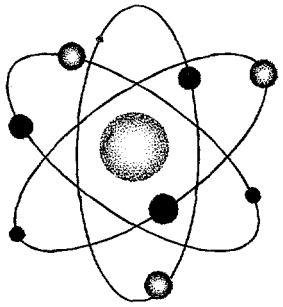


IAEA FELLOWSHIP PROGRAM

1997 REPORT ON

UNITED STATES PARTICIPANTS

National Research Council
National Academy of Sciences
2101 Constitution Ave., NW
Washington, DC 20418

DISCLAIMER

EXECUTIVE SUMMARY

During the period of performance, January 1, 1997 through December 31, 1997, the National Research Council oversaw 505 man-months of technical training. During 1997, 160 Fellows from 40 countries were on tenure in U.S. institutions for training in the peaceful applications of nuclear energy. Of these, 36 were supported by U.S. funds (Type II) and 124 were supported by IAEA or UNDP program funds (80 Type I and 44 Type III Scientific Visitors). The Fellows who received training during the year attended 42 universities, 33 Federal and State Facilities, 20 medical institutions, 13 other institutions, and 2 utilities. Eleven fellows also attended English language school in this country prior to their technical training program.

The proportion of women participants trained as regular Fellows (Type I and Type II) in the U.S. in 1997 was 23%, an increase of 4% compared to the previous year. Of the Scientific Visitors, 34% were women, an increase of 5% compared to the previous year.

The leading fields of study in which the regular Fellows (Type I and Type II) were trained during 1997 were *Nuclear Safety with 29%* and *Agricultural Applications* with 27% of the regular Fellows. These were followed by programs in *Medical Applications* with 17%, *Biological Applications* with 11% *and Nuclear Engineering and Technology* with 9%. The remaining 18% were divided between *Nuclear Physics and Chemistry, Biological Applications, Industrial and Hydrological Applications, and General Atomic Energy Development.*

Agricultural Applications was also the major field of study undertaken by the Scientific Visitors and made up 34% of those awards. *Safety in Nuclear Energy* made up 20%, *Medical Applications* made up 14% of those awards, and the number of SV's in each of the remaining fields was considerably smaller.

There have been many changes in participation among the 86 countries that have sent Fellows to the U.S. during the 40-year history of the program. Historically, the number of participants from countries in the Asia and Pacific region equaled those of all other regions, making up almost 50% of all Fellows trained. In 1997, number of participants from countries in East Asia and Pacific decreased from 51% to 34%, with proportion of participants from Europe (mainly Eastern Europe) and West Asia at 26%. Number of participants from Latin America increased from 12% in 1996 to 26% in 1997.

Thos. C. Rozzell, Sc.D.
Director, Fellowship Program
Office of Scientific and Engineering Personnel

Eliza I. Wojtaszek
Technical Placement Officer
IAEA Fellowship Program

CONTENTS

FELLOWSHIP TRAINING AND RESEARCH PROGRAM IN NUCLEAR SCIENCE INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

PARTICIPANTS IN THE UNITED STATES - 1997 ANNUAL REPORT

General Information

The International Atomic Energy Agency (IAEA) Fellowship Program began in April 1958 as a part of the Agency's Technical Cooperation (TC) Program. Through the TC Program, the IAEA provides technical assistance to meet the needs of recipient countries and to bring about a substantial transfer of technology. This is done by providing experts, equipment, fellowships, and training courses. This report addresses the U.S. component of the fellowship program. These fellowships provide opportunities for research and training of scientists, engineers and physicians from developing countries in the peaceful application of nuclear energy. The fellowships are awarded to persons who are, or soon will be, trusted with responsibilities that are important to the development of their countries.

Resources for the program are made available through contributions of the Member States to the Agency's General Fund and from the United Nations Development Program (UNDP) Fund. Certain Member States, the United States being one, also provide additional funds for Fellowships at their own institutions.

The Fellowships are awarded by the Agency from applications submitted to it by Member States. Candidates are selected on the basis of educational and professional qualifications, their foreign language proficiency, the needs of the nation concerned, the number of fellowships previously awarded to nationals of that State, and on evidence and assurance that upon their return home, the candidate's training will be utilized effectively for a period of not less than two years.

Programs

Regular Fellowship Program

Fellowship awards are classified into two groups, those financed by the IAEA General Fund or the UNDP Fund (Type I Fellowships and Scientific Visits), and those offered by Member States (Type II Fellowships). In placing individuals, preference is given to applicants from countries that are signatories to the Treaty on Non-Proliferation of Nuclear Weapons or to the Treaty for the Prohibition of Nuclear Weapons in Latin America.

The fellowships are normally awarded for periods of one month to one year. Extensions may be granted under certain circumstances. Generally, twenty-four months is the maximum time a Fellow may be in the program, although short extensions beyond this time

have been granted. All extensions require the approval of the International Atomic Energy Agency and the Fellow's government as well as that of the National Research Council.

During 1997, 80 Type I and 36 Type II Fellows either completed their training or were on tenure.

Scientific Visitor Program

In addition to the Type I and Type II fellowships, each year a number of Scientific Visitors (Type III Fellows) visit the U.S. for short periods (less than a month). Type III awards are granted to more experienced scientists and engineers to enable them to:

1) study new developments in nuclear science and technology and review current research;

2) observe organizational aspects and functioning of special services, training programs, and schools; and

3) confer with experts working in their particular field of interest.

The awards are intended to enhance the visitor's professional qualifications and thereby contribute more effectively to their country's scientific and technological progress.

Scientific Visitors often visit several institutions while in the U.S. and many also attend technical meetings of professional societies. During 1997, 44 persons came to the United States under this part of the program and visited 47 institutions during their stays.

Role of the National Research Council

The IAEA Fellowship Program in the United States is administered by the National Research Council (NRC)* through the Office of Scientific and Engineering Personnel (OSEP). In 1997, the staff consisted of Dr. Tom Rozzell, Director of the Fellowship Office, Ms. Eliza Wojtaszek, Technical Program Officer, Ms. Alicia Kraft, Program Supervisor, Ms. Mary Ann Pryor and Ms. Bina Russell, Fellowship Program Coordinators, and Ms. Barbara Kneebone and Ms. Amy Dowd, Program Assistants. We operate under a grant from the U.S. Department of Energy with funds supplied by the U.S. Department of State (DOS).

* The National Research Council is the operating entity of the National Academies of Science and Engineering and the Institute of Medicine.

A committee chaired by the Bureau of International Organization Affairs (IO) in DOS and comprising representatives of other offices in DOS and members from the Department of Energy, the Nuclear Regulatory Commission, and the Arms Control and Disarmament Agency reviews the applications of the candidates whom the IAEA requested be trained in the U.S. Those applications which are approved by IO for placement are forwarded to the NRC which then handles all administrative aspects of the training as indicated below.

Administrative Services

The administration of all fellowships includes:

--setting up a file and a computer record for each candidate.

--evaluating the English language capability of each candidate and recommending one or more months of intensive English schooling in the U.S. when necessary.

--arranging a training program with a suitable advisor and institution appropriate for the candidate's educational background and program objectives.

--recommending these assignments to the IAEA for acceptance.

--providing the candidate with a completed Certification of Eligibility for Exchange-Visitor Status (USIA Form IAP-66) so that s/he can obtain a visa.

--informing the advisor of arrival details and any changes to the program.

--receiving, tracking, and reviewing reports of Fellows' activities and transmitting copies to the Agency.

--assisting Fellows and advisors with mid-program travel, extension requests, health insurance questions and any other problems or questions that arise.

--maintaining records and reports on administered fellowships and scientific visits.

--monthly status reports to IAEA.

For Type II Fellows, the administration also includes:

--arranging and paying for travel to and from the training site.

--paying, during the period of the tenure, the:

maintenance allowance
book allowance
training and tuition expenses to the host institution
health and accident insurance
worker's compensation insurance
excess baggage/shipping allowance.

--assisting with financial and other arrangements in connection with mid-program travel to scientific meetings or field trips in the U.S.

The maintenance allowance ranges from $1,500 to $1,800 per month depending on the cost of living in the Fellow's geographical training location, with the first month allowance at $3,600. The book allowance is $80 per month, and the termination allowance is $100 for a duration of tenure less than 6 months, and $200 for a duration of tenure of six months or more. No provision is made for dependents in the program.

As can be seen, the National Research Council performs most of the same administrative services for Type I Fellows and Scientific Visitors as for the Type II Fellows. In addition, for the convenience of the IAEA and to expedite certain functions, the NRC pays certain expenses for Type I Fellows and SV's and is reimbursed by the IAEA.

Table A-1 (see Appendix) shows how many Fellows and applications the NRC managed in 1997.

Demographics and Statistics

Man-Months

Table 1 shows how many man-months of training we managed in 1997 and in 1996. As can be seen, there were decreases in each of the categories.

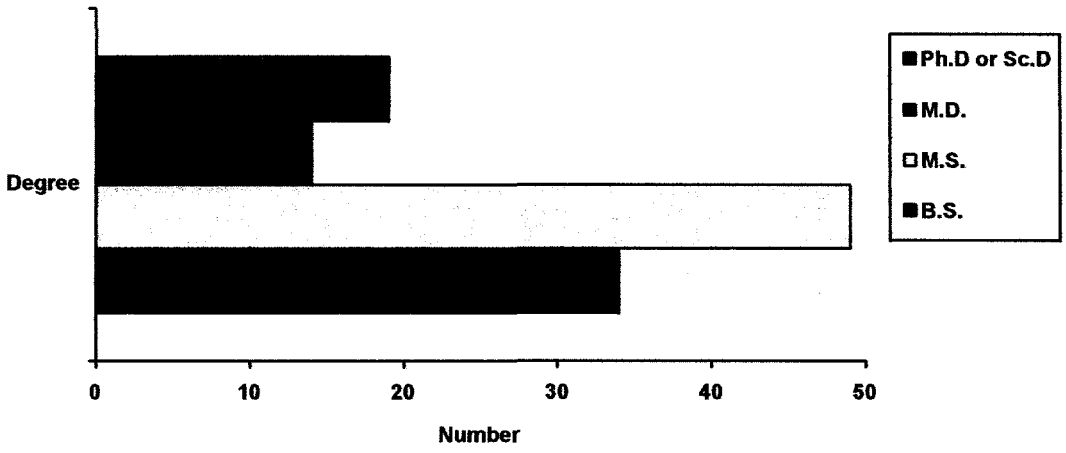
Table 1. Man-Months of Training

	Type I	Sci Vstrs	Type II	Total
1997	376	30	99	505
1996	782	25	658	1465

Academic Background

The nominees for IAEA Fellowships have an academic background of at least a bachelor's degree or its equivalent in training and experience. The distribution of educational levels of regular(Type I & II) Fellows is shown in Figure 1 and in Table A-2. This data shows that 71% of them had graduate degrees (M.S., Ph.D., M.D. or D.V.M). Of Type III Fellows, 73% held graduate degrees.

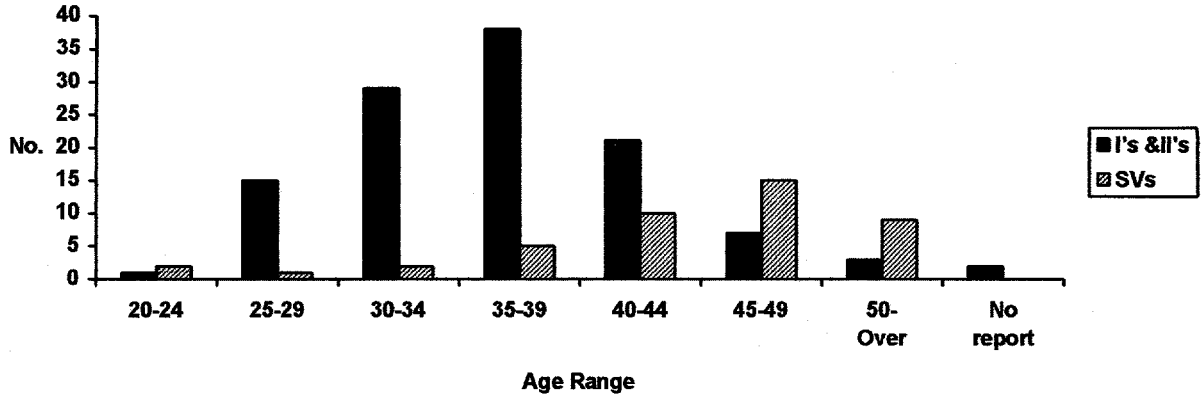
Figure 1. Education Level of Type I and II Fellows



Age

The distribution of ages among the Fellows who were active during 1997 is shown in Figure 2 and also in Table A-2. 76% of the Type I and II Fellows were between the ages of 30 and 44 years. On the other hand, only 39% of the Type III Scientific Visitors were in that age range, and 55% were over age 44. This is consistent with the fact that the scientific visits are designed for the more senior people in their field.

Figure 2. Age Ranges of Fellows



Gender

The distribution by gender is also shown in Table A-2. 23% of the regular Fellows were female in 1997, an increase of 4% compared to 1996. Of the Scientific Visitors, 34% were women, an increase of 5% compared to the previous year.

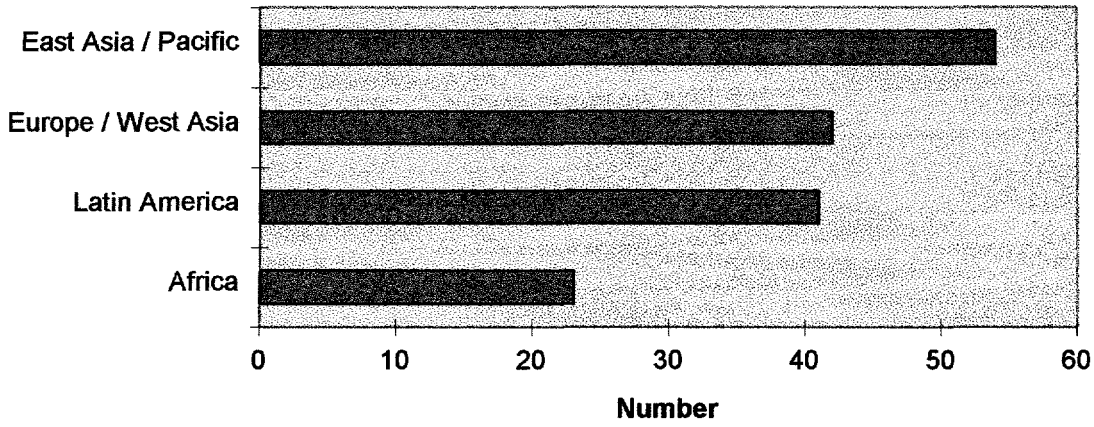
Home Countries

Over the years there have been participants in the program from approximately 88 countries. The countries sending Fellows to the U.S. have changed through the years as their need for and ability to utilize nuclear technology changed. A number of countries that required trained manpower in the early years of the program are now assisting with the training of Fellows from less developed countries.

The home countries of the Fellows and SV's who were here during 1997 is shown in Table A-3. We hosted Fellows and SV's from 40 countries. Of those, 9 countries sent only 1 and 25 sent between 2 and 7 Fellows. Brazil sent 17 fellows, Egypt sent 14 fellows, Republic of Korea sent 12 fellows, Indonesia sent 11 fellows, Turkey sent 10 fellows, and Malaysia sent 8 fellows. These six countries thus accounted for 45 percent of all Fellows and SV's trained in the U.S.

The geographical distribution is shown in Figure 3. Number of participants from countries in the East Asia and Pacific regions decreased from 51% in 1996 to 34% of the total in 1997. The proportion of participants from Europe (mainly Eastern Europe) and West Asia is at 26%. Number of participants from Latin America increased from 12% in 1996 to 26% in 1997.

Figure 3. Geographical Distribution of Fellows



Fields of Study

The principal fields in which the regular Fellows were trained during 1997 were *Nuclear Safety* (29%) and *Agricultural Applications* (27%). These were followed by programs in *Medical Applications* with 17%, *Biological Applications* with 11% *and Nuclear Engineering and Technology* with 9%. The remaining 18% were divided between *Nuclear Physics and Chemistry, Biological Applications, Industrial and Hydrological Applications, and General Atomic Energy Development.*

Agricultural Applications was also the major field of study undertaken by the Scientific Visitors and made up 34% of those awards. *Safety in Nuclear Energy* made up 20%, *Medical Applications* made up 14% of those awards, and the number of SV's in each of the remaining fields was considerably smaller.

Institutions Providing Training

Since the inception of the IAEA Fellowship Program in 1958, over 500 U.S. institutions and thousands of individuals in federal, state and private organizations have lent their support to the program and provided the essential scientific, engineering, and technical expertise required to satisfy the diverse needs of the Fellows and of the countries they represented.

Historically, training provided by universities and federal and state government facilities was approximately equal and jointly accounted for the large majority of all training opportunities. Medical schools typically trained only about 12% of Fellows. The balance of the training was provided by other institutions: private U.S. corporations and state institutions, nuclear power utilities, and mining exploration and processing facilities. About 13% of the Fellows also attended English language schools for a month or more of intensive English training in addition to their technical programs.

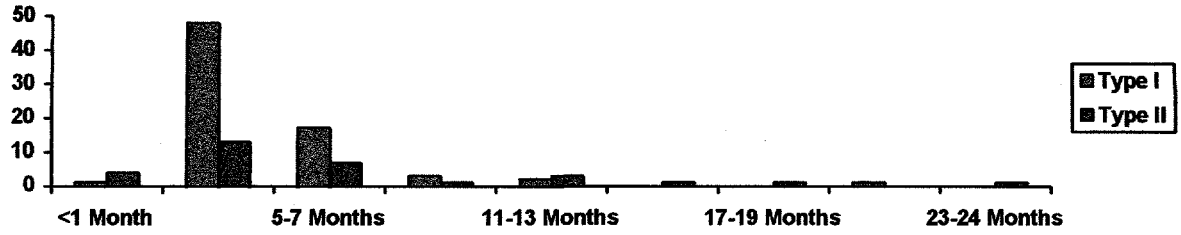
The list and types of institutions providing training for Fellows and SV's during 1997 are shown in Table A-5. Universities and federal and state government facilities remained the principal institutions providing training. Forty two universities and thirty three government facilities trained regular Fellows. Twenty medical schools or hospitals, thirteen other commercial or non-profit organizations, and two utilities also hosted Fellows. The distribution for the SV's was similar. Twelve Fellows attended English language school before beginning their technical training.

Length of Tenure

The length of the awards received by regular Fellows varied over a wide range depending on the type of training required and the prior knowledge and experience of the candidates. They last from one month to one year, with extensions possible. The average length has been running about six months.

The distribution is shown in Figure 4 and Table A-6. 85% of Type I and Type II fellowships last between 1-7 months, an increase of 18% over 1996. The lengths of the regular Fellow's fellowships decreased in 1997 over the previous year. The percentage that were greater than eight months duration was 13% in 1993, 6% in 1994, 8% in 1995, 19% in 1996, and 13% in 1997.

Figure 4. Duration of Fellowships by Type



A significant number of hosts again expressed concern over the length of time requested for scientific visits. The requested visit time was often one week, and most prospective hosts were reluctant to devote an entire week to a visitor. Many times the host indicated that s/he could show the visitor everything relevant that was being done at the facility in one or two days. We were often obliged to arrange shorter term visits to more sites, something that took an inordinate amount of time to arrange. We often requested that the visitor be permitted access to the library for a day or two. This latter strategy actually proved to be a good one in most cases as the visitor could have access to journals that are often not available in his or her home country. Free use of the photocopying machine was granted in all cases.

Appendix Tables

Table A-1. Number of Fellows by Status and Type

	Type I	Sci Vstr	Type II	Total
1. Completed Tenure during 1997	74	44	32	150
2. On Tenure - December 31, 1997	6	0	4	10
Being Processed - December 31, 1997	70	21	41	132
TOTAL	150	65	112	292

Table A-2. Education, Age, and Gender Distribution of Fellows

	Type I	Sci Vstr	Type II	Total
Education				
No degree	0	2	0	2
Baccalaureate	24	10	10	44
Master's	33	12	16	61
Doctorate	12	17	7	36
M.D./D.V.M	11	3	3	17
Age				
25-29	12	3	4	19
30-34	21	2	8	31
35-39	26	5	12	43
40-44	13	10	8	31
45-49	5	15	2	22
50-Over	2	9	1	12
No Report	1	0	1	2
Gender				
Female	17	15	10	42
Male	63	29	26	118
TOTAL	80	44	36	160

Table A-3. Home Countries

Country	Type I	Sci Vstr	Type II	Total
Argentina	1	2	0	3
Bangladesh	2	0	1	3
Brazil	9	6	2	17
Bulgaria	2	1	1	4
Chile	1	4	1	6
Colombia	1	0	2	3
Costa Rica	0	1	1	2
Egypt, Arab Republic of	4	1	9	14
Ethiopia	0	0	2	2
Ghana	2	0	0	2
Hungary	0	7	0	7
Indonesia	4	0	7	11
Israel	1	1	0	2
Jordan	1	1	1	3
Kazakhstan	3	0	0	3
Korea	11	0	1	12
Malaysia	4	3	1	8
Mauritius	2	2	0	4
Mexico	1	3	1	5
Mongolia	0	0	2	2
Morocco	0	0	1	1
Nigeria	1	0	0	1
Pakistan	1	0	0	1
People's Republic of China	3	1	0	4
Peru	1	0	0	1
Phillipines	3	1	0	4
Poland	0	1	0	1
Portugal	0	2	0	2
Romania	3	0	0	3
Saudi Arabia	2	0	0	2
Slovak Republic	1	0	0	1
Slovenia	0	0	2	2
Sri Lanka	1	0	0	1
Tanzania	0	0	1	1
Thailand	2	2	0	4
Turkey	9	1	0	10
Ukraine	1	1	0	2
Uruguay	1	2	0	3
Venezuela	1	0	0	1
Vietnam	1	1	0	2
TOTAL	80	44	36	160

Table A-4. Fields of Study

	Type I	Sci Vstrs	Type II	TOTAL
0 - Gen'l Atomic Energy Development	1	2	3	6
1 - Nuclear Physics	3	0	1	4
2 - Nuclear Chemistry	1	1	1	3
3 - Prospecting, Mining, and Processing	0	0	1	1
4 - Nuclear Engineering and Technology	9	5	2	16
5 - Agricultural Applications	18	15	13	46
6 - Medical Applications	15	6	5	26
7 - Biological Applications	4	2	0	6
8 - Industrial and Hydrological Application	4	4	1	9
9 - Safety in Nuclear Energy	25	9	9	43
TOTAL	80	44	36	160

Table A-5. Institutions Providing Training

A: Universities	Type I	SciVstr	Type II	TOTAL
University of California-Davis	0	1	0	1
Univ of California-Los Angeles	1	0	0	1
Univ of California-Riverside	1	0	0	1
Colorado State University	1	0	0	1
Cornell University/NY	2	0	0	2
University of Delaware	1	0	0	1
Eastern Virginia Medical School/Norfolk, VA	1	0	0	1
Fisk University, Nashville, TN	1	0	0	1
Florida International University	1	1	0	2
University of Florida	1	0	0	1
Georgetown University	0	1	0	1
University of Hawaii at Manoa	3	1	0	4
U of Illinois at Champaign/Urbana	2	0	0	2
Iowa State University	1	1	3	5
John Hopkins University/MD	1	0	0	1
Long Island Jewish Medical Center/NY	0	0	1	1
Louisiana State U and A&M College	0	0	2	2
University of Maryland	1	0	1	2
Massachusetts Inst of Technology	1	0	0	1
U of Massachusetts-Lowell	0	0	1	1
University of Miami/FL	1	1	1	3
Michigan State University	0	1	0	1
University of Minnesota/St Paul	0	1	0	1
University of Missouri-Columbia	0	1	0	1
University of New Mexico	0	0	1	1
North Carolina State U-Raleigh	1	0	0	1
Ohio State University	1	0	1	2
Oregon State University	0	1	0	1
The Pennsylvania State University	0	1	0	1
Purdue University/IN	0	2	0	2
State U. of New Jersey, Rutgers/NJ	1	0	0	1
University of Tennessee-Knoxville	1	0	0	1
Texas A&M University	1	0	0	1
University of Texas,Austin	1	0	0	1
University of Texas-Dallas	0	1	0	1
Tuskegee University/A	0	0	2	2
University of Utah	3	0	0	3
Virginia Polytechnic Inst & State U.	1	0	0	1

Table A-5. Institutions Providing Training (cont'd.)

B: Federal and State Facilities	Type I	SciVstr	Type II	TOTAL
DOD-DNA/Beth MD	0	0	1	1
DOE/Grand Junction/CO	0	1	0	1
DOE-INEL	2	3	0	5
DoE-Argonne Nat Lab/Argon IL	3	1	1	5
DoE-Brookhaven Nat Lab/Uptn NY	4	2	0	6
DOE/Los Alamos NM	0	0	5	5
DoE-Oak Ridge Inst Sci and Edu/TN	7	1	1	9
DoE-Oak Ridge National Lab/TN	1	2	0	3
DoE-Sandia Nat'l Lab/Albuquerque NM	1	1	1	3
FDA/DC	0	1	0	1
HHS-Ctr Disease Contr and Prev/Atl GA	0	1	0	1
Natl Inst Stds andTech/Gaithrbg MD	0	1	0	1
Nuclear Reg Comm/Washington DC	2	7	3	12
Nuclear Reg Comm/Arlington TX	1	0	0	1
Tex Dept of Health/Austin TX	0	1	0	1
Tex Low-Level Radioactive Waste Auth	0	1	0	1
USDA/Bell CA	0	3	0	3
USDA/Beltsville MD	1	1	0	2
USDA/College-Station TX	0	1	0	1
USDA/Columbia MO	0	0	1	1
USDA/Fargo ND	1	0	1	2
USDA/Gainesville FL	0	1	0	1
USDA/Greenbelt MD	1	0	0	1
USDA/Honolulu HI	1	0	0	1
USDA/Miami FL	0	1	0	1
USDA/Mississippi State MS	1	0	0	1
USDA/Phoenix AZ	0	2	0	2
USDA/Stuttgart AR	0	0	1	1
USDA/Tifton GA	0	0	1	1
USDA/Waimanalo HI	2	0	0	2
USDA/Weslaco TX	0	4	0	4
US Geol Survey/Denver CO	0	3	0	3
USGS/Woods Hole	1	0	0	1

Table A-5. Institutions Providing Training (cont'd.)

C: Medical Schools and Hospitals	Type I	SciVstr	Type II	TOTAL
Baylor Coll Med/Houston	1	0	0	1
Colorado U., Denver	0	1	0	1
Columbia Presbyt/NY	0	1	0	1
Georgetown Sch Med/DC	0	0	1	1
Harvard Med Sch/Boston MA	1	0	0	1
Howard U Sch Med/Wash DC	1	0	0	1
Illinois U.-Medical Center, Chicago Ill	1	0	0	1
LA ST. U, Med Center-New Orleans LA	0	0	1	1
Mallinckrodt Inst/St.Louis, MO	1	0	0	1
Maryland, U. Sch Med.	1	0	0	1
Mass Univ Sch/Worcester MA	1	0	0	1
NW Tissue Center, Seattle, WA	1	1	0	2
Scripps Clinic/CA	1	0	0	1
St. Vincent Hospital, NY	2	0	1	3
Stanford Sch Med/Stanford, CA	1	0	0	1
Texas U Hlth Sc/Antonio, TX	0	1	0	1
Tulane U Sch Med/New Orleans LA	1	0	0	1

Table A-5. Institutions Providing Training (cont'd.)

D: Exploration, Mining and Processing	Type I	SciVstr	Type II	TOTAL
Energy Fuels Nuclear, Inc/Denver CO	0	1	0	1

E: Utilities	Type I	SciVstr	Type II	TOTAL
Baltimore Gas&Elec/Calvert Cliffs MD	0	2	0	2
PECO-Peach Bottm/Delta PA	0	0	1	1

Table A-5. Institutions Providing Training (cont'd.)

F: Other Commercial and Nonprofit	Type I	SciVstr	Type II	TOTAL
ABB AMDATA INC/Windsor CT	1	0	0	1
FL Dept of Agri/Gainesville FL	1	0	0	1
Innovative Systems Software Idaho Falls	0	2	0	2
Medx Inc./Woods-Dale Ill	0	0	1	1
General Atomics/San-Diego CA	0	0	3	3
PA Regional Tissue Bank/Scranton PA	1	0	0	1
PLG/Newport Beach CA	1	0	0	1
SAIC	1	1	0	2
Scientech/Rockville, MD	1	0	0	1
Sonalysts/Waterford CT	1	0	0	1
Southwest Research Institue/San-Ant TX	1	0	0	1
Westinghouse Electric/Pittsb PA	1	2	0	3

G: English Language Schools	Type I	SciVstr	Type II	TOTAL
ELS/Atlanta GA	1	0	0	1
ELS/New Haven CT	1	0	0	1
ELS/Chicago-River Forest IL	1	0	1	2
ELS/College of Mt St Vincent NY	1	0	0	1
ELS/Denver CO	1	0	0	1
ELS/Houston TX	0	0	1	1
ELS/Melbourne FL	1	0	0	1
ELS/Oakland CA	1	0	0	1
ELS/Orange CA	1	0	0	1
ELS/Petersburg FL	0	0	1	1
ELS/Philadelphia PA	1	0	0	1

Table A-6. Length of Tenure of Completed Fellowships

	Type I	Sci Vstr	Type II	Total
Less Than 1 Month	1	44	4	49
1 - 4 Months	56	0	18	74
5 - 7 Months	17	0	7	24
8 - 10 Months	3	0	1	4
11 - 13 Months	2	0	3	5
14 - 16 Months	0	0	1	1
17 - 24 Months	1	0	2	3
TOTAL	80	44	36	160