effort by EXCEL faculty to infuse environmental content (e.g., point - counterpoint exercises and critical thinking activities) into the existing syllabus. The intent of

targeting the existing summer programs with environmental infusion efforts is to afford immediate and direct access for Xavier to begin providing environmental education to high school students, prior to their enrollment at an undergraduate institution, that will help direct those interested into an educational program that might meet their desires for an environmental career.

In the spirit of encouraging African American students to pursue environmental careers, the Xavier CEP cooperated with the Louisiana Science & Engineering Fair program in the Spring of 1991 to stimulate students with a general interest in science to attend Xavier University. The judges in the senior categories of environmental science, behavioral and social science, and zoology were asked to identify a project to be acknowledged for its outstanding merit. The CEP, on behalf of Xavier University, and with funding from the U. S. Department of Energy through the HBCU/MI Consortium, awarded a scholarship of \$200 and a cash prize of \$25 to Ms. Charlotte Kerley, a high school student at McDonogh 35 High School in New Orleans. Ms. Kerley participated in the state level Louisiana Science & Engineering Fair Competition in Baton Rouge, LA. She submitted a project entitled "**Phaseolus vulgaris**: **What are the Best Conditions to Increase the Rate of Germination**" that demonstrated the determination of differing environmental effects on plant growth. As the student author of this project, Ms. Kerley was awarded the scholarship and cash award during the Saturday award ceremonies at the state-level competition. She began her matriculation at Xavier University Fall 1992.

- **Undergraduate Student Programs**

The CEP instituted an **Environmental Studies Seminar Series** in 1991-92. The series includes at least one university-wide seminar a month during the school year. Some of the speakers and topics in this seminar series during 1991-92 included the following:

- Mr. Lenny Kohm, a nationally known conservationist and freelance photographer, presented a seminar on "**THE LAST GREAT WILDERNESS**". The presentation featured a multi-media slide show offering a close-up look at the fragile and beautiful Arctic National Wildlife Refuge in Alaska. The 90 minute also featured discussions on the controversy over oil development verses wilderness protection of the Refuge's coastal plain.
- Dr. Warren Banks, Special Assistant to the Administrator of the Environmental Protection Agency in Washington, DC, spoke on the topic of "**MINORITY INVOLVEMENT IN THE**

ENVIRONMENT". His discussion focused upon the importance of minority employment in environmental fields and the issue of environmental equity.

- Mr. Dan Carter of Westinghouse Hanford in Richland, Washington spoke on **"ENVIRONMENTAL REMEDIATION AT THE HANFORD DOE SITE"**. During Mr. Carter's visit to Xavier, he also met with a number of Xavier senior science majors that are interested in environmental careers.
- Dr. Stephen Lien, Director of the DOE Office of Research & Development, Washington, DC. spoke on the **"DOE'S ENVIRONMENTAL RESTORATION and WASTE MANAGEMENT PROGRAM."** During the presentation, he emphasized the need for new graduates to enter the DOE ER/WM work force.

The DOE worked with many different student groups on the Xavier campus to encourage special programs on environmental topics. For example, the issue of environmental justice has become a highly debated topic around the U.S. Environmental justice refers to the rights of all people to benefit equitably from the environment and to be equally protected from the effects of degradation which result from human use and abuse of the environment. Delta Sigma Theta Sorority and the CEP co-sponsored an evening forum on **"ENVIRONMENTAL JUSTICE"**. This forum involved a panel discussion of the unequal exposure of environmental pollution to minority populations. Faculty, students, and members of the general community were invited to attend and participate in the discussions that occurred between a student panel and a panel of experts.

Three students at Xavier University, who hold Environmental Management Career Opportunities for Minorities (EMCOM) scholarships, presented papers at the San Francisco American Chemical Society (ACS) Meetings, April 5-10, 1992.

- Alexandra Zippert, an EMCOM scholar from Xavier's Physics Department, made a presentation at the ACS meetings entitled **"The Effect of Ligands on the Corrosion of Copper in Phosphate Solutions"**. Co-authors on this paper were another student, William Jones, and Ms. Zippert's faculty mentor, Dr. Sally O'Connor from the Xavier Chemistry Department.
- William Washington and Crystal Lewis, EMCOM scholars from Xavier's Chemistry Department, also made a

presentation at the ACS meetings entitled "Flow Injection Analysis with Electrochemical Detection for Monitoring Silver in Industrial Waste Water". This paper was also co-authored by the students' faculty mentor, Ms. Megan McLean from the Xavier Chemistry Department, and Dr. Terry Tougas from the Polaroid Corporation, Waltham MA.

Two Xavier University students attended the *National Minority Environmental Career Conference* held in Atlanta Georgia from March 21 to March 24, 1992. Alexandra Zippert, major, and Rosalind Green, a biology major, were selected to attend this conference through a national competition that was conducted this past winter by the CEIP Fund out of Boston, MA. This activity was sponsored by the Environmental Careers Organization of Boston. Since Alexandra and Rosalind were selected to attend the conference, they also become eligible for a separate competition to be selected as Minority Environmental Summer Associates. If selected for this opportunity, they would be offered a summer experience at a national research laboratory.

The CEP sponsored a *Student Environmental Colloquia* in the Spring of 1992 that highlighted the accomplishments of Xavier University student researchers both in the EMCOM Scholarship program and other scholarship/research programs in which Xavier University participates. The titles of the presentations for the Spring 1992 Student Environmental Colloquium were:

- **Alexandra Zippert** - The Effects of Ligands on the Corrosion of Copper in Phosphate Solutions
- **William Washington & Crystal Lewis** - Flow Injection Analysis with Electrochemical Detection for Monitoring Silver in Industrial Waste Water
- **Linda Reddick** - Specific Biological Effects of an Anti-Rat Antiserum Intraperitoneally Injected Into F344/N Rats

Xavier University sponsored a number of activities during its annual Earth Week observance in April 1992. The following is a listing of those activities:

- Environmental Skit Contest
- Earth Week Poster Competition for St. Marks and W.C.C. Claiborne Elementary School Students
- Planting of Trees and Flowers at Xavier
- Environmental Poem Recital

- Film Showing on Recycling and Energy Conservation
- Paper Drive
- Earth Picnic in the Squad

Faculty & Curriculum Development

Xavier has begun a process of strategic analysis and planning to formulate a specific research direction and community outreach that will attain national eminence in environmental education for the University. Assessment of institutional strengths included the conduct of a university-wide retreat that provided an opportunity for faculty at Xavier to share their perspectives on environmental education and to discuss appropriate strategies for implementing environmental education at the University. More than forty faculty attended the Retreat and eight internationally recognized guest speakers were invited to share their experiences on environmental education through panel discussions. Participants were asked to express their grandest ideas on an environmental education vision, as well as in the design of goals and objectives, to guide the University forward. All who participated reaffirmed their commitment to advancing environmental education at Xavier University.

A Report presenting the recommendations and conclusions of this Environmental Education Retreat was produced in May 1992. The environmental education vision and goals that were developed by all who participated in the Retreat are presented in this report and summarized here. These statements were crafted from the collective deliberation of several participant work groups that independently discussed concepts and perspectives, and then presented their conclusions and recommendations to all Retreat participants for synthesis and agreement. Consensus was achieved on an integrated statement of Vision. This vision guided the participant's discussions of environmental education goals and is stated as follows:

Society will develop an environmental ethic that promotes spirituality, awareness, and literacy about nature, and instills a sense of connection in treasuring, protecting, and sustaining global ecosystems. Xavier University, as a part of the biosphere, will enhance this shared environmental ethic by helping African-American students become role models who foster a value for life and the earth. Xavier will also demonstrate to its larger community an environmentally exemplary university that is ecosystem aware through its own internal operation as well as its continued examination of linkages among economic, social, technological, and environmental issues. The University is committed to the evolution of a life-long educational process in which all students, faculty, and staff share an informed awareness of our global environment and humanity's connectedness to nature's ecosystems.

Goals provide a sense of destination in moving toward the direction implied in the vision statement. The following goals were delineated and agreed to by Retreat participants in order to provide this direction:

GOAL #1: Develop a university-wide plan for environmental literacy that encourages an awareness for the intrinsic value and inherent worth of nature and includes training on environmental equity.

GOAL #2: Develop a precollege process for environmental education infusion.

GOAL #3: Increase the number of African-Americans who are prepared for careers in environmental fields.

GOAL #4: Improve environmental awareness of the Xavier University community and create an environmentally exemplary campus.

GOAL #5: Become a partner with the community to affect community self-empowerment in solving environmental problems.

Now that the institutional strengths have been identified and goals and objectives set, the next step is to assess the interest and abilities of the Xavier faculty in environmental education. To develop a capabilities perspective a survey was conducted during the spring of 1992. The CEP distributed an environmental faculty/researcher survey to seek input on environmental education and research capabilities that Xavier faculty and research staff presently possess or are interested in obtaining through retraining and other faculty development activities. The results of this survey will significantly enhance the CEP's ability to establish a capabilities profile for Xavier University on environmental education and research. Over 250 surveys were distributed.

Faculty Development Programs

- The Environmental Restoration & Waste Management (DOE) Faculty Development Grants Program Committee evaluated faculty development grant proposals submitted from two calls for proposals in 1991-92 (Fall 1991 and Spring 1992). In the Fall 1991 call for proposals competition, a total of six proposals were received and three were granted funding. These included:

- "Philosophy of Art": Integration of Environmental Concerns into a Course, Scott Calef (Philosophy Dept.). \$1,650
- "Themes of Environmental Endangerment": An Annotated Bibliography, Caroline Hall (English Dept.). \$1,750
- Handling Laboratory Waste: A Guidance Manual, Sally O'Connor & other Faculty (Chemistry Dept.). \$2,450
- In the Spring 1992 call for proposals competition, a total of nine proposals were submitted and five were granted funding by the Committee. Those that were funded included:
 - "Advanced Seminar in Children's Literature on Environmental Topics": A course development project, Argiro Morgan (Graduate School and Education Department). \$2,025.
 - "Public Finance of Public Sector Economics": Course infusion of complexities of environmental policies, Jose Bautista (Economics Department). \$1,700.
 - "Sample Lessons, Modules, and Compilations of Resources": Course infusion into pre-service education courses, Sr. Doris Blum & Sr. Stephanie Henry (Chemistry and Education Departments). \$4,000.
 - "Basic Health & Physical Education Course Revision and Attendance at Tufts University TELI Workshop", Ernestine Stubbs (Health & Physical Education Department). \$1,743.
 - "Environmental Infusion into Political Science Courses and Attendance at Tufts University TELI Workshop", William Serban (Political Science Department) . \$1,743.
- With funds from DOE ER/WM Consortium grant, the CEP has already worked with a number of Xavier faculty to identify books and periodicals that could support curriculum infusion of environmental topics at the University. In 1991-92, more than 100 environmental related titles were purchased for the Xavier library. Besides the many environmental books purchased, a number of journals dealing with environmental subjects have also been ordered. Some of the titles that are being subscribed to include Ecological Economics, Environmental Ethics, Journal of Environmental Education, Journal of Environmental Science and Health, and Risk Management Reports.

- Two Xavier Faculty, Dr. Murty Akundi and Dr. Jian Hau Zhang, submitted Faculty fellowships through the HBCU/MI Consortium on Environmental Restoration and Waste Management (ER/WM) to Associated Western Univ., Inc. The purpose of these fellowships are to provide Environmental Restoration and Waste Management (ER/WM) research opportunities at Department of Energy (DOE) laboratories for teaching and research faculty from participating Consortium institutions. A primary goal of the awards is to influence the development and enhancement of ER/WM related research at home institutions and encourage the infusion of ER/WM related materials into the curricula of Consortium member institutions.
- Other Faculty Development activities that were funded in 1991-92 include the following: Funding was provided through the ER/WM Faculty Development Grant Program to support five Xavier faculty in attending a conference on Hazardous Materials Control. This Conference was sponsored by the Hazardous Materials Control Research Institute and was held in New Orleans LA, February 26-28, 1992. The faculty attending this conference included Ms. Tracy Hunter (College of Pharmacy), Drs. Sally O'Connor, Ieva Politzer, and Ms. Megan McLean (Chemistry Department), and Dr. Mercedes Mondecarr (Biology Department). The objectives of the faculty in attending this conference were to make contacts with other researchers and educators in the field of hazardous waste management, to learn about the latest approaches to hazardous waste environmental remediation, to identify topics on environmental management of hazardous materials for incorporation into their teaching, and to determine areas that might be suitable for preparation of research proposals on hazardous materials control and remediation technologies.
- Four Xavier University faculty were offered admission into the Tufts University ENVIRONMENTAL LITERACY INSTITUTE (TELI) for the summer of 1992. The faculty accepted were Dr. Beverly Wright (Environmental Sociology), Prof. William Serban (Political Science), Prof. Ernestine Stubbs (Health & Physical Education), and Dr. Warren Flint (Environmental Science). The purpose of this program is to enrich the faculty's understanding with regards to certain contemporary environmental issues that might be able to be infused into teaching activities of the faculty at Xavier. The issues explored for course infusion during the TELI program include ozone depletion, resource depletion and urban pollution through several interdisciplinary themes including ethics and values, consumerism and equity, energy and the environment, and population and development.

Curriculum Development

Xavier University is evolving a strategic approach to environmental development. General considerations for such programs at Xavier include:

- To identify and understand the interconnectedness of all human and non-human life and how such connectedness relates to our survival on earth.
- To identify and understand the effect of both cultural forces and the political economy of natural resources on all life forms.
- To demonstrate knowledge of the biophysical environment (including both aquatic and terrestrial systems), and social sciences (including political science, political economy, psychology, sociology, and education), and to problem solve effectively using an interdisciplinary approach.
- To develop both group and organizational skills that will take an interdisciplinary approach to rectify social and economic inequity within the context of an environmentally sustainable future for all people, regardless of race, color, creed, or sexual preference.

The CEP is responsible for stimulating the development of curriculum modification strategies that encourage infusion of environmental restoration and waste management topics into courses. The Center's approach is to weave this common thread throughout a majority of existing programs, to bring environmental literacy to all students. The goal is to have 50% of all courses containing environmental examples and perspectives within five years--clearly promoting a multidisciplinary spirit in its approach.

Eventually it is anticipated that there will be an environmental studies minor developed at Xavier University that will integrate a number of environmental courses into an identified track. The evolution of this effort will focus upon education in the area of environmental restoration and waste management topics. The development of this minor will enable the student to pursue a course of study, in conjunction with their traditional major, that will provide additional exposure to environmental instruction prior to their graduation from Xavier. The intent of this minor will be to enhance the student's environmental literacy and also interest the student in pursuing graduate degree programs in environmental science and policy.

Some of the courses that have experienced infusion and modification during 1991-1992 academic year were:

- ENVIRONMENTAL BIOLOGY - The course includes a brief introduction to basic concepts of ecology and demonstrates to the student the relationships between organisms and their environment. Part of the course focuses upon local contemporary environmental problems and concerns.
- INTRODUCTION TO ENVIRONMENTAL TOXICOLOGY - This course provides a broad background in toxicology, including principles, target organ toxicities, selected environmental toxicants, and an overview of treatment protocols in toxic emergencies from environmental exposures.
- PERSONAL and ENVIRONMENTAL HEALTH - This course presents the students with scientific facts pertaining to individual and community health issues. Emphasis is placed on health related to environmental effects. Current regulation and protection trends in the U.S. Environmental Protection Agency are discussed.
- AMERICAN GOVERNMENT - This course looks at issues of American politics, including the Constitution, federalism, interest groups, political parties and elections, the presidency, congress, courts, the Bill of Rights, and political equality. There are several sessions of the course syllabus that are devoted to environmental policy and environmental equity.
- PUBLIC POLICY - This course centers upon the development and content of public policy in the American political system, focusing on the national level, but also considering state and local levels. The course explores processes linking citizen demands and government action and stresses ways in which minorities might cope with and alter policy serve their interest. The course contains a two-week environmental and energy policy learning unit as part of its syllabus.
- ENVIRONMENTAL PHILOSOPHY - This course presents a detailed philosophical study of humanity's understanding of its relationship to the natural environment, concentrating on historically prominent conceptions of that relationship, the philosophical foundation of the contemporary "environmental movement," and attempts to construct philosophically defensible environmental ethics. In addition to developing the student's awareness and understanding of these important issues, the course further enhances the student's capacity for critical reading, thinking, and writing.
- INTRODUCTION TO WORLD LITERATURE - This course provides a critical examination of masterpieces of literature from the eighteenth century through the modern period. The intent of part of this course is to focus upon specific fiction and non-fiction works that explore themes of environmental endangerment and/or pollution as a result of industrial development and waste. The course employs an annotated bibliography of contemporary world literature that exposes the problem of environmental damage due to the spread of technological wastes. This bibliography will enable the student "to explore texts that mirror the grave environmental crisis the global village now faces".

- WORLD CIVILIZATIONS TO 1500 and FROM 1500 (two courses) - These courses survey (1) major civilizations of the ancient world and (2) major world civilizations from 1500 to the post-war world. Emphasis is on the development of modern state systems, the rise of western dominance and the emergence of third world nations. The courses stress both positive and negative ecological changes brought about by the intermingling of the various cultures and illustrate the biological and cultural changes that resulted directly from the discovery of the New World in 1492.

Outreach

• **Xavier Community Outreach**

There exists a strong concern and significant evidence among certain groups within society, that inequity is occurring such that environmental problems are affecting poor and minority groups disproportionately in relation to other sectors of society. This forms the basis for the complex issue of environmental equity. Environmental equity refers to the rights of all people to benefit equitably from the environment and to be equally protected from the effects of degradation which result from human use and abuse of the environment. Of special concern are the right to good health, the right to have viable communities, and the right to economic well being.

Educators and researchers at Xavier University have begun to take an interest in teaching and investigations on environmental impact questions and are considering the application of their findings to solve justice and equity issues. Such research is increasing as social scientists have begun to join biophysical scientists in studying environmental issues. Xavier University, in its environmental equity outreach activities, is designing projects to provide the opportunity for a community participatory process, to stimulate the evolution of educational programs that incorporate environmental justice concerns, and to serve the region by providing a networking tool from which to build upon. Specific goals of this outreach effort include:

- to bring an ongoing national dialogue about environmental justice to the regional level to strengthen educational programs and encourage research;
- to initiate discussion between regional impacted populations and university educators/researchers;
- to identify key environmental policy questions from the perspective of impacted communities; and

- to bring awareness to governments on the various components of environmental justice relevant to their jurisdictions in order to impact decision-making in public policy.

In 1991-1992, Xavier faculty and students began an initiative in environmental equity that will lead to both research and curriculum development in this important area. A student and faculty member are presently researching the phenomena of "**environmental racism.**" Their studies show that in the United States three out of five Black and Hispanic Americans live in areas with uncontrolled toxic waste dumps. In addition, evidence indicates that in areas of the south with a large minority population, predominantly Black communities are targeted as hazardous waste sites. During the remainder of this year, this faculty-student team will examine (1) correlations between locations of hazardous waste sites in Louisiana with concentrations of the Black community, (2) recent allegations of toxic contaminants in and around the Gert Town community, (3) political attitudes in the Louisiana Black community toward environmental issues, and (4) student participation in environmental programs along with the important role of HBCUs in supporting this participation. The CEP is also working with nationally recognized scholars on environmental equity to convene a conference on the subject scheduled for late Fall of 1992.

The CEP sponsors a student committee that focuses upon environmental issues. This student originally evolved to plan and implement a recycling plan for the University. The intent of those who participated on this committee was to enact a recycling strategy that is long-lasting and will serve as a model for other communities to want to duplicate in solving some of society's waste management problems. During the 1991-92 year, this committee accomplished several tasks associated with implementing recycling at Xavier University. The Xavier Student Recycling Committee prepared a "Recycling Fact Sheet" that was mailed to all students, faculty, and staff over the Christmas holidays. A total of 3,500 of these brochures were mailed out. Aluminum Recycling Barrels were placed around the Xavier University campus to initiate recycling activities at Xavier in March 1992. A total of 15 barrels were placed around campus with at least one barrel in each building. In the coming academic year, this student committee is planning to expand its focus in reaching out to the Xavier community and concentrate on other environmental issues that the Xavier student population perceives as important.

Xavier University's Center for Environmental Programs was recognized by the City of New Orleans for its initial efforts at reducing the waste stream in the City through a recycling program. The presentation of an official mayoral proclamation was made to Xavier University on April 29, 1992. The presentation took place in the City Planning

Commission's Offices of City Hall. In further recognition for its leadership role, Xavier University, along with other businesses and institutions in the City, had its name published in the local newspapers by the Mayor of New Orleans.

The Xavier University Office of the Vice President for Academic Affairs sponsored a Colloquium on **"Lead in the Environment"** that included a presentation by Dr. Howard Mielke of Xavier's College of Pharmacy. Dr. Mielke is a leader in research involving lead distributions and exposures in the urban environment. Dr. Warren Flint from the Xavier Center for Environmental Programs provided the Response to Dr. Mielke's presentation on lead in the environment. More than 50 faculty, staff, and students attended the Colloquium. Dr. Mielke's lead research was further recognized regionally by an extensive article published in the Time Picayune (May 11, 1992), the New Orleans newspaper, entitled **"Getting the Lead Out: Lead Places Children's Lives in Peril"**.

Other Institutional Networking

The Center for Environmental Programs is continually attempting to establish links with other institutions that have an interest in environmental restoration and waste management education and research. During 1991-1992, the following activities were conducted as part of this networking effort:

The CEP Director attended the 12th Annual Minerals Management Service (U.S. Department of Interior) Technology Transfer meetings in New Orleans. The primary purpose for attendance was to inform this agency as well as others in attendance that Xavier University is interested in environmental research initiatives that involve the Gulf of Mexico.

The CEP Director traveled to the Battelle Northwest Laboratories in Pasco, Washington to be briefed on Battelle DOE activities. This fact-finding effort is part of a joint Tulane-Xavier potential DOE initiative. The purpose of the trip was to express to Battelle scientists the expertise in environmental research at Xavier and find out information on Battelle activities that Xavier faculty might be interested in.

Staff from the CEP and other Xavier Departments attended an Environmental Equity Workshop at the University of New Orleans. The purpose of this workshop was to develop a plan for preparing a concept on a Deep South Environmental Equity Center for which funding would be sought from EPA.

- The CEP held the first meeting of the Network of Environmental Educators in New Orleans in January 1992. More than 20 people from area universities were in attendance to share their background, expertise, and education/research activities with each other. Dr. Kenneth Olden, the Director of the National Institute of Environmental Health Sciences (NIEHS), also attended the gathering and shared with the group future research and educational funding opportunities that might be forthcoming from NIEHS under his new leadership. It was decided at this meeting that it would be valuable to assemble and distribute an information booklet that would contain the biography of each NETWORK participant. These biographies are being sought now for development of this resource document.
- The CEP Director attended the Alliance for Environmental Education's quarterly Board of Directors Meeting held at Louisiana State University in Baton Rouge, LA in February 1992. At this meeting, he reported on the development of environmental programs at Xavier and shared with the Alliance activities that Xavier has been conducting over the last year as one of the Alliance's designated Centers.
- The CEP Director made a seminar presentation to the Tulane University Department of Ecology, Evolution, and Organismal Biology as part of their spring semester seminar series. The title of his presentation was "Ecology and World Order".