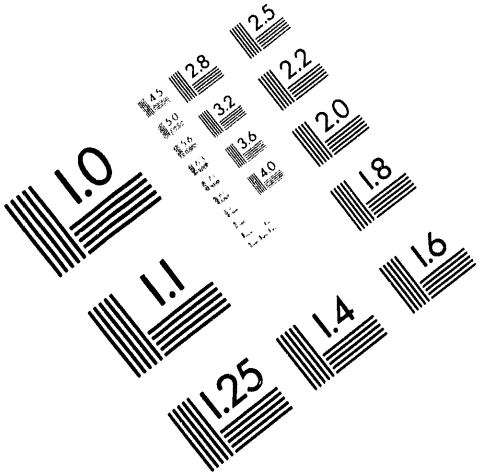

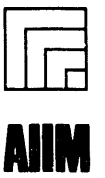

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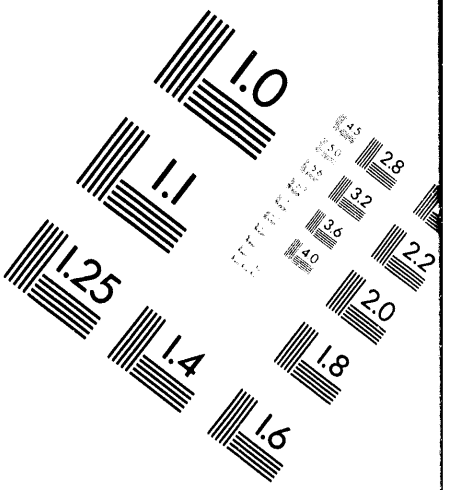

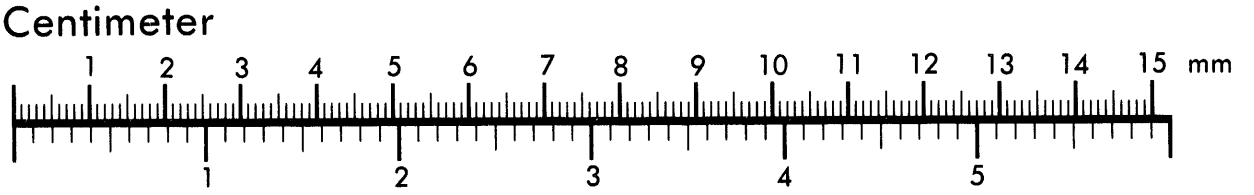

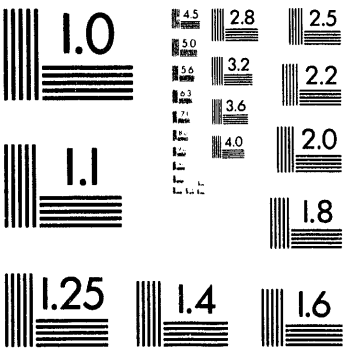

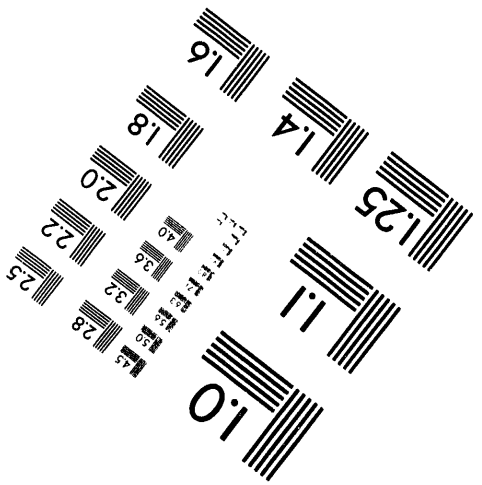

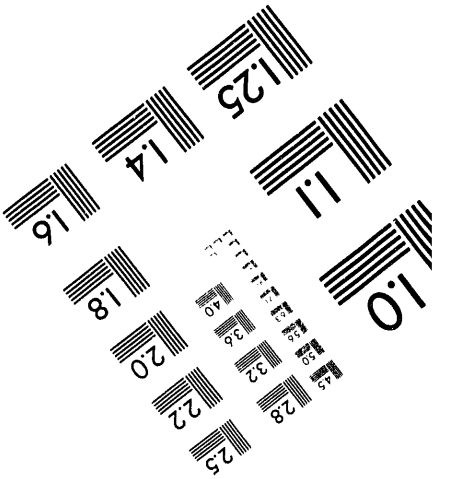

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SCIENCE/ENGINEERING EDUCATION DIVISION ASSESSMENT ACTIVITIES: AN OVERVIEW

FY 1993 Annual Report

Prepared by:
Analysis and Evaluation Programs
Science/Engineering Education Division
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Oak Ridge, Tennessee 37831-0117

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INTRODUCTION

Evaluation and assessment of employment trends and education programs are important functions of the Science/Engineering Education Division (SEED). The objectives of SEED's evaluation and assessment activities are to provide quantitative measures of the impact of programs on participants; assess programmatic achievements; provide valuable information for continued program operation; ensure that the programs meet their objectives; develop and maintain data bases on scientific and engineering employment and education; provide information about trends in employment and education for energy-related scientists and engineers; and provide analyses of energy-related science and engineering employment requirements, future labor market trends, adequacy of supply of new graduates, and implications for education programs. The results of an evaluation can be useful to justify continuation and improve the operation of existing programs and to promote initiation of new programs. Whenever possible, data are collected that are consistent with information obtained by other national surveys to facilitate comparisons to national norms. This report summarizes the assessment and program evaluation activities undertaken by SEED in FY 1993.

A Profile of Approved Universities in the U.S. Department of Energy Global Change Graduate Fellowship Program, (working paper), Leigh Ann Pennington, December 1992.

This working paper provides a profile of 60 universities participating in the Global Change Graduate Fellowship Program sponsored by the U.S. Department of Energy. The information used to develop this profile was taken entirely from the university applications for participation in the program.

Each of these 60 participating universities had strong faculty and ongoing research related to global change issues. They also produced graduates who obtained employment in areas relevant to global change research and applications. These universities emphasized the necessity of a multidisciplinary program to accommodate the diverse nature of issues related to global change and generally concentrated their research efforts in one or more of eight technical areas designated by the Committee on Earth and Environmental Sciences as the interdisciplinary science elements of global change.

The descriptive profile of participating universities includes measures of academic units involved, enrollments, course offerings, degrees granted, dissertations and theses, employment, faculty, and research projects.

Assessing the Adequacy of Future Science and Engineering Degree Awards, (prepared for U.S. Department of Energy and U.S. Nuclear Regulatory Commission), November 1992.

This paper compares projected job openings due to growth and replacement needs with the projected number of new bachelor's graduates in natural science and engineering. The projections of job openings are derived from U.S. Department of Labor employment projections and replacement rate data. The projections of bachelor's degrees in natural science and engineering (NS&E degrees) are developed by the authors.

The authors noted that previous projections published by the National Science Foundation and the U.S. Department of Labor assumed that the number of NS&E degrees would vary only with the population of 22-year-olds. The authors found however that the ratio of NS&E degrees to the 22-year-old population has varied in the range of 4.0 to 5.2 percent between 1970 and 1990. They developed a measure of the level of starting salaries for these NS&E degree recipients and found that variations in starting salary explain most of the variations in the NS&E degree award rate, and that there is a lag of about 5 years. Using this information, they then project degree awards to 1997.

The results indicate that the number of NS&E degrees awarded during 1991-1997 are likely to be about 1.5 times the number of job openings in natural science and engineering occupations. This does not necessarily indicate a surplus of these graduates as some will always take jobs in other occupations. The authors suggest that the best way to assess the adequacy of the future supply is to compare this ratio with the same ratio computed for an earlier period, 1984-1990. Since the ratio was 1.7 during that period, they conclude the supply of NS&E bachelor's degrees will be about 20,000 smaller than the level needed to maintain the 1984-1990 supply/demand balance.

Employment Estimates for Civilian Radioactive Waste Management Activities, 1993-1996, (data brief prepared for U. S. Department of Energy), May 1993.

This data brief contains estimates of occupational employment requirements for work funded by the Office of Civilian Radioactive Waste Management (OCRWM). The data brief builds on two earlier ORISE reports examining OCRWM employment to : 1) reflect the changes in project structure; and 2) collect data from TRW, Inc., which is now the major project contractor.

These updated projections indicate that total OCRWM employment is expected to increase from 3,020 in 1993 to 3,250 in 1996, or by 8 percent. From 1993 to 1996, engineering employment is projected to increase from 690 to 760; scientific employment is projected to increase from 470 to 540. In 1993, OCRWM activities are estimated to employ over 320 Ph.D.s; including 70 Ph.D. engineers and 170 Ph.D. scientists.

Estimates of the Number of Graduate Students Supported by Department of Energy Research and Development Funds to Universities and Colleges, FY 1992, (prepared for U.S. Department of Energy, Office of Science Education and Technical Information), Norman Seltzer and Larry Blair, March 1993.

This paper presents the results of the first comprehensive effort to estimate the amount of DOE research and development funding to universities and colleges, and the number of graduate students supported by these funds in FY 1992. The information is disaggregated by major funding offices within DOE and the DOE contractor-operated facilities.

The estimates of the number of graduate students supported are based on data available in DOE-funded project files provided by the DOE Office of Energy Research (OER), information on graduate students supported by the National Science Foundation (NSF) research and development funds, and information on estimated research and development funding to universities and colleges provided by DOE offices, other than OER, and by the DOE contractor-operated facilities.

Approximately 6,500 graduate students were supported by about $660 million of FY 1992 research and development funding by DOE to colleges and universities. There is considerable variance among DOE offices in the estimated number of graduate students supported per million dollars, with several offices averaging over 12 graduate students per million while some averaged fewer than 7 per million. The Office of Energy Research supports approximately 60 percent of the graduate students and provides 67 percent of the research and development funding to universities and colleges.

An appendix on methodology outlines the estimation procedures used to provide data.

"HEALTH PHYSICS/RADIATION PROTECTION Enrollments Increased at All Levels in 1992. Undergraduate and Doctoral Degrees Decreased, While Master's Degrees Increased," **Manpower Assessment Brief**, DOE/OUSE No. 22, June 1993.

This manpower assessment brief summarizes the results of the twenty-first annual "Health Physics/Radiation Protection Enrollments and Degrees Survey, 1992," sponsored by the U.S. Department of Energy and conducted by the Oak Ridge Institute for Science and Education. The brief presents current and historical survey data and includes enrollments and degrees by degree level and by state and institution; employment or postgraduation plans; and participation of foreign nationals, women, and minorities.

Undergraduate enrollments increased slightly in 1992, by 5 percent. After a slight rise in 1991, the number of bachelor's degrees decreased by 17 percent. Master's enrollments have continued to rise since 1988 and increased in 1992 by 14 percent over 1991. Master's degrees also increased from 1991, by 10 percent. At the doctoral level, the number of enrollments increased by only 1 student, and degrees were down by 4 students.

Of the known employment or postgraduation plans for degree recipients, 34 percent of the bachelor's elected to continue study toward a higher degree, while the largest proportion of the master's and doctorates went to work in medical facilities (32 percent and 29 percent, respectively).

The appendixes to the brief provide detailed information by individual school and by type of program.

"Industrial Hygiene Education Programs and Related Employment, " **Manpower Assessment Brief**, U.S. Department of Energy/Office of Environment, Safety and Health, No. 23, July 1993.

This brief summarizes information collected during 1992 pertaining to the graduate education and employment of industrial hygienists. The first section of this brief provides an overview on the status of graduate education in the field, which includes a summary of important issues identified by faculty in the programs, descriptive information on graduate program characteristics, enrollments and degrees data, and postgraduation employment data. The second section provides an estimate of the number of industrial hygienists in the Department of Energy contractor system and the federal civil service system. The final section summarizes additional information that can provide insight into the labor market conditions for industrial hygienists.

Fall 1991 industrial hygiene master's enrollments were estimated to be 587 full-time students and 998 part-time students. An estimated 438 master's degrees were awarded in this field during the 1990-1991 academic year.

Industrial hygiene doctoral enrollments in fall 1991 were estimated to be 103 students, including both full- and part-time enrollments. An estimated 20 doctoral students graduated from industrial hygiene programs during the 1990-1991 academic year.

Full-time employment of industrial hygienists in the federal civil service system increased 44 percent (from 1,012 to 1,455) between the years 1985 and 1991. Within the Department of Energy contractor system, the April 1992 estimate of employment in this field is approximately 750 workers, 52 percent of whom are located in the western states.

The appendixes to this brief provide detailed information on enrollments and degrees by individual school, as well as a list of all schools contacted that indicated they did not have a graduate program in industrial hygiene.

Labor Market Trends for Nuclear Engineers, (prepared for the U.S. Department of Energy and U.S. Nuclear Regulatory Commission), November 1992.

This paper examines historical trends in new graduates, employment, and salaries as the basis for understanding the current labor market for nuclear engineers. The paper also examines expectations of future employment needs and new graduate supply and assesses future labor market conditions.

For the period 1983-1991, both the numbers of new nuclear engineers available for employment and the number of nuclear engineering job openings have declined. However, because nuclear engineering supply has declined faster than job openings, the number of new graduates per 100 job openings declined from 92 graduates in the 1983-1987 period to 82 in the 1987-1991 period. Additional data regarding nuclear engineering salary offers, survey data of engineering recruitment, and DOE contractor reports are consistent with nuclear engineering demand increasing relative to supply.

Overall nuclear engineering employment growth is expected to be flat over the 1991-1997 period; however, job openings will number approximately 400 annually for replacement of existing nuclear engineers who leave the field. Beyond 1997, new nuclear capacity is likely according to the National Research Council Committee on Nuclear Engineering Education. As a result, annual job openings are projected to increase to approximately 430 for the 1997-2000 period, 700 for 2000-2005, and 1,100 for 2005-2010.

The immediate future (1991-1997) is projected to be one of approximate balance between nuclear engineering job openings and new degree supply. For the longer term, job openings are expected to grow substantially in excess of current new degree supply.

"NUCLEAR ENGINEERING Enrollments Increased Overall by 3 Percent in 1992. Undergraduate and Master's Degrees Continue to Decline, While Doctoral Degrees Increased by 11 Percent from 1991," **Manpower Assessment Brief**, DOE/OUSE No. 21, June 1993.

This brief summarizes the results of the twenty-first annual "Nuclear Engineering Enrollments and Degrees Survey, 1992," sponsored by the U.S. Department of Energy and conducted by the Oak Ridge Institute for Science and Education. The brief presents current and historical survey data including enrollments and degrees by degree level and by state and institution; employment or postgraduation plans; and participation of foreign nationals, women, and minorities.

In 1992, undergraduate enrollments increased by 8 percent, while the number of bachelor's degrees continued the downward trend with a decrease of 7 percent over 1991. At the master's level, enrollments increased by 4 percent, and the number of degrees decreased by 5 percent. While the number of doctoral enrollments decreased by 8 percent, doctoral degrees continued a fluctuating pattern with a slight increase from 1991.

Of the known employment or postgraduation plans of the graduates, one-third of the bachelor's and 41 percent of the master's planned to continue study toward a higher degree. For the doctorates, 19 percent went to work at DOE contractor facilities (M&Os), while 17 percent went to work for foreign employers.

The appendixes to the brief provide detailed information by individual school and by type of program.

Phase I: A Comment on Occupational Separation and Replacement Needs for Engineers, Oak Ridge Institute for Science and Education, (prepared for U.S. Department of Energy), November 1992.

The Bureau of Labor Statistics (BLS) has recently published new estimates of net occupational separation rates (Monthly Labor Review, November 1991). Although these new estimates are a substantial improvement over previous estimates of labor market mobility, the estimates do not distinguish between occupational in-mobility of new graduates from related educational programs and in-mobility from other sources. Because educational output is usually the "policy variable" of interest to analysts, this shortcoming reduces the usefulness of the estimates for purposes of assessing the adequacy of new degree awards.

This paper outlines a method of estimating the contribution of new graduates as a source of supply. This new graduate supply estimate is then used to adjust the BLS net occupational separation rates. The effect of this adjustment is to increase annual replacement needs for engineers from 2.4 percent (BLS estimate) to 3.6 percent. When these adjusted replacement rates are applied to projections of engineering employment, annual engineering job openings are estimated at 70 thousand (compared to 57 thousand using the BLS separation rates).

Results of the FY 1993 DOE-SRT Training Needs Survey, (prepared for U.S. Department of Energy/Savannah River Operations Office/Office of Training), July 1993.

This report presents the results of the second training needs self-assessment conducted by the Department of Energy Operations Office at Savannah River (DOE-SR). DOE-SR requested that employees provide a self-assessment of their training needs during the first half of FY 1993. Employees were divided into five groups, each with a different questionnaire. Employees were asked to rank their training needs on a scale from 0 to 3, ranging from not applicable to critically needed.

Of the 585 employees at DOE-SR in January 1993, 399 completed survey questionnaires. Results are reported for DOE-SR as a whole, by occupational group, by DOE-SR organizational unit, and by length of service. The five items that respondents ranked highest overall, in terms of the percentage of respondents indicating a considerable or moderate training need, are as follows:

Effective listening and memory development
Understanding personnel policies and procedures
Using effective problem-solving methods
Effective presentations
Time management

For employees in the Administrative occupational group, the most critical training item was "Effective listening and memory development ." Clerical staff reported their greatest training need to be "Effective communications." Senior Executive Service staff reported their greatest training need to be "Maintaining working relationships with external groups." Facility Representatives indicated that their top training item was DOE Order 5481.1B (Safety Analysis and Review System). Managers and supervisors reported their greatest training needs to be "Personal liability of the Federal official." For employees in the professional occupational group, the most critical unique training item was "Techniques for negotiating."

The report also presents results by training category. The category with the most critical training needs is Supervisory and Managerial Practices, followed by Individual Development Training, Technical Training, and Information Technology.

In addition to the report, a desktop computer database was developed to allow users to query the survey results in terms of GS Series, occupational group, length of service, and DOE-SR organizational unit. This allows specific cross-tabulations of survey results to be produced on demand as needed by DOE-SR decision makers.

Salary Information for Nuclear Engineers, Health Physicists, and Health Physics Technicians, October 1992, (prepared for the U.S. Nuclear Regulatory Commission, Office of Personnel), January 1993.

Salary information was collected in October 1992 for personnel working as nuclear engineers, health physicists, and health physics technicians. For the nuclear engineers and health physicists, the salary information includes personnel at the B.S., M.S., and Ph.D. levels with zero, one, and three years of professional work experience. For the health physics technicians, the salary information includes personnel with less than a two-year college degree and those with a two-year college degree or more and with zero, one, three, and five-to-ten years of professional work experience. Information is provided for utilities and non-utilities. Non-utilities include private sector organizations and DOE contractor-operated facilities. Government agencies, the military, academic organizations, and medical facilities are excluded.

Responses were received from 24 of the 51 utilities and from 60 of the 143 non-utilities. For health physicists and nuclear engineers, utilities tended to pay higher salaries for B.S. personnel, while non-utilities tended to pay higher salaries for personnel with graduate degrees. Starting salaries for nuclear engineers and health physicists at the B.S. level with no work experience had averages in the $32,000 to $35,000 range, with utilities paying health physicists slightly more than nuclear engineers and non-utilities paying slightly more for nuclear engineers. The percentage increase in salaries over the previous year for personnel with no experience averaged between 3.5 percent and 8.5 percent, with the percentage increase for health physicists higher than that for nuclear engineers at all degree levels. Starting salaries for health physics technicians with no work experience averaged about $14 per hour at utilities and $10 per hour at non-utilities.

Status of Graduate Programs in Radiochemistry and Nuclear Chemistry, 1992, April 1993.

This paper summarizes data provided by 36 university departments, 24 of which indicated that they have a graduate program concentration in nuclear chemistry or radiochemistry.

Degree awards have been relatively stable (at a low level) during the past 5 years, after a substantial decline during the previous 15 years. Most of the departments have two or more faculty members in nuclear and/or radiochemistry, but many departments were pessimistic about their ability to maintain faculty and programs in the face of small enrollments and limited research funding in these areas.

The report summarizes reasons given by faculty for the present condition of these programs and gives suggestions made for improving their strength.

Supply of Science and Engineering Graduates for the United States Nuclear Industry, (prepared for the Organization for Economic Cooperation and Development and Nuclear Energy Agency International Workshop, December 2-3, 1992), Joe G. Baker and Larry M. Blair.

In the United States, there is concern about the adequacy of supply of new graduate scientists and engineers to meet technical employment needs. This concern is particularly acute within the nuclear field because of declines in the number of education programs and number of students in nuclear engineering, health physics, and radiochemistry. This decrease may be attributed to four factors: a decrease in the number of college-age students, a decline in interest in majoring in science and engineering, a slowdown in growth in demand for electricity (decreasing job opportunities in electric power in general), and lack of growth in nuclear electric power.

The decline in the number of new graduates is assessed in comparison to current and projected future employment needs. Currently, supplies of new graduates are just meeting employment needs in nuclear engineering and are less than adequate in health physics and radiochemistry. If the number does not increase, these inadequacies of supply are likely to become more severe in the future.

U. S. Citizens and Residents in Managerial, Professional, Technical, and Administrative Support Occupations by Gender and Ethnicity, July 1993.

This data report provided gender and ethnicity counts from the *1990 Census of Population and Housing/Equal Employment Opportunity File* for use in the 1994 ORAU *Affirmative Action Plan*. These counts are for U.S. citizens in approximately 180 detailed occupations within the managerial, professional, technical, and administrative support occupational groups. The 1990 census results serve as national indicators of the workforce availability of under-represented groups and allows ORAU to compare their workforce to the national workforce in these occupations. These counts were used as inputs into the process that measures ORAU's progress in meeting affirmative action goals and timetables and to prepare new goals.

The statistical standards that measure ORAU utilization of minorities and women by job group are called availability conclusions. To reach these conclusions, an extensive review is made of census reports, surveys of professional organizations and other valid studies. "Job group" is a group of jobs having similar content, wage rates, and opportunities and may require aggregation of the detailed census data. In many cases, data from the 1990 census EEO file is considered to be the best available benchmark for these purposes.

U.S. Citizens in Selected Science and Engineering Occupations by Gender, Ethnicity, and Years of Experience in 1992, (prepared for the U.S. Nuclear Regulatory Commission/Office of Personnel), January 1993.

This report includes tables that summarize the gender and ethnicity distributions of U. S. citizens and permanent residents working in selected science and engineering occupations in the U.S. civilian labor force, categorized by years of experience. Experienced workers are defined as scientists and engineers who have at least three years of experience in 1992. Other tables contain estimates for the entire U.S. civilian labor force regardless of experience, the estimates for new graduates with less than three years of experience, and gender and ethnicity distributions for the experienced group.

These estimates are developed from several different data sources including the *1990 Census of Population and Housing/Equal Employment Opportunity File, 1990 Survey of Science and Engineering Graduates*--sponsored by the National Science Foundation with funding support from the U.S. Department of Energy, the annual *Health Physics/Radiation Protection Enrollments and Degrees Survey*, and the annual *Nuclear Engineering Enrollments and Degrees Survey* conducted by Oak Ridge Institute for Science and Education (ORISE) for the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission.

The estimates for the experienced group are developed from 1990 census data collected from the census long form, except in the case of health physics. The health physics gender and ethnicity distributions and labor force estimates are developed from the U.S. Department of Energy survey of new graduates conducted by ORISE. The estimates for new graduates come from a variety of data sources. Initial labor force counts and gender and ethnicity distributions come from the *1990 Survey of Science and Engineering Graduates*. These are then projected to 1992 by examining trends in degrees and adjusting to account for underlying changes in the U.S. economy over the period 1990-1992. The degree data came from the Engineering Manpower Commission, the American Geological Society, the National Science Foundation, the U.S. Department of Energy Surveys referenced above, and the American Institute of Physics.

U. S. Department of Energy Environmental Restoration/Waste Management Junior Faculty Award Program: Survey of 1990 Awardees, (working paper), May 1993.

The Environmental Restoration/Waste Management (ER/WM) Junior Faculty Award Program provides the opportunity for collaborative educational research among the Department of Energy, Office of Environmental Restoration and Waste Management, DOE laboratories, junior faculty members, and their academic institutions. The objective is to increase the number of faculty members and students who conduct educational development, technology development, and research in the ER/WM area.

This brief report summarizes a phone survey of the six awardees for 1990, who were completing their final year of the program. The interviews were based on a structured set of questions, developed by the Program Evaluation and Assessment group, Oak Ridge Institute for Science and Education. The faculty members were very willing to talk about the program and reported very positive experiences.

U.S. Department of Energy Health Physics Faculty Research Award Program: Survey of 1992 and 1993 Awardees, (working paper), September 1993.

The Health Physics Faculty Research Award Program is sponsored by the Department of Energy to recognize and support the efforts of outstanding faculty members for creative research in areas related to radiation protection supportive of DOE's mission and who have improved health physics education. Program goals are to enhance the quality and status of health physics programs at academic institutions; encourage new and innovative ideas for health physics research; provide new opportunities for students interested in pursuing careers in health physics; and strengthen ties between academic institutions and DOE facilities.

This report summarizes a phone survey of eight of the awardees for fiscal years 1992-1993 and 1993-1994. The general questions asked of awardees were developed by the Program Evaluation and Assessment group, Oak Ridge Institute for Science and Education. The new awardees were asked about their expectations during the coming year of research and about anticipated student involvement.

U. S. Department of Energy MathQuest: Report on 1992 Student Participants, Gary C. Tesdal, Teacher Research Associate, September 1993.

The 1992 MathQuest camp was sponsored by the U.S. Department of Energy (DOE) and conducted by the Oak Ridge Institute for Science and Education (ORISE). The purpose was to show how everyday activities can be used to stimulate students' interest in math. Modules for activities were developed around weaknesses in measurement, statistics, estimation, and problem solving, which were identified through the Tennessee Comprehensive Assessment Program (TCAP), a series of state-wide competency tests.

The students, rising seventh and eighth graders, were chosen from 40 different school systems in East Tennessee and Northern Georgia. From over 400 applications, 73 students were selected to participate in this free ten-day residential camp. The selection was based on a three-page application, which included a teacher recommendation and student essay. A selection committee picked students from various socioeconomic and ability levels without regard to race/ethnicity, sex, or disability.

During the camp, students were housed in University of Tennessee dorms at the Knoxville and Chattanooga campuses, and were transported to activities located around Knoxville, Chattanooga, and Atlanta. The MathQuest program included many different instructional and hands-on activities in various settings, including athletic events, businesses, science centers, and amusement parks.

Based on the data collected in this assessment activity, the MathQuest program generally accomplished its objectives of providing interesting, hands-on, fun-oriented activities that also enhanced the participants' awareness of the importance of math in everyday activities, including entertainment settings, business settings, and scientific endeavors.

U.S. Department of Energy Teacher Research Associates Program: Profile and Survey of 1990-1991 Participants, Frank Vivio and Wayne Stevenson, November 1992.

The Teacher Research Associates (TRAC) program, sponsored by the U.S. Department of Energy, is designed to provide eight-week summer research appointments to outstanding seventh- through twelfth-grade teachers of science, mathematics, and technology. This major report evaluates the 1990 and 1991 TRAC programs by assessing the programs' impact on the knowledge, skills, and attitudes of former participants.

More than 400 teachers from across the nation participated in the program at 21 laboratory sites during the summers of 1990 and 1991. While the male/female participation in the program is consistent with national educational statistics, the 18 percent minority representation is greater than average. Teachers rated every aspect of their knowledge and understanding of science and mathematics more positively after the TRAC program than before. A follow-up survey of 1990 TRAC participants revealed that 99 percent had shared information from the program with colleagues and 96 percent had used program experiences in their teaching. A focus group evaluation affirmed that teachers were enriched by their TRAC research experiences and had shared their experiences with students and colleagues in many diverse ways.

SUMMARY AND FUTURE ACTIVITIES

Evaluation and assessment activities have continued to expand in FY 1993. The tasks performed are diverse and include the following: evaluating education programs sponsored by DOE and NSF; assessing science and engineering employment and education trends; sponsoring symposiums and workshops on employment and education/training issues; maintaining computer data bases and information systems on scientific and engineering personnel and education programs; conducting surveys of employment, education, and human resources data; and collecting information about employment and education issues for DOE's use in response to inquiries from OMB, Congress, and other organizations.

Evaluation of education programs is ongoing. This is accomplished through the use of a varying series of questionnaires administered to participants prior to the program, upon leaving the program, and at designated intervals after completing the program; to research mentors (in some research participation programs); and to supervising principals (in some precollege teacher programs). ORISE and Argonne National Laboratory continue to evaluate the University/DOE Laboratory Cooperative Program to document the accomplishments at the national level. Evaluation of the Lab Co-op Program was initiated in FY 1986 with undergraduate students and now includes faculty, graduate students, and postgraduates, all of whom are surveyed in follow-up studies. In addition, ORISE and Argonne conduct follow-up assessments for the Office of University and Science Education Programs: Science and Engineering Research Semester (SERS), Teacher Research Associates Program (TRAC), and High School Science Student Honors Program (HSSSHP).

During the past few fiscal years, the Program Evaluation and Assessment (PEA) group has expanded its activities beyond those programs included under the OUSEP Lab Co-op umbrella to include assessments of several DOE-sponsored fellowship and faculty awards programs, as well as both DOE- and NSF-sponsored precollege programs. FY 1993 represented the final year of a three-year NSF/DOE-sponsored precollege teacher workshop program, for which PEA conducted an outcomes assessment. In addition, PEA also provided assessments for 8 fellowship and 2 faculty awards programs as well as for DOE/ERWM MathQuest, DOE/National Geographic Society Kids Network, DOE Pre-Freshman Enrichment Program, and NSF ScienceQuest.

The primary continuing employment assessment work is to provide data and analysis for DOE's Office of University and Science Education Programs (OUSEP) about energy-related science and engineering employment trends and adequacy of supply in the educational pipeline. Employment assessment work is also conducted for DOE's Office of Civilian Radioactive Waste Management (OCRWM), and Division of Industrial Hygiene Program (ESH/DIHP); U.S. Nuclear Regulatory Commission, Office of Personnel (NRC/OP); DOE's Savannah River Field Office, Office of Training (DOE-FO, SR, OT), and for the National Science Foundation. Ongoing employment assessment work includes the following activities.

For OUSEP:

1. Assess future employment trends and the adequacy of future supplies of new graduates for scientists and engineers in energy-related activities.

2. Provide baseline and trend data on women and minorities in science and engineering.

3. Conduct the "Survey of Occupational Employment in Nuclear-Related Activities," and prepare a DOE Manpower Assessment Brief for this survey.

4. Provide estimates of the number of graduate students supported by DOE R&D funding to universities and colleges.

5. Develop estimates of the total number of scientists, engineers, and technicians employed in DOE contractor facilities.

6. Provide coordination and cooperation in the collection and sharing of employment and education data with other DOE offices and other agencies.

7. Conduct surveys of enrollments and degrees in nuclear engineering and in health physics academic programs, and prepare DOE Manpower Assessment Briefs for these surveys.

8. Prepare reports on "Labor Market Trends for Health Physicists" and "Labor Market Trends for Nuclear Engineers."

9. Develop a model to estimate future trends in science and engineering degrees including gender and ethnicity information.

For OCRWM:

10. Develop estimates for future employment trends for OCRWM-funded activities.

For ESH/DIHP:

11. Assess status of industrial hygiene graduate education programs and enrollment and degree trends.

12. Provide data on employment of industrial hygienists in the DOE contractor system and information on labor market trends.

For NRC/OP: (complementary funding for items #7 and #8)

13. Provide salary information for recent graduate nuclear engineers and health physicists.

14. Provide data on U.S. citizens in selected science and engineering occupations by gender and ethnicity.

For DOE-FO, SR, OT:

15. Provide training needs assessments and data analyses.

16. Develop an employment and training outlook model.

For NSF:

17. Provide estimates of the number of foreign nationals receiving Ph.D.s in science and engineering from U.S. universities who remain in the U.S. workforce.

18. Assess factors affecting degree completion rates for NSF fellowship recipients.

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