

PART VI

BIOLOGY AND MEDICINE

(UNCLASSIFIED)

The principal aspects of the Commission's program of biology and medicine to receive emphasis during the next 12 months are:

1. Civil defense liaison activities, including the development of radiation detection instruments;
2. Studies to establish permissible levels of exposure and methods of radioactive waste disposal;
3. Studies of radiation injury and long-term effects of radiation, including the work of the Atomic Bomb Casualty Commission in Japan;
4. Training of health physicists in radiation protection;
and
5. Study of the toxicity and metabolism of carbon 14 and tritium.

Civil Defense Liaison

The Commission's program in civil defense was outlined in testimony and statements submitted to the Joint Committee in executive session, February 17, 1950, and in the open hearing, March 17, 1950. Progress in significant phases of the program since then is described below.

Instructor training courses. The Radiological Monitoring Courses at Brookhaven National Laboratory, at the Atomic Energy Project, University of California at Los Angeles, and at Oak Ridge, began in March and April. There were 15 participants in the Brookhaven course, 12 at the University of California, and 21 at Oak Ridge. Similar courses will be given at two additional locations, Reed College, Portland, Oregon, commencing in June, and the Illinois Institute of Technology, Chicago, Illinois, beginning in July.

One-week courses in the Medical Aspects of Atomic Warfare were held at seven locations during March, April, and May and had the following participation:

<u>Institution</u>	<u>No. of students</u>
University of Rochester Atomic Energy Project	30
Johns Hopkins University School of Medicine	23
Argonne National Laboratory	25
Western Reserve University School of Medicine	23

4005956

<u>Institution</u>	<u>No. of students</u>
University of Utah School of Medicine	8
University of California at Los Angeles Atomic Energy Project	27
University of Alabama	8
Total	<u>144</u>

Emergency radiation control program. Organization and training of the emergency monitoring teams continued under the jurisdiction of the Operations Offices. Allocation of stockpile radiation detection instruments to the teams was nearly completed. The Hanford Operations Office was engaged in assembling standard individual kits to be used by the four teams in that area. The New York Operations Office and the Oak Ridge Operations Office reviewed operating plans and manuals for their respective emergency radiation control programs.

Technical information for the NSRB. The third and last report in the series to be abstracted from the Weapons Effect Handbook was forwarded to the National Security Resources Board on April 14, 1950, for use in their civil defense planning program. Radiation Detection Instruments is the subject of this interim report.^{1/}

Radiation Detection Instruments

In January the Radiation Instruments Branch, Division of Biology and Medicine, was transferred from Oak Ridge to its present location at the National Bureau of Standards, Washington, D. C. This move will facilitate general AEC-wide coordination in radiation detection instrumentation and will permit closer work with the Bureau.

Contacts were made with 38 industrial concerns for the purpose of obtaining their ideas on the development of a simple, inexpensive radiological safety instrument. As a result of these contacts, 27 proposals ranging in cost from approximately \$3,500 to \$50,000 each were received from 15 companies. These proposals, suggesting the development of 9 different types of devices, are being reviewed and contractual action on several is expected to be initiated.

Six projects for the development of simple, inexpensive radiation detection instruments were being carried on by instrument experts at various AEC laboratories:

1. An ionization chamber instrument about the size of a photographic light meter was developed by the Oak Ridge National Laboratory.

^{1/} The report was transmitted to the Joint Committee by letter, April 13, 1950.

the end of the year. Initially, the investigations will be on the ability of existing methods of water treatment and purification to remove radioactive contamination from water supplies.

A proposed Columbia River survey was agreed upon by the U. S. Public Health Service and is now under consideration by the Hanford Operations Office. The survey will obtain information on the hydrological, physical, chemical, and biological characteristics of the River as they relate to Hanford plant operation and waste disposal before and after future impoundment of the River by McNary Dam, now under construction. The study is expected to begin July 1 and last two years; the costs are to be borne by the Public Health Service.

Various surveys were initiated at the Reactor Testing Station, among them a meteorological survey by the U. S. Weather Bureau and a geological study by the U. S. Geological Survey, and plans are being made for radioactive background studies. An ecological survey of the White Oak Pond and drainage basin at Oak Ridge was begun in collaboration with TVA.

Health Physics Training

The second group of 21 fellows training in health physics at Oak Ridge and the University of Rochester will complete the regular courses in September, 1950. An additional three fellows were offered an opportunity to take broader training in radiation biophysics, and two are now studying at the University of Minnesota and one at the California Institute of Technology. As an extension of this plan, the Advisory Committee for Biology and Medicine recommended that the AEC establish approximately 20 fellowships for predoctoral training in biophysics.

After the National Research Council withdrew from administration of the AEC predoctoral fellowship program, administration of a national program was undertaken by the Oak Ridge Institute of Nuclear Studies. Arrangements were instituted with Vanderbilt University for its participation in the Oak Ridge part of the program. Graduate credit is offered for course work at both training centers (Rochester-Brookhaven and Oak Ridge-Vanderbilt), and provision is made for selected fellows to take master's degrees upon an extension of the fellowships. From among 194 applicants, 40 fellowships were awarded by the Fellowship Committee, composed of representatives from Rochester and Vanderbilt Universities, Oak Ridge National Laboratory, Oak Ridge Institute of Nuclear Studies, and the AEC. This group will begin their training in the Fall of 1950.

Cancer Research Plans and Facilities

Argonne Cancer Research Hospital. The contract between the University of Chicago and the Atomic Energy Commission for operation of the Argonne Cancer Research Hospital and the contract for the lease of the property to the University of Chicago were signed. Bids for construction of the Hospital are now being taken and an award is scheduled for June.

Oak Ridge cancer research unit. Construction of the cancer wing at the Oak Ridge Hospital was completed, and the unit was equipped and ready to receive patients at the end of May. A plan for the initial cancer research activities was established and includes among other studies the following:

1. The use of radiogallium in the treatment of experimental and, later, human cancer;
2. The properties of radioruthenium in the treatment of surface tumors;
3. The use of radiomanganese in the treatment of thyroid tumors;
4. The action of antimony compounds in cancer by radio tracer techniques; and
5. The development and design of a telecobalt therapy unit to use a thousand curie source when this becomes available. The project is being carried on in conjunction with the Post-Graduate School of Medicine, the University of Texas, and the M. D. Anderson Hospital for cancer research.

Research Proposals Approved

A list of the research proposals approved by the Division of Biology and Medicine during the period January through April, 1950, is shown in Appendix D. (End of UNCLASSIFIED section.)

4005959

Appendix A

Table 1. - COSTS INCURRED - BY PROGRAMS

(Millions of dollars *)

	Fiscal year 1949	Fiscal year 1950			Total (nine months)
		July- Sept. 1949	Oct.- Dec. 1949	Jan.- Mar. 1950	
<u>OPERATING PROGRAMS</u>					
Source & Fissionable Materials	\$108.7	\$23.5	\$36.0	\$24.9	\$84.4
Weapons	90.7	22.5	20.5	22.2	65.2
Reactor Development	17.0	6.1	6.5	8.7	21.4
Physical Research	26.2	7.1	6.5	8.0	21.6
Biology and Medicine	14.7	3.9	4.2	4.5	12.7
Community Operations	14.5	1.3	1.6	1.6	4.5
Program Direction and Administration	21.7	5.4	4.8	5.3	15.5
Subtotal-Operating Programs	<u>\$293.5</u>	<u>\$69.8</u>	<u>\$80.2</u>	<u>\$75.2</u>	<u>\$225.3</u>
<u>PLANT AND EQUIPMENT</u>					
Production Facilities	\$158.5	\$20.9	\$25.1	\$24.6	\$70.6
Research Facilities	85.2	16.7	27.0	21.5	65.2
Community Facilities	69.1	18.7	9.4	4.4	32.5
Administrative Facilities	1.5		.3		.3
Multi-purpose Facilities	23.6	3.4	5.2	4.5	13.0
Changes in Undistributed Construction Costs		(2.9)	1.1	(1.5)	(3.3)
Subtotal- Plant and Equipment	<u>\$338.0</u>	<u>\$56.8</u>	<u>\$68.1</u>	<u>\$53.5</u>	<u>\$178.4</u>
Total-Operating and Plant and Equipment Programs	<u>\$631.5</u>	<u>\$126.6</u>	<u>\$148.3</u>	<u>\$128.7</u>	<u>\$403.6</u>

(*) Detail may not add to total due to rounding.

~~OFFICIAL USE ONLY~~

DOE ARCHIVES

4005960

[REDACTED]

Appendix A (continued)

Table 2. - COSTS INCURRED - BY OPERATIONS OFFICES

(Millions of dollars *)

Operations Office	Fiscal year 1949	Fiscal year 1950			Total (nine months)
		July-Sept. 1949	Oct.-Dec. 1949	Jan.-Mar. 1950	
<u>OPERATING PROGRAMS</u>					
Chicago	\$ 19.4	\$ 5.7	\$ 5.9	\$ 6.4	\$ 18.0
Hanford	37.7	7.6	9.5	10.1	27.2
Idaho		.1	.1	.3	.5
New York	28.3	7.9	6.5	6.7	21.1
Oak Ridge	71.0	15.7	14.7	14.7	45.1
Santa Fe	76.3	21.6	18.2	20.6	60.4
Schenectady	6.5	1.7	2.9	3.9	8.6
Raw Materials	26.4	6.2	16.4	7.1	29.7
Washington	<u>27.9</u>	<u>3.4</u>	<u>5.8</u>	<u>5.3</u>	<u>14.6</u>
Subtotal-Operating Programs	<u>\$293.5</u>	<u>\$69.8</u>	<u>\$80.2</u>	<u>\$75.2</u>	<u>\$225.3</u>
<u>PLANT AND EQUIPMENT</u>					
Chicago	\$ 24.3	\$ 5.8	\$ 6.6	\$ 5.8	\$ 18.2
Hanford	152.3	8.0	7.7	7.1	22.8
Idaho	.2	.1	.7	1.4	2.2
New York	25.2	3.8	4.6	3.0	11.3
Oak Ridge	45.8	13.2	10.5	12.1	35.8
Santa Fe	48.8	19.7	29.7	18.3	67.8
Schenectady	16.9	2.6	3.0	1.7	7.4
Raw Materials	1.8	.5	.2	.1	.8
Washington	<u>22.7</u>	<u>3.2</u>	<u>4.9</u>	<u>4.0</u>	<u>12.1</u>
Subtotal-Plant and Equipment	<u>\$338.0</u>	<u>\$56.8</u>	<u>\$68.1</u>	<u>\$53.5</u>	<u>\$178.4</u>
Total-Operating and Plant and Equipment Programs	<u>\$631.5</u>	<u>\$126.6</u>	<u>\$148.3</u>	<u>\$128.7</u>	<u>\$403.6</u>

(*) Detail may not add to total due to rounding.

4005961

Appendix B

~~CONFIDENTIAL~~

<u>ated</u> <u>bes</u> <u>lete</u>	<u>Estimated</u> <u>cost</u> <u>(000's)</u>
30,	\$ 1,800
30,	67,000
1,	162,400
1,	2,000
1, *	25,564
30, *	3,152
1, *)	1,810
1, *)	
13, *	6,583 Δ

896500h

Appendix B

CONSTRUCTION PROGRESS SCHEDULES FOR PRINCIPAL TECHNICAL FACILITIES
AS OF MARCH 31, 1950 - (continued)

Project	Status of construction at end of each quarter (percent) 1950		Status of construction at end of each quarter (percent) 1949		Currently estimated construction dates	Estimated cost (000's)
	1st	2nd	3rd	4th		
WEAPONS (continued)						
Los Alamos (cont'd.)						
Detonator Facilities (GMX-7)	4	52	91	99	June 3, 1949	\$ 759
	2	60	100	100		
Electric & Steam Plant #	0	0	7	11	Dec. 8, 1949	3,300
	0	0	5	8		
HE Firing Facilities (GMX-8)	0	22	77	98	July 18, 1949	1,500
	0	22	88	98		
Sandia						
Production Building (A-17)	2	7	37	72	May 23, 1949	4,743
	1	8	39	55		
A-19 Building #	0	0	0	2	Feb. 6, 1950	4,068
	0	0	0	3		
Hanford						
234-5 Bldg. Program	78	78	86	87	Mar. 19, 1948	24,950
All phases	78	78	90	89		
RESEARCH AND REACTOR FACILITIES						
Schenectady						
Knolls Atomic Power Lab.	77	91	97	99	Aug. 1, 1947	27,000
	81	93	99	100		
Intermediate Power-Breeder Reactor (Service Bldgs. Only)	0	0	28	53	Sept. 27, 1949	560
	0	2	47	89		

(See footnotes at end of table)

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

Appendix C

PHYSICAL RESEARCH PROPOSALS APPROVED BY THE DIVISION
OF RESEARCH, JANUARY THRU APRIL, 1950

Institution, investigator, subject of research,
and estimated annual cost

American Smelting and Refining Co. (A. A. Smith) - Properties of liquid metals - \$20,000	Illinois Institute of Technology (A. F. Clifford) - Polonium chemistry and chemistry of acids of hydrogen fluoride system - \$10,000
Carnegie Institute of Technology (E. C. Creutz) - Nuclear research program with 450 Mev synchro- cyclotron - \$475,000 *	Illinois Institute of Technology (Martin Kilpatrick) - Fundamental chemistry of ozone - \$11,900
Carnegie Institute of Technology (Truman P. Kohman) - Nuclear chemistry - \$27,000	Illinois Institute of Technology (S. E. Wood) - Properties of non- electrolytic solutions - \$12,000
Chicago, University of (S. K. Allison) - Biological and chemi- cal research with 35-inch cyclotron - \$31,500	Iowa, State University of (N. C. Baenziger) - Structure of inter- metallic compounds - \$12,000
Columbia University (T. A. Read) - - Diffusionless phase-changes in solid metals and alloys - \$27,000	Iowa, State University of (James Jacob) - Operation of electro- static generator - \$40,000
Cornell University (J. H. Hoard) - Structure of fluocarbons and elementary boron - \$6,500	Massachusetts Institute of Technology (C. D. Coryell, D. N. Rume, and J. D. Roberts) - Nuclear chemistry - \$115,000 *
Dow Chemical Company (J. C. McDonald) - Properties of magnesium-base alloys - \$23,000	Massachusetts Institute of Technology (J. C. Slater) - Radiation damage in materials - \$28,000
Fordham University (M. Cefola) - Use of thenoyltrifluoroacetate (TTA) as an analytical reagent - \$10,000	Northwestern University (Fred Basolo and R. G. Pearson) - Substitution reactions of inorganic complexes - \$5,100

(*) Represents continued support by AEC, heretofore supported jointly
with ONR.

4005964

Appendix C (continued)

- Northwestern University (D. D. DeFord)
- Solution chemistry of ruthenium
in lower valence states - \$7,500
- Pennsylvania State College (W. C. Fernelius) - Stability of coordination compounds and related problems - \$15,000
- Pennsylvania, University of (R. M. Brick) - Thermodynamics of iron-oxygen-sulfur system - \$8,000
- Pittsburgh, University of (Harry Freiser) - Organic reagents for inorganic analysis - \$6,000
- Reed College (K. E. Davis) - X Radiation from K- and L-capture - \$9,500
- Rochester, University of (R. E. Marshak) - Nuclear research with 250 Mev cyclotron - \$460,000 *
- Tennessee, University of (G. K. Schweitzer) - Low-energy beta particle emission - \$4,500
- Washington, University of (C. L. Utterback) - operation of 60" cyclotron - \$65,000 *
- Wichita, University of (Luther Lyon) - Techniques for measurement of surface area of powders - \$10,000
- Wisconsin, University of (W. J. Blaedel) - High frequency titrations - \$5,400
- Yale University (J. M. Sturtevant and Louis Meites) - Polarographic diffusion current - \$12,000

Note: Each of the above projects is for Unclassified work.

(*) Represents continued support by AEC, heretofore supported jointly with ONR.

4005965



Appendix D (continued)

- Minnesota, University of (Dr. W. D. Armstrong) - Effect of ionizing radiation on electrolyte and water metabolism - \$47,174
- Minnesota, University of (Dr. G. E. Moore) - The study of methods and instruments to improve the localization of radioactive materials in the body; with special reference to the diagnosis of brain tumors - \$22,713 *
- Minnesota, University of (Dr. Samuel Schwartz) - Synthesis of hemoglobin in bone marrow and maturation and multiplication of blood cells - \$20,738
- Minnesota, University of (Dr. C. J. Watson) - The influence of radiation and chemically induced bone marrow injury upon porphyrin injury - \$18,630
- Montefiore Hospital, New York City and Polytechnic Institute of Brooklyn (Drs. Daniel Lazzio and K. G. Stern) - The relationship of stable and radioactive lanthanum to nucleic acid synthesis in normal and neoplastic tissue - \$30,000
- New England Deaconess Hospital, Boston, Mass., (Drs. S. P. Hicks, M. W. Holt, S. O. Sommers, E. H. Thompson, and S. W. Warren, Scientific Advisor) - Acute radiation injury - \$15,400 plus overhead.
- New York University - Bellevue Medical Center (Dr. M. B. Sulzberger) - Skin changes produced by low voltage roentgen ray irradiation - \$6,480 *
- North Carolina, University of (Drs. J. C. Andrews and M. K. Berkut) - Tracer studies and irradiation in dental metabolism - \$4,500
- North Carolina, University of (Dr. Arthur Roe) - Carbon 14 research - \$4,300 (15 months) *
- North Carolina, University of (Drs. C. D. Van Cleave and C. T. Kaylor) - Radioautographic study of distribution and retention of beryllium in the rat - \$18,533 *
- Northwestern University (Dr. J. G. Bellows) - Studies on radiation cataract - \$24,000
- Ohio State University (Dr. J. L. Morton) - Physical and medical principles in the therapeutic use of radiocobalt 60 - \$25,000
- Oklahoma, University of (Dr. S. H. Wender) - Isolation and identification of flavonoid pigments of use in the control of radiation injury - \$12,000
- Oregon University of, Medical School (Dr. E. S. West) - Studies on metabolism - \$17,604 *
- Pittsburgh, University of (Drs. Campbell Moses and A. J. Allen) - Effects of neutrons from a cyclotron on mammals, with particular reference to the development of cataracts - \$16,537
- Rice Institute, Houston, Texas (Dr. Roy V. Talmage) - Studies of the influence of adrenocortical and other hormones on electrolyte balance - \$17,400 *

(*) Renewal of project.

- 56 -

Appendix D (continued)

- Tennessee, University of (Dr. E. F. Williams, Jr.) - Calcium metabolism - \$3,000 *
- Tennessee, University of (Drs. J. L. Wood and D. H. Sprunt) - The uptake of radioactive sulfur by the lungs of mice infected with swine influenza - \$5,200 *
- Tennessee, University of (Dr. Lester Van Middlesworth) - (a) Determination of the effects of anoxia on the thyroid gland (b) Study of the metabolism of radioactive methionine in tissues during normal metabolism, in tissues undergoing repair and in radiation tumor - \$4,350 *
- Tennessee, University of (Drs. D. S. Carroll, Jos. Cara, and D. H. Sprunt) - Study of the use of radioactive ruthenium in the treatment of superficial lesions - \$3,985
- Trudeau Foundation (Saranac Lab.) Saranac, New York (Dr. A. J. Vorwald) - The influence of cortisone upon chronic inflammatory - disease of the lung - \$2,000
- Tufts College, Medford, Mass. (Dr. David Rapport) - The effect of radiations on reactions associated with growth - \$16,200 *
- Tulane University (Dr. G. E. Burch) - Study of the turnover rate of chlorine under controlled dietary and therapeutic conditions in patients with congestive heart failure and in control subjects - \$3,600
- Utah, University of - Basic training course of physicians, nurses, and dentists on the medical aspects of atomic warfare - \$1,500
- Wake Forest College - Bowman Gray School of Med. (Dr. G. T. Harrell) - Distribution and turnover of sodium and potassium in acute infections - \$12,831 *
- Wake Forest College - Bowman Gray School of Med. (Dr. Camillo Artom) - Formation of tissue phospholipides - \$10,590 *
- Wake Forest College - Bowman Gray School of Med. (Drs. G. T. Harrell, C. Artom, and D. Cayer) - Toxicity of radiation as related to previous damage and the functional capacity of an organ; the effect of P³² and X-rays on liver and marrow - \$5,975 *
- Washington, University of (Dr. C. A. Finch) - Studies on iron metabolism - \$17,800 *
- Washington University - St. Louis, Mo. (Dr. W. M. Allen) - Use of gamma ray as a therapeutic agent of carcinoma - \$11,124 *

4005967

(*) Renewal of project.

Appendix D (continued)

Washington University - St. Louis
(Dr. G. B. Forbes) - Investigations of electrolyte balance and thyroid metabolism - \$8,320

Washington University - St. Louis
(Dr. David Lipkin) - The chemistry of nucleic acids, nucleotides and related organic phosphorus compounds - \$17,600 *

Worcester Foundation for Experimental Biology, Inc., Shrewsbury, Mass. (Drs. H. Hoagland and G. Pincus) - An investigation of the effects of radiation on the biosynthesis and metabolism of adrenocortical steroids - \$68,000

II - BIOLOGY

Battelle Memorial Institute (Dr. K. S. Chester) - Use of radioactive indicators in the study of the mode of action of fungicides - \$13,200 *

California, University of (Drs. H. A. Barker and W. Z. Hassid) - Chemical activities of plants and bacteria - \$15,900

California, University of (Drs. Roy Overstreet and Louis Jacobson) - The mechanisms of ion absorption by plants - \$7,776

Chicago, University of (Drs. E. M. K. Geiling, F. E. Kelsey, and J. M. Beal) - Biosynthesis of radioactive drug compounds - \$50,000 *

Connecticut Agricultural Experiment Station (Drs. J. G. Horsfall and A. E. Dimond) - Therapy of plant disease by nuclear radiations - \$1,675 (14 months) *

Duke University (Dr. K. M. Wilbur) - Isolation and properties of rat liver nuclei; Shell formation in mollusks as studied by radioisotopes - \$7,614 *

Fordham University (Dr. F. F. Nord) - Investigation of enzymatic degradation of native and chemically modified proteins - \$13,575

Georgia, University of (Dr. H. W. Schoenborn) - The production of mutant strains of euglenoid flagellates and their use in the study of carbon dioxide fixation processes - \$4,985

Harris Research Laboratories, Washington, D. C. (Drs. M. Harris, A. E. Brown, and G. A. Greathouse) - The chemistry of biosynthesized isotopically labeled cellulose and allied polysaccharides - \$15,500

Illinois, University of (Drs. R. C. Johnson and H. E. Carter) - Metabolism of vitamins and their interrelationships with amino acids - \$4,800

(*) Renewal of project.

Appendix D (continued)

- Illinois, University of (Drs. H. H. Mitchell and O. F. Kampmeier) - The content in human tissues of eleven trace minerals - \$8,500
- Indiana, University of (Dr. T. M. Sonneborn) - The specific immobilization substances (antigens) of paramecium aurelia - \$8,100
- Iowa State College (Drs. J. W. Cowen and Janice Stadler) - A quantitative study of lifetime sickness and mortality and progeny effects resulting from exposure of animals to penetrating irradiation - \$293,910 plus overhead (2 years)
- Iowa State College (Drs. C. H. Workman and F. Schlenk) - Studies on the metabolism of purine and pyrimidine bases on nucleic acids and nucleotides - \$10,500
- Johns Hopkins University (Drs. Wm. D. McElroy and C. P. Swanson) - Modification through the use of supplemental environmental factors of the frequency of gene and chromosome changes induced by X-rays, ultra-violet light, and nitrogen mustard - \$16,443
- Long Island Biological Association, Inc. (Dr. M. Demerec) - Adaptive value of experimental populations exposed to radiations - \$29,760 *
- Maryland, University of (Dr. J. C. Shaw) - The metabolism of acetate B-hydroxybutric glucose and other carbon compounds in lactating ruminants - \$10,000
- Michigan State College (Drs. L. F. Wolternick and E. P. Reineke) - Hormonal and nutritional factors which alter the effective half-lives and differential absorption ratios of calcium, manganese, and cobalt in the animal body - \$15,120 *
- Minnesota, University of (Dr. E. C. Stakman) - The effects of radioactive substances on plant pathogens and other micro-organisms - \$31,500 *
- North Carolina, University of (Dr. W. C. Gregory) - Peanut seed irradiation project - \$17,085 *
- Ohio Agricultural Experimental Station (Dr. R. S. Davidson) - Physiology and genetics of plant microorganisms - \$3,600 *
- Pennsylvania, University of (Dr. D. W. Wilson) - Synthesis of isotopic carbon compounds used in biochemistry - \$11,624 (13½ months) *
- Pittsburgh, University of (Drs. M. A. Lauffer and H. T. Epstein) - Correlation of radiation effects with physical and chemical changes in viruses - \$12,900

(*) Renewal of project.

UNCLASSIFIED

Appendix D (continued)

- Polytechnic Institute of Brooklyn (Dr. Carl Neuberg) - Factors influencing the solubility of heavy metal complexes and their metabolism - \$6,480
- Purdue University (Drs. H. Koffler and Dorothy M. Powelson) - The comparative biochemistry of molecular hydrogen: I The physiology of hydrogen bacteria - \$4,104
- Rutgers University (Drs. H. H. Haskin and T. C. Nelson) - Distribution and accumulation of radioisotopes of physiological importance in shellfish - \$3,888
- Southern California, University of (Drs. H. J. Deuel, Jr., and A.L.S. Cheng) - The effect of radiation on intestinal absorption and metabolism of fats and carbohydrates - \$23,382
- Tennessee, University of (Dr. Wm. K. Baker) - The influence of oxygen tension on the frequency of X-ray induced mutations and chromosome aberrations in drosophila - \$5,065 plus overhead
- Tennessee, University of (Dr. R. R. Overman) - Mechanisms of ionic imbalance and cellular membrane permeability to Na and K in adrenal insufficiency, malaria, and associated pathological studies - \$5,200 *
- Tennessee, University of (Drs. D. H. Sprunt, C. E. Nurnberger, and A. H. Lipscomb) - Study of the effects of radioactive iodine on patients with carcinoma of the thyroid and with hyperplastic thyroid - \$4,245 *
- Utah State Agricultural College (Dr. D. W. Thorne) - The use of radio iron in studying lime-induced chlorosis - \$6,100
- Washington, State College of (Dr. N. Higinbotham) - Rate of movement of ions into and through plant parenchyma tissue as affected by rate of water uptake - \$1,944 *
- Wisconsin, University of (Drs. R. H. Burris and P. W. Wilson) - Biological nitrogen fixation with isotope tracers - \$5,000
- Wisconsin, University of (Drs. R. H. Burris, M. J. Johnson, and P. W. Wilson) - Metabolism of organic acids in higher plants and microorganisms - \$6,500
- Wisconsin, University of (Dr. D. E. Green) - The cyclophorase system of animal tissue - \$29,400
- Wisconsin, University of (Dr. P. H. Phillips) - Long time effects of intermittent radiations on dogs - \$30,458
- Wisconsin, University of (Drs. A. J. Riker and J. E. Kuntz) - The use of isotopes to ascertain the role of root-grafting in the translocation of water, nutrients and disease-producing organisms among forest trees - \$8,748

(*) Renewal of project.

- 60 -

UNCLASSIFIED

DOE ARCHIVES

4005970

III - BIOPHYSICS

Howard University - Washington,
D. C. (Dr. Herman Branson) -
Studies with radioactive and
stable isotopes - \$15,000 *

Illinois, University of (Drs. G.
A. Bennett and R. A. Harvey) -
Distribution and effect of
radioactive calcium and strontium
in bone development - \$23,620

Massachusetts Institute of
Technology (Dr. Rolf Eliassen) -
The efficiency of present
water treatment methods in re-
moving radioactive substances
from water - \$44,100 *

Massachusetts Institute of Technology
(Dr. K. S. Lion) - New radiation
detector - \$17,960

Mount Sinai Hospital (Dr. R.
Loevinger) - Measurement of tissue
dosage delivered by gamma and
beta active radioisotopes -
\$5,100 *

Pittsburgh, University of (Drs. A.
G. Kramer, T. F. Hatch, and W.
H. Ray) - Hazard from inhaled
radioactive particulate matter -
\$32,560

(*) Renewal of project.

4005971

Appendix E

ESTIMATED NUMBER OF SCIENTIFIC AND TECHNICAL PERSONNEL *
EMPLOYED ON THE ATOMIC ENERGY PROGRAM AT SELECTED LOCATIONS

Employer or Installation	1948				1949				1950	
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q
Ames Laboratory	135	170	190	180	160	180	210	210	215	700
Argonne National Laboratory	440	490	510	530	590	610	630	630	700	700
Battelle Memorial Institute	100	110	120	140	145	140	130	150	145	145
Brookhaven National Laboratory	185	220	245	245	245	250	250	285	280	280
California, University of	420	460	465	460	510	540	550	545	570	570
Radiation Laboratory	900	870	860	860	840	840	725	725	710	710
Carbide and Carbon Chemical Div. (K 25-27)	430	480	530	550	555	560	600	570	550	550
Hanford Works (Tech., Health Instrument, and Med. Divs. only)	310	370	480	565	660	570	300	360	290	290
Kellogg Corp.	200	210	230	250	275	280	290	260	340	340
Knolls Atomic Power Laboratory	395 #	430 #	410 #	425 #	460 #	510 #	530 #	535 #	540	540
Los Alamos Scientific Laboratory	50	50	60	60	55	50	85	75	80	80
Mallinckrodt Chemical Co.	190	220	220	230	230	235	240	235	235	235
Mound and Scioto Laboratories	600	615	590	570	580	630	620	560	590	590
Oak Ridge National Laboratory (X-10)	400	420	440	420	375	350	310	315	320	320
Oak Ridge National Laboratory (Y-12)	130	130	130	130	120	110	105	110	110	110
Rochester, University of	250	375	550	700	775	800	900	925	1,085	1,085
Sandia Laboratory	500	550	600	600	650	65	710	885	900	900
Westinghouse Electric Corp.	5,635	6,170	6,630	6,915	7,225	7,355	7,275	7,490	7,850	7,850
Other contractors	340	370	420	440	450	480	510	570	585	585
Subtotal	5,975	6,540	7,050	7,355	7,675	7,835	7,785	8,060	8,435	8,435
AEC Scientific and Technical Total	61,625	67,247	68,566	68,651	67,452	62,529	58,615	56,610	59,107	59,107
Total AEC and Contractor Employment (all classes)										

(* Scientific and technical personnel include those employed on operations but not construction, and range generally from laboratory assistants to scientists in supervisory positions but not in top management positions. Revised estimates. (#)

SAE200078 010002

Attachment 37

OPENNET REQUIREMENTS

All documents declassified and publicly releasable on or after October 1, 1994, must have bibliographic information made available to be entered into the Department of Energy (DOE) OPENNET database. The minimum requirements are as follows:

- 1) Accession number to uniquely identify the document
- 2) Title of the document
- 3) Location of the document (where the public can obtain a copy)
- 4) Originating organization
- 5) Document type (memo, letter, report, etc...)
- 6) Declassification status (declassified, sanitized, never classified, etc...)

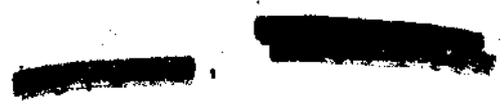
Software that is compatible with the OPENNET is available from Office of Scientific and Technical Information and may be obtained by calling Mr. Axel Ringe at (615) 576-2616.

If you are currently maintaining an electronic card file, please contact Mr. Ringe at (615) 576-2616 to arrange downloading of the data into the proper format for OPENNET.

A copy of each declassified document as well as a floppy disk containing the required bibliographic information must be sent to the DOE public reading room.

Additional information regarding OPENNET may be obtained from Mr. Fletcher Whitworth at (301) 903-4864.

4005973



94 SAE200078 010002