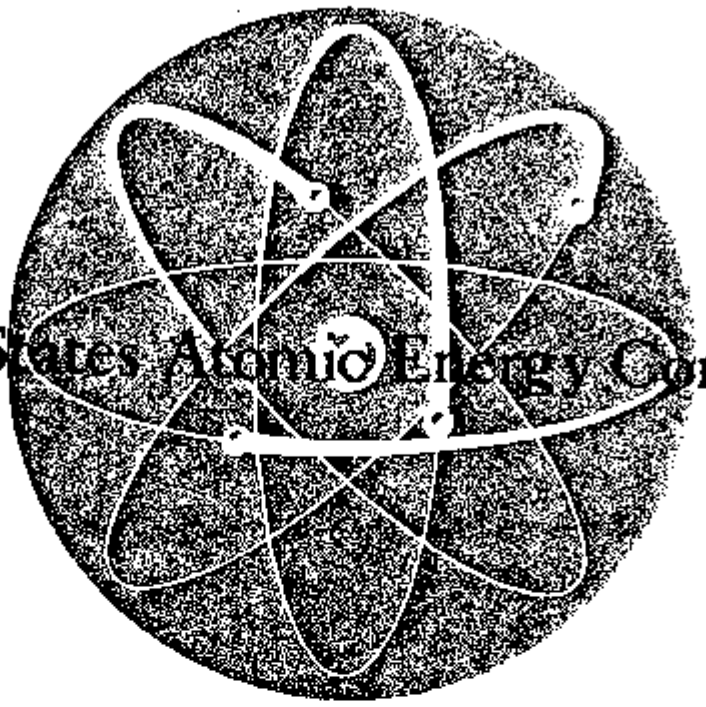
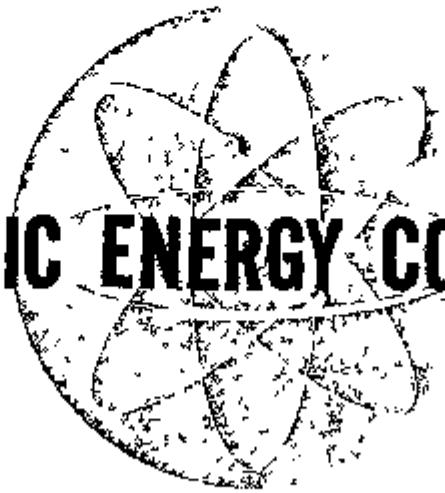


United States Atomic Energy Commission

1964

FINANCIAL REPORT



U.S. ATOMIC ENERGY COMMISSION

1964 FINANCIAL REPORT

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"I have pledged . . . that the government will get a dollar's value for a dollar spent"

PRESIDENT LYNDON B. JOHNSON

CHAIRMAN SEABORG

COMMISSIONER BUNTING

COMMISSIONER PALFREY

COMMISSIONER RAMEY

COMMISSIONER TAPE

THE UNITED STATES ATOMIC ENERGY COMMISSION

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

September 30, 1964

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER BUNTING
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

This is the unclassified Financial Report of the Atomic Energy Commission for fiscal year 1964. The financial statements have been examined by the AEC internal audit staff and, except for the exclusion of information relating to weapons and production inventories for security reasons, the auditors have found the statements to present fairly the financial position of AEC at June 30, 1964 and the results of operations for the year ended on that date.

John P. Abbadessa

John P. Abbadessa
Controller

U.S. ATOMIC ENERGY COMMISSION

1964
FINANCIAL REPORT

CONTENTS

Ten Years of Progress

INTRODUCTION

Ten Years of Progress

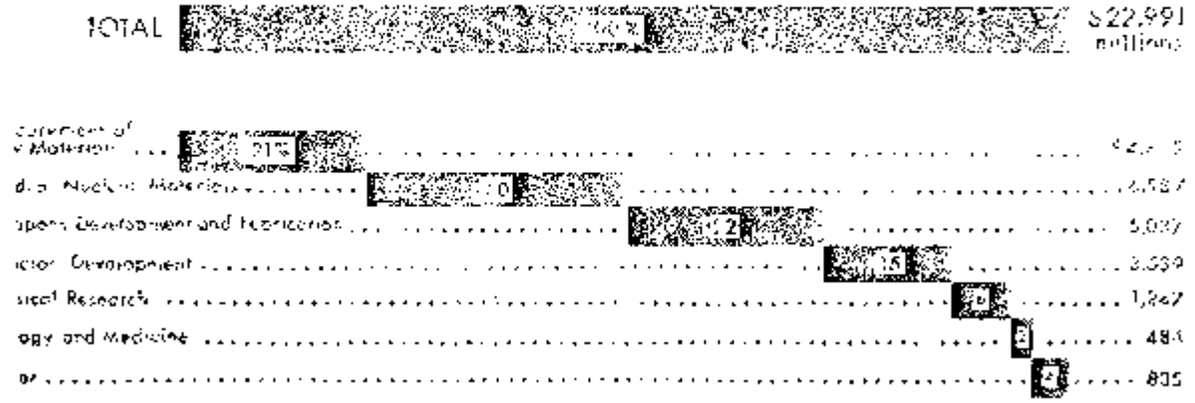
The Atomic Energy Commission is an independent agency responsible to the President and Congress. It was established by the Atomic Energy Act of 1946, with its functions and responsibilities revised and expanded by the Atomic Energy Act of 1954 to encourage the peaceful uses of atomic energy. This year marks the end of ten years of progress under the 1954 legislation. We are using this occasion to highlight the costs and accomplishments of this decade.

Funds are provided to the AEC in two congressional appropriations—one for construction and one for operations. The AEC accounting system, therefore, must comply with the requirements of Federal Government accounting. However, since the AEC is engaged in large industrial and research activities, its management requires knowledge of the cost of each step in its operations. The AEC accounting system, approved by the U.S. General Accounting Office, provides this through the application of commercial accrual and cost accounting principles, including the recording of depreciation. For the AEC, both governmental and commerical accounting have been combined into a single system. The principles of both, therefore, underlie the preparation of this report.

Most of the work involved in actually achieving the AEC goals is performed by commerical firms, or educational or other nonprofit organizations under contract to the AEC. Government-owned facilities are operated by contractors who maintain complete accounting records on their AEC activities. The report contained in the following pages is a consolidation of unclassified information obtained from financial reports submitted to the AEC by the contractors as well as information obtained from the AEC records.

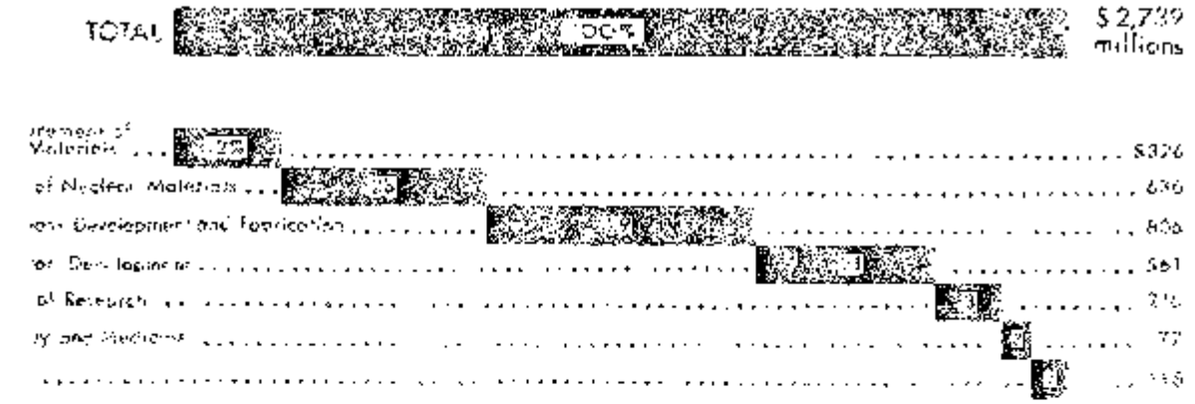
UMMARY OF
IET OPERATING COSTS

1955–1964 OPERATING COSTS



e chart above shows AEC costs for the various programs for the period 1955 through 1964 and shows percent of the total costs incurred for each of the programs. The chart below shows similar informa- for fiscal year 1964 only. Comparison of the two charts shows the shift in emphasis from procurement production to research and development activities.

1964 OPERATING COSTS



PROCUREMENT OF RAW MATERIALS

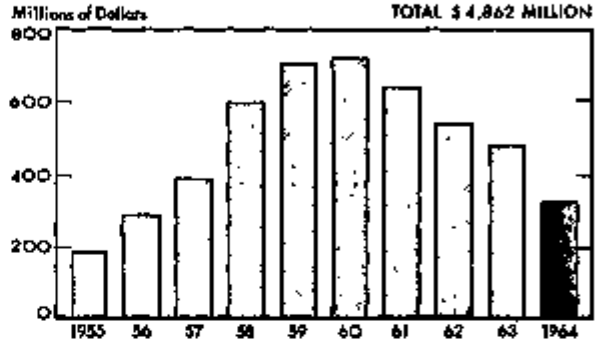
As a result of the interest developed by AEC in uranium prospecting and production during the 1950 decade, the domestic industry developed resources sufficient to support both a defense program and a civilian nuclear power industry. During recent years, the AEC has taken actions to bring procurement of U_3O_8 more in line with requirements by negotiating deferral arrangements for concentrates purchased from Canadian and domestic sources.

Cost of raw materials procurement for fiscal years 1955 through 1964 totaled $4,862 million. During the first six years, approximately 60% of uranium receipts came from foreign sources.

This trend was reversed in the period 1961 through 1964 when over 50% of receipts came for domestic sources. Annual costs have decreased from a high of $717 million in fiscal year 1960 to $326 million in 1964 due to the rapidly decreasing annual rate of foreign procurement and deferral of deliveries under the domestic stretch-out program.

The 1964 costs include procurement of uranium concentrates (U_3O_8) of $328 million and other costs of $1 million less ore sales of $3 million.

● RAW MATERIALS PROCUREMENT 1955-1964



The table below shows, by source, AEC's procurement in millions of dollars and tons of U_3O_8 for fiscal years 1964 and 1963.

SOURCE	Total Cost		Quantity		Average Cost	
	1964	1963	1964	1963	1964	1963
	(in millions)		(tons U_3O_8)		(dollars per lb.)	
Domestic	$202	$248	12,584	15,759	$8.03	$7.85
Canadian	39	137	2,239	7,017	8.74	9.77
Overseas	87	95	3,832	4,205	11.32	11.29
Total	$328	$480	18,655	26,981	$8.79	$8.89

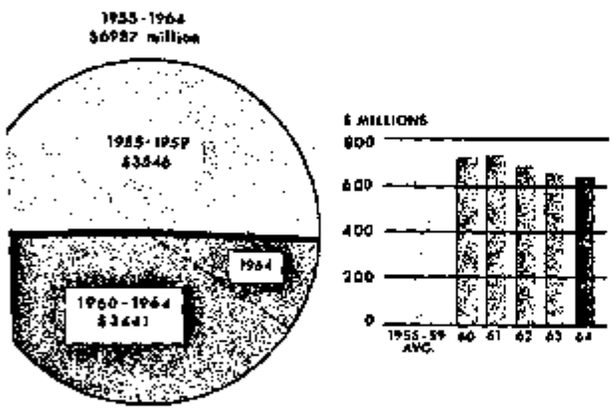
At June 30, 1964, there remained to be delivered (1) 7,200 tons of U_3O_8 in concentrates with an estimated cost of $150 million from Canadian and South African sources through December 31, 1966, and (2) 47,400 tons of U_3O_8 in concentrates (including 3,100 tons resulting from deferral arrangements) from domestic sources estimated to cost $748 million through December 31, 1970. Also, the AEC had under way negotiations with uranium contractors for deferral of deliveries beyond current contract dates, and; as an incentive for such deferrals, the AEC has offered to take an additional 11,900 tons of concentrates in 1969 and 1970 at an estimated cost of $137 million. In addition, AEC may purchase up to a maximum of 1,900 tons of U_3O_8 in concentrates during the period 1967 through 1970 from small independent producers at an estimated cost of $78 million.

PRODUCTION OF NUCLEAR MATERIALS

n the past ten fiscal years, AEC's cost of producing uclear materials for weapons, research, and civilian eeds was $6,987 million.

)urjng the five years 1960 through 1964, substantial ıcreases were made in the quantiites of materials roduced. However, as a result of increased produc- on efficiency in all processes and reductions in the use f electric power made possible by the cascade improve- ent program carried on for the past eight years, the re-year cost of $3,441 million was 3% less than the ,546 million cost for the five years 1955 through 1959.

imarily because of the improvements mentioned above, e 1964 cost of $636 million was $16 million below that 1963 and $69 million or 10% less than the 1955–1963 erage. The effect of production cutbacks announced is year will be reflected in future periods.

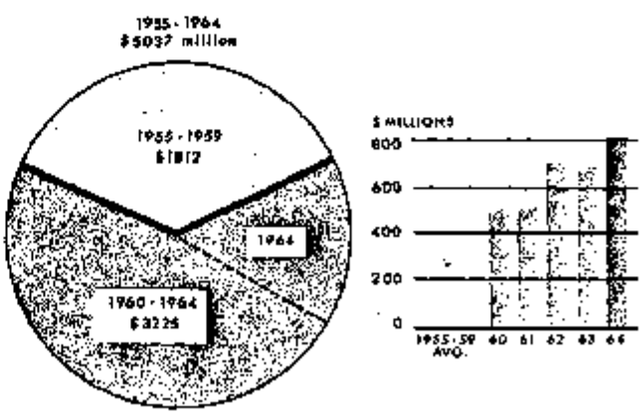


Uranium fuel elements used in one of the plutonium reactors at Richland, Washington.

'EAPONS DEVELOPMENT AND FABRICATION

shown by the chart on the right, the cost eveloping, testing, and producing atomic pons was $5,037 million for the ten .3 years 1955 through 1964. Of this unt, $3,225 million, or 64%, represents cost of the last five years.

addition to providing a substantial ntity of new weapons for the atomic kpile during the last five years, a con- ally increasing portion of the weapons ram activity was directed toward im- ing yield-to-weight ratios and other- incorporating the latest design and

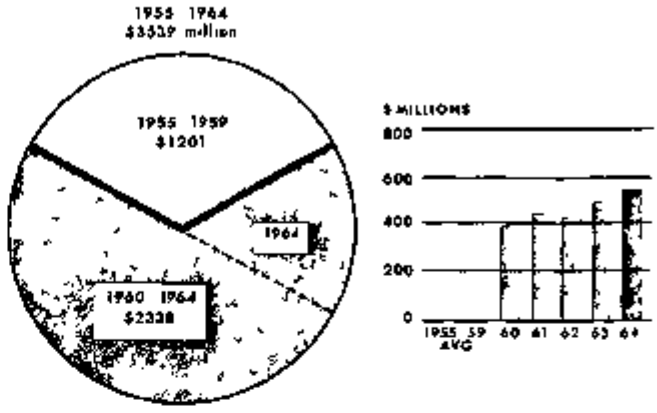


iological concepts to improve reliability, safety, and efficiency of stockpiled weapons.

s increased to $805 million in 1964, 15% above those for 1963, mainly as a result of costs related to afeguards commitments in connection with the test ban treaty including increased underground ıg, maintenance of weapons laboratories, and developing a readiness capability for the conduct of spheric tests.

REACTOR DEVELOPMENT

This program is largely oriented toward acquiring and utilizing knowledge for the development and improvement of nuclear reactor systems



For the past ten years the AEC costs for the development of nuclear reactors have totaled $3,539 million For the five years 1955 through 1959 the costs were $1,201 million, for the five years 1960 through 1964 the costs were $2,338 million, an increase of almost 95% Recent years have seen a leveling off of costs in the areas of civilian, army, and navy programs along with rapidly increasing costs for space propulsion and auxiliary power sources

In fiscal year 1964 the costs for reactor development were $561 million, an increase over the $507 million for 1963 of $54 million or approximately 11%. Figures relating to space applications, auxiliary power sources, civilian and military reactors, cooperative power reactors, and general reactor technology are shown on the next six pages

Reactors used at the Oak Ridge National Laboratory to produce air and ground-scattering radiation effects The reactors are raised 200 feet in the air by cables suspended from four 325-foot towers This research is part of the general reactor research and development program, the details of which are shown on page 12

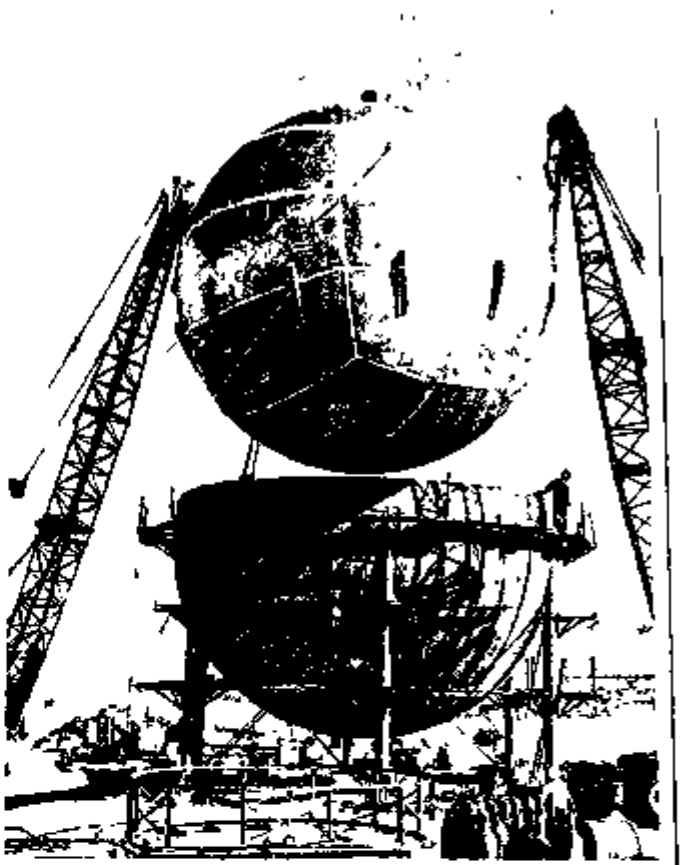
SPACE APPLICATIONS

PROPULSION—ROVER

Space vehicles to be used in extended manned flights will require nuclear propulsion. AEC in its Rover program is carrying out a research effort to meet this requirement. It has been determined that a graphite reactor system will form the basis for the first nuclear rocket engine for space propulsion. The design parameters for this system have been established, and tests conducted have demonstrated the technical feasibility and operating capability of the reactor.

For the nine fiscal years since this program was initiated, the cumulative costs total $283 million, with 73% incurred in the last three years.

PROPULSION (Rover)	Fiscal Year	
	1964	1963
	(In thousands)	
Nerva (Engine Development)	$30,801	$29,340
Kiwi (Rocket Reactor Development)	22,637	25,974
Advanced technology	11,367	6,622
Nuclear Rocket Development Station operations	9,974	7,740
Total	$94,779	$69,676



A hydrogen storage tank which will be used in connection with testing for the NERVA reactor experiment at the Nuclear Rocket Development Station.

UXILIARY POWER SOURCES (SNAP)

e Commission is developing systems for nuclear auxiliary power (SNAP). They are compact systems · use in space and areas of difficult access. Some systems are already in use as power sources in space vigation satellites, navigation light buoys, and unmanned weather stations. The cumulative costs for se activities since inception in fiscal year 1956 amount to $261 million, with 82% incurred in the last ee years.

AUXILIARY POWER SOURCES (SNAP)	Fiscal Year	
	1964	1963
	(In thousands)	
Reactor power systems	$48,021	$47,041
Advanced space power systems	27,995	25,349
Radioisotope power systems	9,588	2,798
Total	$86,604	$75,188

The Baltimore lighthouse in Chesapeake Bay is the first lighthouse in the world to be operated by an atomic generator. It is shown at the left as the nuclear-powered ship, the "NS Savannah," passes by.

CIVILIAN REACTORS

ıe civilian power program has developed a chnology that can build nuclear power plants hich, in some geographic areas, compete favor-ly with fossil fuel plants.

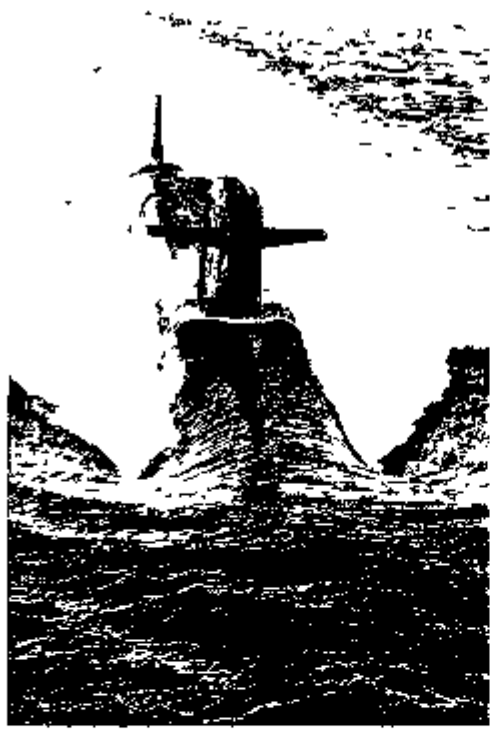
ighteen of the experimental and central stat'on ıclear power plants built under the United States omic energy program have become operable in ıe past ten years. The total net installed generat-ıg capacity of these plants now exceeds 1,000 ıegawatts (electrical).

otal AEC costs in the ten-year period for the evelopment of civilian nuclear power reactors mount to $711 million.

CIVILIAN NUCLEAR POWER REACTORS	Fiscal Year	
	1964	1963
	(in thousands)	
Sodium cooled	$29,547	$26,250
Pressurized light water	34,522	23,435
Gas cooled	13,327	12,054
Heavy water	7,455	8,384
Boiling light water	9,003	8,174
Organic moderated	1,990	7,783
Other studies and development	2,624	2,080
Total	$98,468	$88,140

MILITARY REACTORS

ıAVAL PROPULSION



Nuclear technology has been developed to the extent that Congress has authorized ninety-two nuclear-powered submarines and four surface ships. Of the authorized vessels, forty-six submarines and three surface ships are now in operation. AEC's costs over the past ten years for the development of naval propulsion total $845 million.

NAVAL PROPULSION REACTORS	Fiscal Year	
	1964	1963
	(in thousands)	
Submarine projects	$ 52,648	$ 52,350
Surface ship projects	44,612	42,842
Operation of test facilities and other costs	16,530	13,697
Total	$113,790	$108,889

The submarine USS Nathan Hale powered by atomic reactors. The submarine is not diving but is proceeding in its normal surface sailing attitude

ARMY POWER REACTORS

The Army power reactor program has developed specialized nuclear power reactors which are now being operated by military services in some of the most remote areas of the world. These reactors largely eliminate the supply problem involving the transportation of large amounts of fossil fuel. The costs of developing these reactors for the ten-year period amounted to $80 million.

COOPERATIVE POWER REACTOR PROJECTS

The AEC's civilian power reactor program has as its basic objective the development of a broad technology which can be used by the utility industry to extend fuel resources and to achieve economic generation of electricity with nuclear power plants In January 1955, the AEC determined that this objective could be achieved most expeditiously by developing the basic technology of nuclear power reactors, by constructing and operating reactor experiments and demonstration prototype nuclear power plants, and by participating with other organizations—both private and public—in nuclear power technology

There are fourteen atomic power projects in which the Commission and either public or private utilities share the cost The table below and on the next two pages shows AEC and participants' costs incurred and estimated for the development and construction of cooperative projects The costs of operation are shared by AEC on only five projects (Elk River, Piqua, Hallam, Puerto Rico, and Dairyland) Such costs are not included in the table

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1964		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
Yankee Atomic Electric Co , Rowe, Mass	August 1960 175,000 kwe	(in millions)			
Research and development		$ 5 0	$ 2	$ 5 0	$ .2
Plant and training of operators			39.2		39.2
Waiver of use charges		3 2		3.7	
Fuel fabrication			1.7		1.7
Total		8 2	41.1	8 7	41.1
Power Reactor Development Co., Lagoona Beach, Mich	August 1963 60,900 kwe				
Research and development		3 2	28.7	4 3	28.7
Plant and training of operators			69.5		70.0
Waiver of use charges		3 8		6.2	
Fuel fabrication			3.8		3 8
Total		7 0	102 0	10 5	102 5
Rural Cooperative Power Association, Elk River, Minn	November 1962 23,000 kwe				
Plant and training of operators		10 8	1 6	12 5	1 6
Fuel fabrication		.6		1.7	
Total		11 4	1 6	14 2	1 6
City of Piqua, Piqua, Ohio	June 1963 11,400 kwe				
Research and development		3 6		3 6	
Plant and training of operators		10 2	3 9	11 6	3 9
Fuel fabrication		1 3		2 4	
Total		15 1	3 9	17 6	3 9

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1964		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
		(in millions)			
Consumers Public Power District, Hallam, Nebr.	August 1962 75,000 kwe				
Research and development		$16.4		$16.7	
Plant and training of operators		33.0	$19.5	33.6	$20.6
Fuel fabrication		5.3		6.7	
Total		54.7	19.5	57.0	20.6
Northern States Power Co., Sioux Falls, S. Dak.	March 1964 58,500 kwe				
Research and development		7.4	.2	8.5	.2
Plant and training of operators	..		25.5		25.6
Waiver of use charges		.9		1.8	
Fuel fabrication			3.5		3.6
Total		8.3	29.2	10.3	29.4
Carolinas-Virginia Nuclear Power Association, Inc., Parr, S C.	March 1963 17,000 kwe				
Research and development	.	9.7	.8	12.3	1.8
Plant and training of operators			21.7		21.8
Waiver of use charges		.3		.9	
Fuel fabrication			1.3		2.5
Total		10.0	23.8	13.2	26.1
Consumers Power Co. of Michigan, Big Rock Point, Mich.	September 1962 72,000 kwe				
Research and development		3.6	1.3	4.6	1.4
Plant and training of operators			26.7		27.5
Waiver of use charges		.4		1.7	
Fuel fabrication	..		2.1		3.8
Total		4.0	30.1	6.3	32.7
Philadelphia Electric Co., York County, Pa	February 1965 40,000 kwe				
Research and development		12 7	7.8	14.5	7.8
Plant and training of operators			27.1		29.6
Waiver of use charges .		.4		2.5	
Fuel fabrication					1.0
Total		13 1	34.9	17.0	38.4

*As reported by participant

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1964		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
Puerto Rico Water Resources Authority, Punta Higuera, P.R.	April 1964 16,300 kwe	(in millions)			
Research and development		$ 1.2	$ .2	$ 1.3	$ .2
Plant and training of operators		11.6	5.0	13.7	5.4
Fuel fabrication		1.5	....	3.5	....
Total		14.3	5.2	18.5	5.6
Dairyland Power Cooperative, Genoa, Wisc.	December 1965 50,000 kwe				
Plant and training of operators		3.4	3.1	11.6	7.9
Fuel fabrication		....	....	3.2	....
Total		3.4	3.1	14.8	7.9
Connecticut Yankee Atomic Power Co., Haddam Neck, Conn.	April 1967 462,000 kwe				
Design		1.7	....	6.0	....
Plant and training of operators		....	2.1	....	82.3
Waiver of use charges		....	....	7.2	....
Fuel fabrication		....	....	....	6.0
Total		1.7	2.1	13.2	88.3
Southern California Edison and San Diego Electric Co., San Clemente, Calif.	December 1966 375,000 kwe				
Research and development		4.9	....	6.4	.7
Plant and training of operators		....	1.5	....	100.5
Waiver of use charges		....	....	6.6	....
Total		4.9	1.5	13.0	101.2
Los Angeles Department of Water and Power, Corral Canyon, Calif.	April 1968 463,000 kwe				
Design		.8	....	8.0	....
Plant and training of operators		....	....	....	88.6
Waiver of use charges		....	....	8.2	....
Total		.8	....	16.2	88.6
SUMMARY	1,899,100 kwe				
Research and Development and Design		70.2	39.2	91.2	41.0
Plant and Training of Operators		69.0	246.4	83.0	524.5
Waiver of Use Charges		9.0	....	38.8	....
Fuel Fabrication		8.7	12.4	17.5	22.4
Total		$156.9	$298.0	$230.5	$587.9

*As reported by participant.

GENERAL REACTOR RESEARCH AND DEVELOPMENT

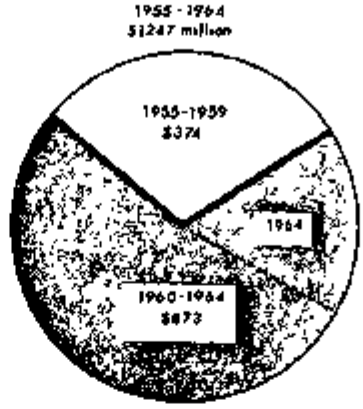
The Commission has been conducting programs in nuclear safety and general research to develop technology applicable throughout the reactor development effort. Activity in the areas of fuels and materials, reactor physics, components and equipment have made possible the present status of nuclear safety and technology. AEC's costs in this area for the past ten years total $784 million. The table below compares the costs incurred for fiscal years 1964 and 1963 for the various areas of activity of General Reactor Research and Development; the total fiscal year 1964 costs exceeded those of 1963 by $15 million.

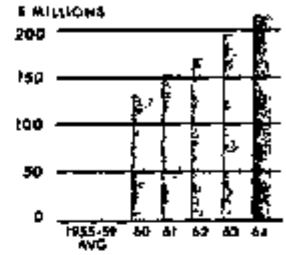
AREAS OF ACTIVITY	Fiscal Year	
	1964	1963
	(in thousands)	
TECHNOLOGY DEVELOPMENT		
Reactor fuels and materials	$ 29,344	$ 30,017
Plutonium utilization	11,761	12,224
Chemical separations	9,448	8,445
Reactor physics	8,559	7,442
Other	6,919	7,159
Total	66,031	65,287
NUCLEAR SAFETY		
Engineering field tests	15,340	10,552
Effluent controls	7,697	6,442
Reactor kinetics	5,491	4,769
Reactor containment	1,651	1,598
Fast reactor safety	988	1,185
Other	2,082	1,790
Total	33,249	26,336
ADVANCED SYSTEMS RESEARCH AND DEVELOPMENT		
Molten salt reactor experiment	5,869	6,103
Los Alamos molten plutonium reactor experiment	4,431	4,522
Direct conversion	3,227	3,594
Test reactors	2,706	2,751
Experimental beryllium oxide reactor	1,867	2,225
Ultra high temperature reactor experiment	2,074	1,691
Other	9,367	3,826
Total	29,541	24,712
EURATOM	4,160	3,797
OPERATIONS OF SERVICE FACILITIES AND MISCELLANEOUS	3,583	994
TOTAL GENERAL REACTOR RESEARCH AND DEVELOPMENT COSTS	$136,564	$121,126

PHYSICAL RESEARCH

esearch in the physical sciences seeks a 'eater understanding of the basic laws)verning the physical world in order to rther the development, use and control of ıclear energy.

ıe chart at the right shows that in the ten cal years from July 1, 1954 to June 30, 1964, EC has incurred costs for this program of ,247 million. For the five-year period, 55 through 1959, the costs were $374 llion; for the five-year period, 1960 through 64, the costs were $873 million.





RESEARCH AREAS	Fiscal Year	
	1964	1963
	(In thousands)	
High energy physics	$ 89,757	$ 73,123
Chemical properties and reactions	34,462	33,298
Low energy physics	27,252	26,361
Fusion power research	22,914	26,204
Metallurgy and materials research	22,269	21,945
Systems and materials chemistry research	5,593	5,684
Mathematics and computer research	5,098	4,871
Other chemical research	8,337	7,040
Total	$215,682	$198,526

The principal areas of research with cost comparisons between 1964 and 1963 are shown in the table at the left. High Energy Physics and Fusion Power Research are highlighted on the two following pages. Salient features of the other three major programs are given below.

EMICAL PROPERTIES AND REACTIONS

s research is directed toward increasing basic knowledge in the fields of chemical science related to nic energy. Costs for research on chemical properties and reactions total $215 million in the ten- period, 1955-1964. Outstanding achievements include the discovery of three new transplutonium ıents, and the discovery that some of the inert gases form chemical compounds. The latter discovery ıges a previously accepted basic tenet of chemical science.

W ENERGY PHYSICS

research is directed toward obtaining a better understanding of the atomic nucleus. Knowledge ıis area has been significantly increased by the development and application of new research tools. ıe tools include variable energy cyclotrons, tandem Van de Graaff accelerators, solid state detectors, small general purpose computers. Costs for this research from 1954 to 1964 total $171 million.

TALLURGY AND MATERIALS RESEARCH

: research in metallurgy and materials has contributed a variety of important accomplishments which de the finding of a new crystalline phase of carbon, the demonstration of the approach of insulators semiconductors to the metallic state at high pressures, the discovery of superconducting alloys, and levelopment of techniques for obtaining X-ray measurements at high pressures. The costs for the ten years have totaled $124 million.

The picture on the left shows one phase of construction of the two-mile long Stanford Linear Accelerator estimated to cost $114 million. The beam tube will be contained in the ten-foot square re-enforced concrete tunnel here shown partially completed. The concrete tunnel will be covered by 25 feet of earth. On top of that, a building housing the instruments and controls is yet to be constructed

HIGH ENERGY PHYSICS

High Energy Physics research is directed toward further understanding of the subatomic particles which compose all matter. Very complex and sophisticated research facilities are required. In the past ten years, four new particle accelerators with energies above 1 bev (billion electron volts) have been successfully brought into operation by AEC, and all are now doing productive research. Costs for high energy physics research totaled $386 million in the ten-year period 1955 through 1964

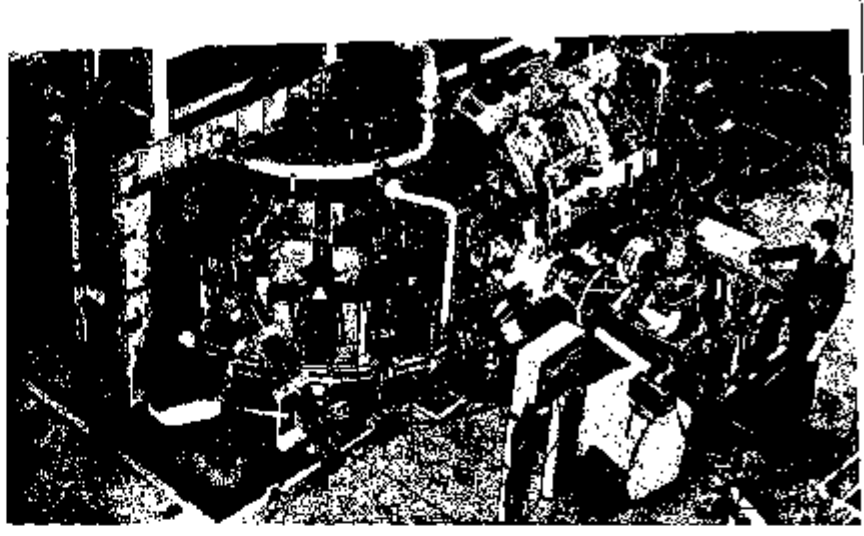
The table on the right compares the costs associated with high energy accelerators for fiscal year 1964 with the costs for fiscal year 1963.

RESEARCH COSTS	Fiscal Year	
	1964	1963
	(in thousands)	
Accelerators in Operation		
Alternating Gradient Synchrotron 33 BEV (Brookhaven)	$14, 872	$11, 374
Bevatron 6 2 BEV (Lawrence)	13, 230	11, 682
California Institute of Technology Accelerator 1.5 BEV	1, 524	1, 031
Cambridge Accelerator 6 BEV	7, 391	6, 854
Cosmotron 3.2 BEV (Brookhaven)	5, 211	5, 480
184" Cyclotron 740 MEV (Lawrence)	1, 966	2, 792
Princeton-Penn Accelerator 3 BEV	6, 715	4, 768
Zero Gradient Synchrotron 12 5 BEV (Argonne)	12, 359	5, 563
	63, 268	49, 544
Accelerators Under Construction		
Stanford Accelerator 10 to 20 BEV	5, 642	5, 799
Other High Energy Physics Research	20, 847	17, 780
Total	$89, 757	$73, 123

Photo at left is a view of the 3 Bev Princeton-Pennsylvania Proton Accelerator, one of the more recently completed high energy physics research facilities, located at Princeton University

FUSION POWER RESEARCH

Fusion power research seeks to determine the possibility of obtaining energy from controlled thermonuclear fusion or the joining of the nuclei of light elements. The energy of the sun is an example. Successful fusion power would mean an inexhaustible fuel supply (hydrogen from the sea), and there would be no problem of disposing of radioactive wastes.

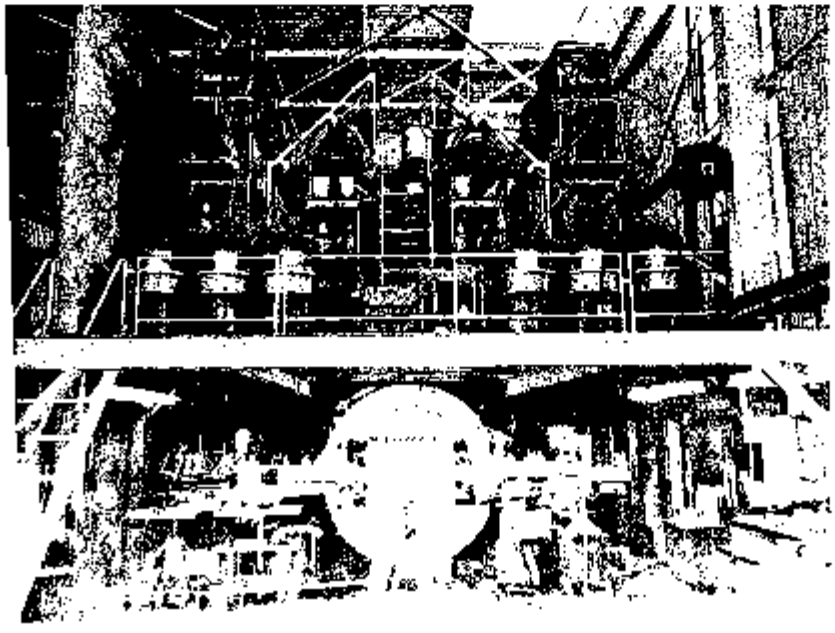


The Stellarator device used in fusion power research at Princeton University.

During the past ten years U.S. scientists have kept this country in the forefront in the world's efforts toward understanding and developing controlled thermonuclear devices. The majority of the information in this field has been contributed by the U.S. scientists who at present represent about one-fourth of the total world man-power devoted to controlled thermonuclear research. Total costs during the past ten years for this research amount to $206 million.

APPROACHES	Fiscal Year	
	1964	1963
	(in thousands)	
Stellarator	$6,090	$7,070
Direct current experiment	5,033	5,736
Magnetic mirror	3,122	3,895
Pinch, magnetic shock compression, and rotating plasma	2,802	3,445
Relativistic electron	1,472	1,512
General research and development	4,395	4,546
Total	$22,914	$26,204

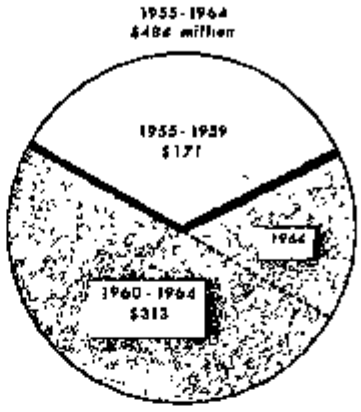
The table on the left compares the costs for the various approaches of fusion power research for fiscal years 1964 and 1963.

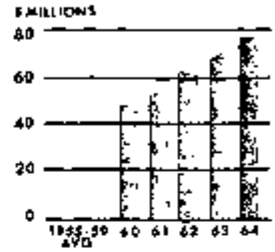


The picture on the left shows the Scylla IV, a rapid high magnetic compression device, at Los Alamos Scientific Laboratory.

BIOLOGY AND MEDICINE RESEARCH

Scientists obtain clues to the effects of the Hanford Plant on the Columbia River by examining plant and animal life obtained from the river. Water from the Columbia is used to cool atomic reactors at the Hanford Plant.





The program of research in biology and medicine is broad in scope and is conducted to determine the direct and indirect effects of radiation on man. The results have perhaps a more direct impact on daily living than those of other fundamental research in nuclear energy.

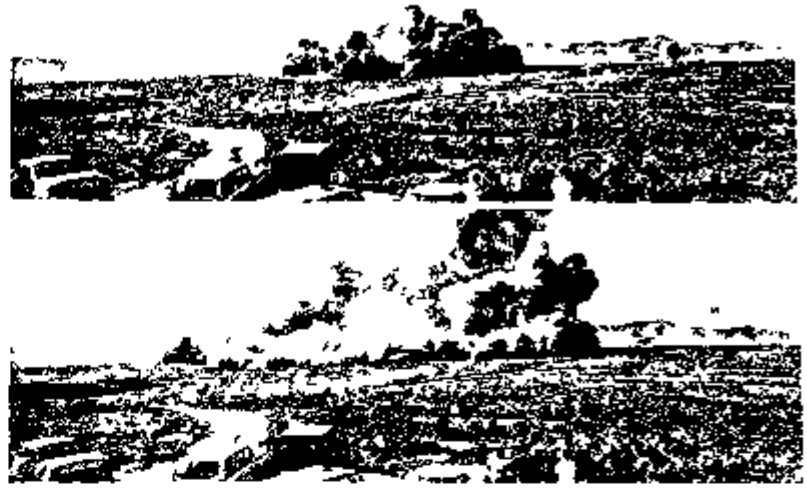
Total costs for the ten-year period ending at June 30, 1964, amounted to $484 million. For the five-year period 1955 through 1959 the costs totaled $171 million; for the five-year period 1960 through 1964 the total cost was $313 million, an increase of nearly 84%.

Research in the past ten years has clearly shown that the genetic effects from radiation are dependent not only on the total dose of radiation received, but also on the rate at which exposure is incurred. Research sponsored by the Division of Biology and Medicine has also demonstrated a similar dose rate dependency for radiation effects on average life span and for leukemia production. These observations are of vital interest to those concerned with setting permissible radiation exposure standards.

Research carried out by a group of scientists working under Commission sponsorship in this period disclosed the manner in which plants convert carbon dioxide from the atmosphere into carbohydrates. The importance of this research on the pathway of carbon in plant photosynthesis was recognized by the award of the Nobel Prize in 1961.

The table on the right shows the costs for the principal fields of biomedical research for fiscal years 1964 and 1963.

FIELDS OF BIOMEDICAL RESEARCH	Fiscal Year	
	1964	1963
	(in thousands)	
Somatic effects of radiation	$22,000	$19,365
Environmental radiation studies	15,315	13,413
Molecular and cellular level studies	14,212	12,588
Cancer research	5,738	5,969
Radiation genetics	5,593	5,455
Radiological and health physics and instrumentation	6,002	5,378
Combating detrimental effects of radiation	2,820	2,570
Nuclear energy weapons effects studies	1,555	1,364
Chemical toxicity	738	779
Selected beneficial applications	3,379	3,642
Total	77,352	70,523



A series of pictures of "Project Dugout," a simultaneous detonation of five 20-ton charges. The chemical explosives were placed in a row to produce a ditch in hard rock. The pictures show the progress of the explosions from the beginning to maximum and finally the pile of rubble that was blown out of the ditch.

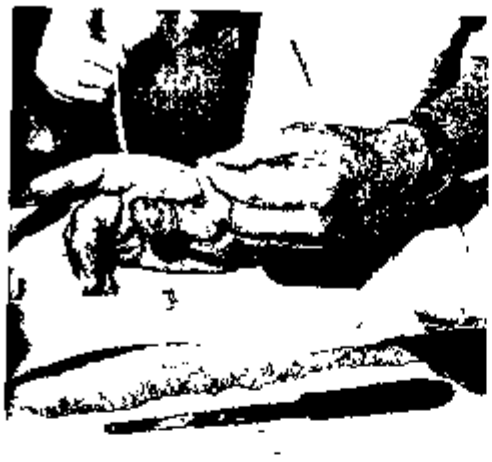
'EACEFUL USES OR NUCLEAR XPLOSIVES

is program, known as Plowshare from the Biblical reference to beating "swords into plowshares," ks to find practical industrial and scientific uses for nuclear explosives. Beginning in fiscal year 1958 d continuing through June 30, 1964, the cumulative costs total $51 million. The costs for fiscal year 64 were $14 million.

ring this period the research and development and experiments conducted, such as the Gnome shot in cember 1961 and the Sedan cratering experiment in July 1962, have rapidly advanced the understanding the phenomena associated with nuclear explosives. Technology and nuclear devices have been developed the point of being on the threshold of several constructive uses.

e table below shows the cost for the Plowshare program for fiscal years 1964 and 1963. The engineering plications include the costs of the excavation experiments, and the scientific applications show the costs the underground experiments.

AREAS OF RESEARCH	Fiscal Year	
	1964	1963
	(in thousands)	
Applications		
Engineering	$6, 301	$1, 536
Scientific	1, 775	5, 400
Total applications	8, 076	6, 936
General research and development	5, 845	4, 066
Total	13, 921	11, 002



fin being removed from the back of an individual's nand. This is the first step in experimental tests to mine the future potential of neutron activation ysis as a method of determining if suspects have tly fired a gun.

USES OF ISOTOPES

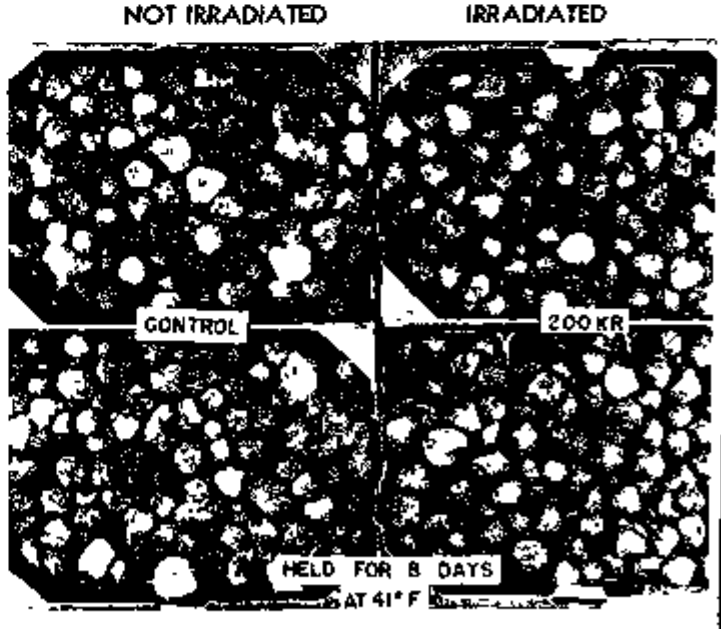
The cost of research to develop uses of radioisotopes and high level radiation for fiscal year 1964 was $8.5 million, an increase of $1.7 million over fiscal year 1963. The following table shows the cost of the areas of research for fiscal years 1964 and 1963.

AREA OF RESEARCH	Fiscal Year	
	1964	1963
	(in thousands)	
Isotopic power and heat source	$2,586	$ 890
Process radiation development	1,832	1,932
Radioisotope production and separations	1,592	1,708
Radioisotope technology	1,488	1,566
Radiation pasteurization of foods	1,023	719
Total	$8,521	$6,815

RESEARCH ON FOOD PRESERVATION

AEC is conducting research to establish the feasibility of extending the refrigerated storage life of selected marine products and fruits by radiation pasteurization. The following table shows the cost of this program for fiscal years 1964 and 1963.

AREAS OF RESEARCH	Fiscal Year	
	1964	1963
	(in thousands)	
Radiation technology	$1,023	$719
Wholesomeness	428	394
Total	$1,451	$1,113



An illustration of the preservative effects of giving fruits and vegetables a small dose of radiation. The strawberries shown on the left side of the picture were not irradiated and have begun to mold after being held for eight days. No mold shows in the irradiated berries pictured on the right.

EDUCATION AND TRAINING

The cost of financial assistance to colleges, universities, teachers and students, for the purpose of helping the institutions develop their capabilities in nuclear education, amounted to $9 million in fiscal year 1964. In addition, the AEC has materials on loan to educational institutions valued at $16 million on which use charges of $700 thousand are waived.

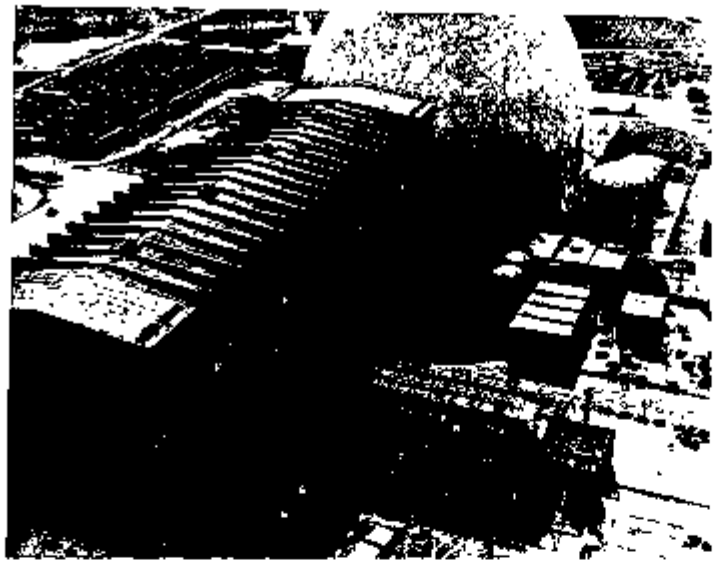
STUDENTS AND FACULTY MEMBERS PARTICIPATING IN AEC'S EDUCATION AND TRAINING PROGRAM AT ARGONNE NATIONAL LABORATORY

The laboratory makes available for the students' study and research the extensive tools and complex facilities that are so important to modern science.

Carefully selected students, majoring in Biology, Chemistry, and Physics, serve as research assistants on a half-time basis and submit reports of their work. They receive first-hand experience in their chosen fields by working in close association with laboratory staff scientists. The remainder of their time is devoted to study under college faculty members at the laboratory. The students live on the laboratory grounds and receive college credit and compensation.

The table below shows the principal types of assistance given for education and training purposes in fiscal years 1964 and 1963.

TYPE OF ASSISTANCE	Fiscal Year	
	1964	1963
	(in thousands)	
Training courses at AEC locations	$2,529	$3,048
Faculty Institutes and University-AEC Laboratory Cooperation	2,471	1,656
Grants to colleges and universities for the purchase of equipment	1,518	1,620
Fellowships	1,878	1,523
Other costs	825	783
	9,221	8,630
Waiver of use charges	736	656
Total	$9,957	$9,286



The 150 MWE boiling water SENN (Societa Elettronucleare Nazionale) reactor, located in northern Italy, is the first reactor to be completed under the U.S.-Euratom Joint Reactor Program. The reactor began full power operations in May 1964.

INTERNATIONAL ACTIVITIES

To further the objectives of U.S. foreign policy, the AEC carries out a program of international cooperation in the peaceful uses of atomic energy through agreements with 35 foreign countries, the European Atomic Energy Community (EURATOM) and the International Atomic Energy Commission (IAEA). In addition to the items shown to the right, the AEC has made available, through sale or lease, enriched uranium and other materials to foreign organizations for nuclear research and development as shown in the table below.

MAJOR ITEMS SUPPORTED BY FUNDS APPROPRIATED TO AEC	Fiscal Year 1964
	(in thousands)
Joint Euratom research and development	$4,138*
Cooperation with Canada in research on heavy water reactors	927
Advisory and consultant services	64

* For research and development performed domestically as the U.S. share in cooperative programs.

MATERIALS AVAILABLE TO FOREIGN COUNTRIES	Nuclear Materials	Heavy Water	Isotopes	Total
	(in millions)			
Sales during 1964	$2.9	$1.4	$.6	$4.9
Value of materials held by foreign governments under long-term credit arrangements	18.9	.....	.....	18.9
Value of materials leased at June 30, 1964	23.3	8.7	.....	32.0

INTERNATIONAL SCIENTIFIC NUCLEAR ENERGY EXHIBITS

In furthering the program of international cooperation in the peaceful uses of atomic energy, the AEC sponsors or participates in exhibits to demonstrate peaceful applications of atomic energy to overseas scientific or lay audiences. Since 1955, the AEC has participated in 20 exhibits held in 19 different countries at the cost of $11 million. The cost of the three exhibits held during 1964 was $800 thousand.

SALES OF MATERIALS AND SERVICES

Revenue from sales of materials and services for fiscal year 1964 mounted to $15.4 million as compared with $18.9 million for fiscal year 1963. The table shows the major sources of this income.

MAJOR SOURCES OF INCOME	Fiscal Year	
	1964	1963
	(in thousands)	
Source and special nuclear materials	$ 9,163	$11,636
Heavy water	1,558	1,937
Radioisotopes	1,519*	1,434*
Other materials	1,135	723
Services	2,025	3,158
Total	$15,400	$18,888

*Includes $240 thousand for packaging and handling in 1964 and $242 thousand in 1963.

MATERIALS LEASED

Materials on lease with licensees and foreign governments increased to $132.2 million at June 30, 1964 from $129.7 million at June 30, 1963. The amounts represent the established value of the materials. The following table compares the value of materials leased by type of organizations at June 30, 1964 and 1963. It also shows the value of such material that was subject to use charges and the value of material that is exempt from use charges. Use charges earned in 1964 were $3.5 million. Use charges waived during fiscal year 1964 were $2.9 million.

SOURCE AND SPECIAL NUCLEAR MATERIALS AND HEAVY WATER LEASED	Total		Subject to 4¼% Use Charge		Exempt from Use Charge	
	June 30		June 30		June 30	
	1964	1963	1964	1963	1964	1963
	(in thousands)					
Domestic						
Industrial organizations	$80,657	$90,040	$38,867	$50,213	$41,790	$39,827
Educational and research institutions	16,145	15,352	189	204	15,956	15,148
Other Federal Agencies	3,453	2,866			3,453	2,866
Foreign countries	31,964	21,460	31,758	21,030	206	430
Total	$132,219	$129,718	$70,814	$71,447	$61,405	$58,271

SALE OF RADIOISOTOPES

Radioisotope sales in fiscal year 1964 amounted to $1 3 million as compared to $1 2 million for fiscal year 1963 The increase was primarily because of increased demand for Polonium-210 and Hydrogen-3 This increase was partially offset by a reduction in price of other radioisotopes

RADIOISOTOPES	Quantity Fiscal Year		Dollars Fiscal Year	
	1964	1963	1964	1963
	(curies)		(in thousands)	
Calcium-45	2	2	$ 34	$ 33
Calcium-47	(*)	(*)	40	38
Carbon-14	43	37	196	205
Cesium-137	57, 792	61, 180	50	50
Chlorine-36	(*)	(*)	24	18
Cobalt-60	130, 824	72, 405	69	64
Gold-198	112	321	7	20
Hydrogen-3 (Tritium)	112, 430	60, 010	125	95
Iodine-131	178	182	40	47
Iridium-192	2, 841	5, 465	19	34
Iron-59	2	2	46	58
Krypton-85	4, 682	6, 424	59	69
Mercury-203	19	18	19	18
Nickel-63	2	3	15	29
Phosphorous-32	61	89	58	88
Polonium-210	3, 200	1, 077	88	24
Promethium-147	2, 903	3, 777	12	13
Strontium-85	(*)	(*)	35	29
Strontium-90	3, 995	968	11	3
Sulphur-35	14	16	12	29
Technetium-99	52**	46**	5	4
Thallium-204	19	16	13	10
Xenon-133	236	147	7	7
Other			295	207
Total			$1, 279	$1, 192

*Less than 1 curie
**In grams

In addition, in fiscal year 1964, quantities of radioisotopes produced and distributed for use within AEC were as follows 1,219,000 curies of Cobalt-60, 224,000 curies of Cesium-137, and 230,000 curies of Strontium-90 These compare with 17,000 curies of Cobalt-60, 42,000 curies of Cesium-137 and 257,000 curies of Strontium-90 in fiscal year 1963

RESEARCH LABORATORIES

A major portion of AEC research and development is conducted in government-owned laboratories. The acquisition cost of AEC-owned research facilities at June 30, 1964, was $2,148 million. These facilities include research reactors, accelerators, general laboratory buildings, equipment and research devices. The research and development work conducted in AEC-owned laboratories includes civilian and military reactor design and development, research in the physical and life sciences, and research to improve nuclear materials production processes and techniques.

The 10 laboratories listed below are the principal AEC-owned research centers. The operating costs of these laboratories together with the costs incurred at other AEC-owned installations and the cost of the work performed in facilities owned by universities, industrial, and other privately-owned organizations are included in the costs of the various research areas shown throughout this report.

The High Flux Beam Reactor under construction at Brookhaven National Laboratory

LABORATORIES	Acquisition Cost of Completed Plant June 30, 1964	Operating Costs Fiscal Year	
		1964	1963
		(in thousands)	
Ames Research Laboratory	$ 12,365	$ 6,777	$ 6,184
Argonne National Laboratory[1]	232,746	70,868	59,708
Bettis Atomic Power Laboratory[1]	118,256	72,124	67,332
Brookhaven National Laboratory	162,921	47,689	41,968
Hanford Laboratory[2]	92,174	40,703	40,875
Knolls Atomic Power Laboratory[1]	120,582	54,224	52,115
Lawrence Radiation Laboratory[3]	226,627	154,997	143,606
Los Alamos Scientific Laboratory[3]	200,162	96,838	92,872
Oak Ridge National Laboratory	211,177	74,819	72,399
Savannah River Laboratory	60,499	16,893	16,858

[1] Includes facilities at NRTS, Idaho
[2] Renamed Pacific Northwest Laboratories effective January 1, 1965
[3] Includes facilities at Mercury, Nevada

COSTS INCURRED BY AEC BY LOCATION

The following table shows the costs incurred by AEC in fiscal year 1964. Allocations of costs are made in accordance with the physical location of contractors and AEC offices but do not necessarily represent funds spent in those locations.

LOCATION	Operations [1]	Plant and capital equipment	Total
		(in thousands)	
Alabama	$ 197	.....	$ 197
Alaska	63	.....	63
Arizona	8,077	$ 2	8,079
Arkansas	392	.....	392
California	316,213	61,649	377,862
Colorado	67,983	10,321	78,304
Connecticut	31,723	3,144	34,867
Delaware	76	54	130
District of Columbia	13,226	13	13,239
Florida	17,719	3,125	20,844
Georgia	738	.....	738
Hawaii (Including Pacific Test Area)	21,930	30	21,960
Idaho	39,106	33,669	72,775
Illinois	77,016	24,981	101,997
Indiana	6,518	375	6,893
Iowa	13,465	2,557	16,022
Kansas	494	.....	494
Kentucky	81,318	1,869	83,187
Louisiana	242	.....	242
Maine	274	.....	274
Maryland	37,494	356	37,850
Massachusetts	22,396	6,637	29,033
Michigan	3,321	660	3,981
Minnesota	2,082	177	2,259
Mississippi	70	.....	70
Missouri	114,061	9,621	123,682
Montana	23	.....	23
Nebraska	124	1,271	1,395
Nevada	130,265	24,419	154,684
New Hampshire	70	.....	70
New Jersey	14,327	5,859	20,186
New Mexico	397,862	41,779	439,641
New York	116,557	22,858	139,415
North Carolina	1,408	10	1,418
North Dakota	21	.....	21
Ohio	150,961	8,299	159,260
Oklahoma	128	.....	128
Oregon	786	300	1,086
Pennsylvania	70,642	10,478	81,120
Puerto Rico	2,282	2,283	4,565

See footnote at end of table.

LOCATION	Operations [1]	Plant and capital equipment	Total
		(in thousands)	
Rhode Island	$ 566	.....	$ 566
South Carolina	85, 234	$ 14, 205	99, 439
South Dakota	5, 380	.....	5, 380
Tennessee	197, 054	42, 415	239, 469
Texas	21, 727	2, 494	24, 221
Utah	39, 750	95	39, 845
Vermont	46	.....	46
Virginia	3, 921	294	4, 215
Washington	133, 924	32, 000	165, 924
West Virginia	106	.....	106
Wisconsin	4, 050	2, 163	6, 213
Wyoming	37, 898	.....	37, 898
Foreign Countries	132, 615	162	132, 777
TOTALS	$2, 423, 921	$370, 624	$2, 794, 545

[1] Excludes depreciation.

AEC COST FOR ACTIVITIES PERFORMED BY COLLEGES AND UNIVERSITIES*

In addition to the activities of the AEC laboratories (shown on page 23), some of which are operated for AEC by universities or associations of universities, AEC had other contracts with 310 colleges or universities for atomic energy work. The table below shows that the cost of this work totaled about $102 million in fiscal year 1964 and identifies the universities where costs in excess of $500,000 each were incurred.

COLLEGES AND UNIVERSITIES	Fiscal Year 1964
	(in thousands)
California Institute of Technology	$2, 503
California, University of	5, 215
California, University of, at Los Angeles	2, 578
Carnegie Institute of Technology	1, 764
Case Institute of Technology	811
Chicago, University of	1, 292
Colorado, University of	688
Columbia University	4, 771
Cornell University	1, 047
Duke University	716
Florida State University	929
Harvard University	6, 134
Illinois Institute of Technology	649
Illinois, University of	2, 884
Johns Hopkins University	780
Maryland, University of	935
Massachusetts Institute of Technology	7, 138
Michigan, University of	2, 348
Minnesota, University of	1, 229
New York University	2, 073
Notre Dame, University of	1, 203
Oregon, University of	631
Pennsylvania State University	504
Pennsylvania, University of	1, 984
Princeton University	14, 456
Puerto Rico, University of	2, 124
Purdue University	1, 106
Rensselaer Polytechnic Institute	1, 108
Rice University	689
Rochester, University of	4, 587
Stanford University	959
Tennessee, University of	1, 266
Utah, University of	815
Virginia, University of	659
Washington, University of	2, 065
Western Reserve University	549
Wisconsin, University of	1, 801
Yale University	3, 352
Other (272 colleges or universities)	15, 635
Total	$101, 977

*Includes special [illegible] and [illegible] equipment

AEC COSTS INCURRED BY PRINCIPAL PRIME INDUSTRIAL CONTRACTORS*

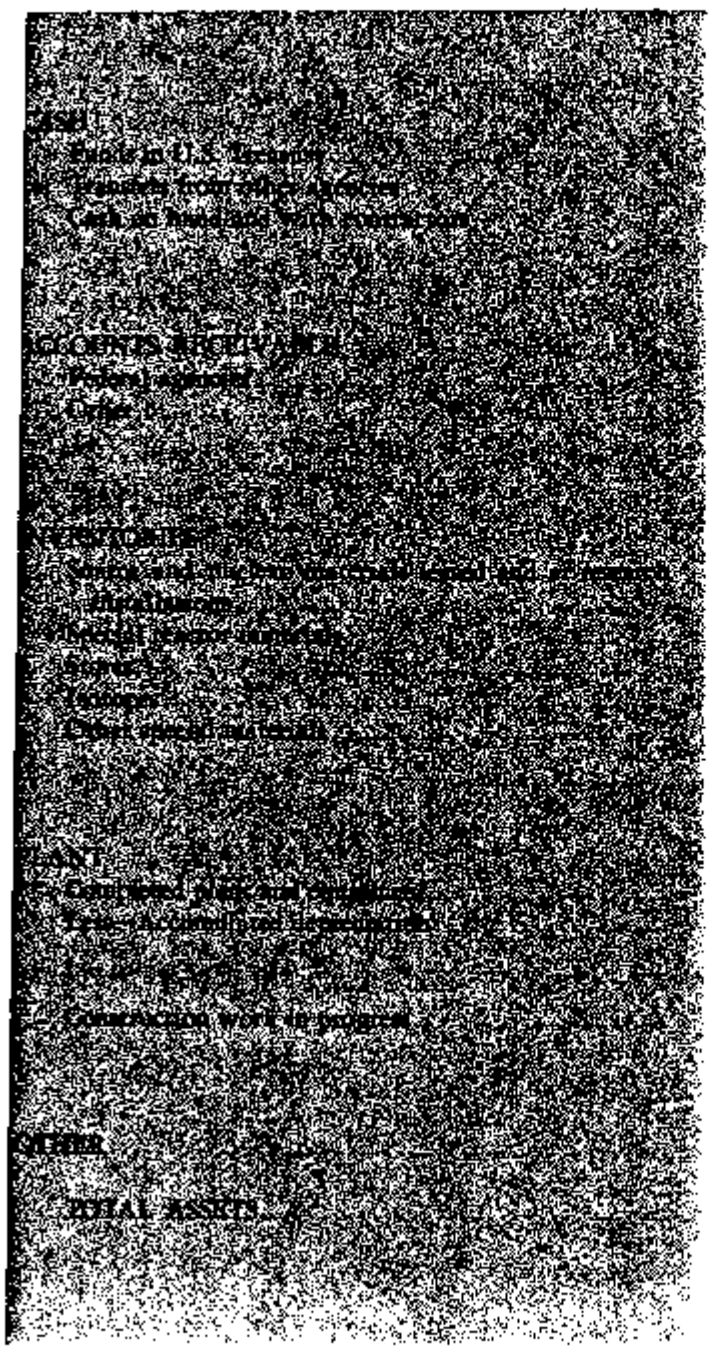
rivate industrial organizations working under contract with the Commission perform most of the production and much of the research and development work accomplished by AEC In fiscal year 1964, .EC's principal prime industrial contractors accomplished work amounting to some $1,862 million The ollowing table lists the industrial supply, production, and research and development contractors where osts incurred exceeded five million dollars

Industrial Organizations	Fiscal Year 1964
	(in thousands)
ACF Industries, Incorporated	$ 33, 544
Aerojet-General Corporation	50, 123
Allied Chemical Corporation	8, 861
Anaconda Company	12, 095
Atlas Corporation	37, 782
Atomics International Division, North American Aviation, Incorporated	68, 976
Bendix Corporation	112, 745
Catalytic Construction Company	6, 558
Dow Chemical Company	39, 883
Edgerton, Germeshausen & Grier, Inc	20, 107
E I duPont, de Nemours & Company	96, 490
Federal-Radorock-Gas Hills Partners	5, 025
Fluor Corporation, Ltd	9, 553
General Atomic Division, General Dynamics Corporation	8, 154
General Electric Company	231, 649
Goodyear Atomic Corporation	78, 998
H K Ferguson Co —Morrison-Knudsen Co , Inc	10, 930
Holmes & Narver, Inc	24, 790
Homestake-Sapio Partners	17, 578
Kaiser Engineers Division of H J Kaiser Company	9, 049
Ketmac Nuclear Fuels Corp —Kerr-McGee Oil Industries, Inc	26, 383
Mallinckrodt Chemical Works	10, 056
Mason & Hanger—Silas Mason Company	25, 534
Mines Development, Inc —Susquehanna Corp	5, 241
Monsanto Research Corp —Monsanto Company	19, 457
National Lead Company	27, 459
Pan American World Airways, Inc	8, 631
Petrotomics Company	5, 700
Phillips Petroleum Company	20, 504
Pratt & Whitney Aircraft Division of United Aircraft Corporation	26, 138
Reynolds Electrical and Engineering Company, Incorporated	88, 575
Sandia Corp —Western Electric Company, Inc	230, 454
Union Carbide Corporation	230, 390
United Nuclear Corporation	15, 859
Utah Construction & Mining Co	10, 012
Western Nuclear, Inc	9, 774
Westinghouse Electric Corporation	83, 664
Other	135, 551
Total	$1, 862, 271

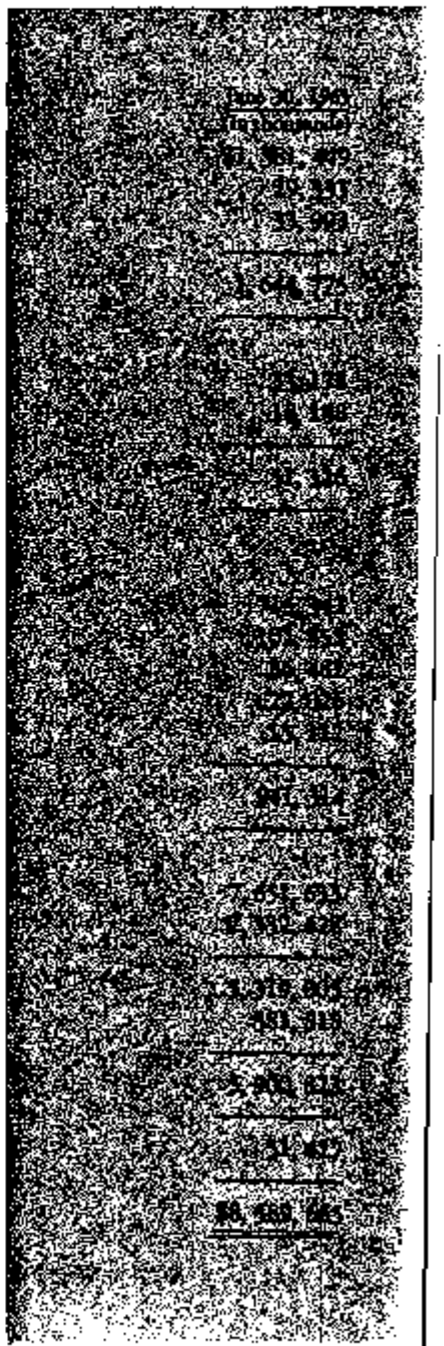
[illegible] depreciation and actual construction of capital equipment

UNITED STATES ATOMIC BALANCE

ASSETS *

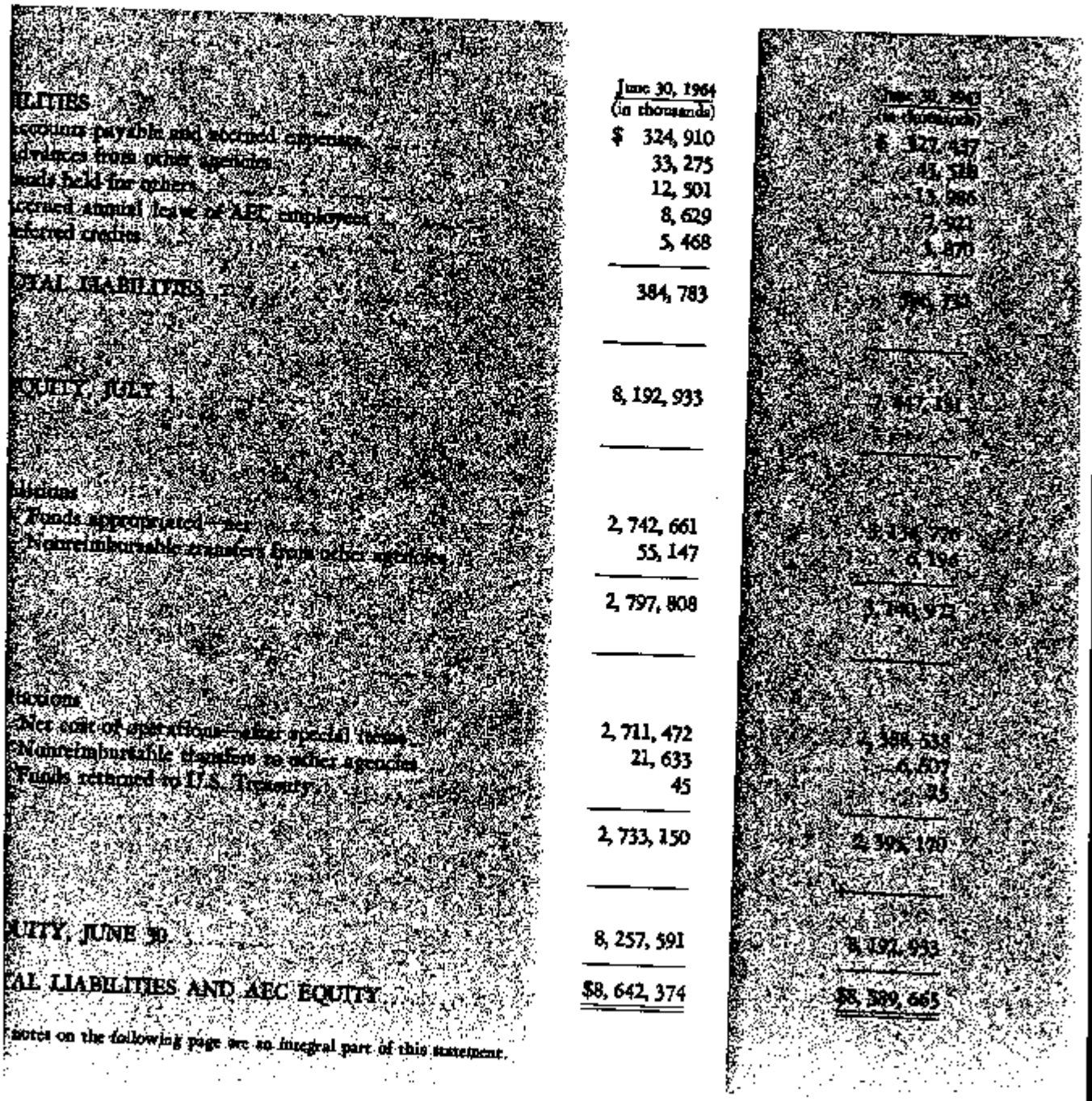


	June 30, 1964 (in thousands)
	$1, 559, 546
	19, 868
	22, 492
	1, 601, 906
	25, 501
	17, 589
	43, 090
	707, 503
	101, 486
	102, 844
	27, 795
	15, 374
	955, 002
	8, 169, 613
	2, 592, 221
	5, 577, 392
	408, 556
	5, 985, 948
	56, 428
	$8, 642, 374



GY COMMISSION

LIABILITIES AND AEC EQUITY*



	June 30, 1964 (in thousands)	June 30, 1963 (in thousands)
ILITIES		
ccounts payable and accrued expenses	$ 324,910	$ 327,437
dvances from other agencies	33,275	45,328
unds held for others	12,501	13,986
ccrued annual leave of AEC employees	8,629	7,921
eferred credits	5,468	3,870
OTAL LIABILITIES	384,783	398,732
QUITY, JULY 1	8,192,933	7,917,191
ditions		
Funds appropriated—net	2,742,661	3,134,776
Nonreimbursable transfers from other agencies	55,147	6,196
	2,797,808	3,140,972
uctions		
Net cost of operations—other special items	2,711,472	2,848,538
Nonreimbursable transfers to other agencies	21,633	6,507
Funds returned to U.S. Treasury	45	85
	2,733,150	2,865,130
UITY, JUNE 30	8,257,591	8,192,933
AL LIABILITIES AND AEC EQUITY	$8,642,374	$8,389,665

* Notes on the following page are an integral part of this statement.

NOTES TO THE BALANCE SHEET

1. The Balance Sheet Does Not Include in Assets:

   a. Certain inventories for security reasons.

   b. 64,751,316 troy ounces of silver loaned to AEC by the Treasurer of the United States for use as electrical conductors in plants. Of this amount, 280,500 troy ounces have been lost in usage and are, therefore, not returnable. Based on market quotations at June 30, 1964, the value of the silver on loan was $83,723,000. The value of silver lost and the cost of recovering and processing that on hand and returning it to the Treasury is estimated at $678, 000.

   c. Plant and equipment on loan from other Federal Agencies at June 30, 1964 amounting to $39,594,000.

   d. Contested claims against others of $1,963,000.

2. The Balance Sheet Does Not Include in Liabilities:

   a. Contingent liabilities related to contracts for the supply of electric power and natural gas for the Oak Ridge, Paducah and Portsmouth production facilities. If cancellation notice had been given at June 30, 1964, the estimated liabilities would have amounted to $258,089,000.

   b. Contingent liabilities as guarantor of loans to the extent of $8,288,000.

   c. Contingent liabilities for claims against AEC of approximately $46,553,000.

   d. Commitments for an estimated 68,400 tons of U_3O_8 at an estimated cost of $1,063,000,000 (see page 4 for details).

   e. Commitments under Section 56 of the Atomic Energy Act of 1954, as amended, for the acquisition of plutonium. Estimated commitments of $1,302,000 for fiscal year 1965 are based upon projected quantities of plutonium to be produced and delivered by domestic licensees during this period. There will also be additional liability, impossible to estimate at this time, for purchase under Section 56 of the Atomic Energy Act of 1954, as amended by the "Private Ownership of Special Nuclear Materials Act", Public Law 88-489, August 26, 1964, of additional quantities of certain licensed reactor-produced plutonium delivered to the AEC prior to January 1, 1971 and uranium enriched in the isotope U-233 delivered to the Commission during future periods yet to be determined.

   f. Outstanding contracts, purchase orders and other commitments of $1,099,000,000.

U.S. ATOMIC ENERGY COMMISSION
STATEMENT OF OPERATIONS

	Fiscal Year	
	1964	1963
	(in thousands)	
Production		
Procurement of raw materials	$ 326,338	$ 477,873
Production of nuclear materials	636,366	652,426
Weapons development and fabrication	804,598	696,866
	1,767,302	1,827,165
Research and development		
Development of nuclear reactors	561,191	507,343
Physical research	215,682	198,526
Biology and medicine research	77,352	70,523
Peaceful application of nuclear explosives	13,921	11,002
Isotope development	8,521	6,815
	876,667	794,209
Community operations		
Expenses	10,591	10,931
Revenues	(5,706)	(5,973)
	4,885	4,958
ales of materials and services		
Cost	14,251	18,060
Revenue	(15,400)	(18,888)
	(1,149)	(828)
ducation and training	9,221	8,630
EC administrative expenses	72,866	67,068
ecurity investigations	6,282	6,930
ther expenses	9,954	12,849
ther income	(6,970)	(7,774)
Net cost of operations*	2,739,058	2,713,207
ecial items		
Adjustments to costs of prior years—net	(3,575)	(178,917)
Transfers to inventories—net	(24,011)	(145,752)
Net cost of operations—after special items	$2,711,472	$2,388,538

cludes depreciation of $302 million in 1964 and $282 million in 1963

U.S. GOVERNMENT INVESTMENT IN THE ATOMIC ENERGY PROGRAM

(from June 1940 through June 1964)

	(in millions)	
Appropriation Expenditures		
National Defense Research Council	$ .5	
Office of Scientific Research and Development	14.6	
War Department (including Manhattan Engineer District)	2,218.3	
		$ 2,233.4
Atomic Energy Commission*		
Fiscal Years Prior to 1955	8,118.4	
Fiscal Year 1955	1,861.8	
Fiscal Year 1956	1,633.5	
Fiscal Year 1957	1,931.5	
Fiscal Year 1958	2,268.0	
Fiscal Year 1959	2,541.2	
Fiscal Year 1960	2,622.8	
Fiscal Year 1961	2,713.5	
Fiscal Year 1962	2,805.7	
Fiscal Year 1963	2,757 9	
Fiscal Year 1964	2,764 6	
		32,018.9
Total		34,252.3
Unexpended balance of funds in U S Treasury June 30, 1964		1,559.5
Total funds appropriated		35,811.8
Less		
Collections paid to U.S. Treasury	54.8	
Property and services transferred to other Federal agencies without reimbursement, net of such transfers received from other Federal agencies	219.7	
Cost of operations (including depreciation and obsolescence) from June 1940 through June 30, 1964	27,279 7	
		27,554.2
AEC Equity at June 30, 1964, as shown on Balance Sheet		$ 8,257.6

PLANT AND EQUIPMENT

3C-owned plant and equipment includes plants for the preparation of feed materials, gaseous diffusion ants for the separation of the fissionable isotope uranium-235 from the stable isotope uranium-238, actors for the production of plutonium, isotopes and other reactor products, facilities for the fabrication d testing of weapons, reactors for testing materials and equipment components, reactor prototypes, and earch laboratories Completed plant, at cost, amounted to $8,170 million at June 30, 1964, an increase $518 million over June 30, 1963

e estimated cost of plant under construction and projects authorized but not started at June 30, 1964, aled $1,287 million Costs incurred through June 30, 1964, on plant under construction amounted to 9 million, leaving the estimated costs to be incurred subsequent to June 30, 1964 at $878 million A jor portion of this authorized plant expansion is for construction of reactors and related facilities and acilities to be used in high energy research.

INVESTMENT IN PLANT AND EQUIPMENT BY TYPE OF FACILITY
June 30, 1964

TYPE OF FACILITY	Acquisition Cost	Accumulated Depreciation	Net Investment in Plant
		(in thousands)	
PRODUCTION			
Raw materials	$ 4,063	$ 1,374	$ 2,689
Feed materials	276,438	86,683	189,755
Gaseous diffusion plants	2,341,537	780,145	1,561,392
Alloy development plant	185,368	49,722	135,646
Production reactors and separation areas	1,799,344	586,237	1,213,107
Weapons production and storage	656,696	218,489	438,207
Heavy water	163,491	58,144	105,347
Other production facilities	70,425	33,704	36,721
Total production	5,497,362	1,814,498	3,682,864
RESEARCH AND DEVELOPMENT			
Laboratories	1,277,714	407,030	870,684
Reactors	537,220	105,852	431,368
Accelerators	225,473	37,261	188,212
Other research facilities	107,167	35,253	71,914
Total research	2,147,574	585,396	1,562,178
COMMUNITIES	75,070	28,415	46,655
GENERAL PURPOSE	449,607	163,912	285,695
	$8,169,613	$2,592,221	5,577,392
CONSTRUCTION WORK IN PROGRESS			408,556
TOTAL			$5,985,948

AEC PLANT AND EQUIPMENT BY LOCATION

(AT COST)

June 30, 1964

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1] [2]	Total
	(in millions)			
CALIFORNIA				
Lawrence Radiation Laboratory University of California				
Berkeley	$ 78.5	$ 9.5	$23.4	$111.4
Livermore	134.2	5.7	44.8	184.7
Total . .	212.7	15.2	68.2	296.1
Stanford University, Palo Alto				
Linear Electron Accelerator	6.6	23.7	83.7	114.0
Other research facilities	3.0		4.2	7.2
Total	9.6	23.7	87.9	121.2
Research facilities, Sandia Corporation, Livermore	17.2	1.5	3.5	22.2
Medical research facilities, University of California, Los Angeles	1.5		.2	1.7
Research facilities, California Institute of Technology, Pasadena	2.2		2.0	4.2
Reactor and research facilities, Atomic International Division, North American Aviation, Inc., Canoga Park—Santa Susana	35.9	6.9	17.3	60.1
Computer facilities, University of California, La Jolla	1.2			1.2
Research facilities, Holmes and Narver, Inc., Los Angeles	.6		.1	.7
Bio-Med research facilities, University of California—Davis	1.7	.1	.4	2.2
Total California	282.6	47.4	179.6	509.6
COLORADO				
Uranium handling, sampling and general facilities, Lucius Pitkin, Inc , Grand Junction	4.1			4.1
Rocky Flats Plant, Dow Chemical Company, Boulder	94.7	9.5	25.5	129.7
University of Colorado, Boulder	1 3		.1	1.4
Total Colorado	100.1	9 5	25.6	135.2

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1,2]	Total
	(in millions)			
CONNECTICUT				
Pratt and Whitney, Middletown	$67.3	$ .6	$7.3	$75.2
Linear accelerator, Yale University, New Haven	4.2	1.5	1.9	7.6
Submarine reactor facilities, Combustion Engineering, Inc., Windsor	14.9	.2	.1	15.2
Total Connecticut	86.4	2.3	9.3	98.0
FLORIDA				
Pinellas Plant, General Electric Company, Clearwater	13.3	2.2	2.7	18.2
IDAHO				
National Reactor Testing Station, Phillips Petroleum Company				
Chemical processing plant	55.1	.3	.3	55.7
Advanced test reactor	.1	30.9	20.9	51.9
Materials test reactor	15.1	.4	.7	16.2
Engineering test reactor	15.4			15.4
MTR–ETR facilities	19.0	.1	.3	19.4
Nuclear safety engineering test facilities	4.2	.8	24.6	29.6
Reactor facilities	51.6	2.0	10.4	64.0
General facilities	46.2	2.7	3.3	52.2
Total	206.7	37.2	60.5	304.4
Westinghouse Electric Corporation				
Large ship	35.6	.4		36.0
Submarine thermal reactor	16.0	.8		16.8
Other research facilities	12.4	2.7	2.0	17.1
Total	64.0	3.9	2.0	69.9
Reactor facilities, Argonne National Laboratory	23.6	15.1	24.1	62.8
Knolls Atomic Power Laboratory, General Electric Company	3.7	14.0	2.4	20.1
Experimental Beryllium Oxide Reactor, General Atomics	1.7	6.7	2.4	10.8
Total Idaho	299.7	76.9	91.4	468.0

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1] [2]	Total
	(in millions)			
LLINOIS				
Argonne National Laboratory, University of Chicago, Argonne ..	$209.2	$41.9	$47.6	$298.7
Argonne Cancer Research Hospital, University of Chicago, Chicago	5.1	.1	.2	5.4
University of Illinois, Urbana	1.8		.7	2.5
Total Illinois	216.1	42.0	48.5	306.6
NDIANA				
Radiation Laboratory, University of Notre Dame, Notre Dame	2.2	.1	.3	2.6
IOWA				
Research facilities, Ames Research Laboratory, Ames	12.4	4.8	3.3	20.5
Iowa Ordnance Plant, Mason and Hanger, Burlington	35.7	.2	4.4	40.3
Total Iowa	48.1	5.0	7.7	60.8
KENTUCKY				
Paducah				
Gaseous diffusion plant, Union Carbide Nuclear Company	755.8	1.5	2.6	759.9
Feed materials plant, Union Carbide Nuclear Company	31.2			31.2
Total Kentucky	787.0	1.5	2.6	791.1
MARYLAND				
AEC Headquarters, Germantown	21.0		.4	21.4
MASSACHUSETTS				
Cambridge electron accelerator, Harvard University, Cambridge	16.5	.6	4.1	21.2
Research facilities, Edgerton, Germeshausen & Grier, Inc , Boston	12.2	.5	4.4	17.1
Research facilities, Massachusetts Institute of Technology, Cambridge	3.3	3	.6	4.2
Total Massachusetts	32 0	1 4	9 1	42.5

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1]	Total
	(in millions)			
MINNESOTA				
Linear accelerator, University of Minnesota, Minneapolis	$ 2.3	$ 1.5	$ 1.7	$ 5.5
Elk River Reactor, Rural Cooperative Power Association, Elk River	9.7		1.6	11.3
Total Minnesota	12.0	1.5	3.3	16.8
MICHIGAN				
Research facilities, University of Michigan, Ann Arbor	.6	.8	.3	1.7
MISSOURI				
Kansas City Plant, The Bendix Corporation, Kansas City	56.8	3.8	14.5	75.1
Feed materials plant, Mallinckrodt Chemical Works, Weldon Spring	61.3	.6	1.7	63.6
Total Missouri	118.1	4.4	16.2	138.7
NEBRASKA				
Hallam Nuclear Power Facility, Consumers Public Power District, Hallam	33.4		.6	34.0
NEVADA				
Mercury:				
Nevada Test Site, Reynolds Electrical and Engineering, Co., Inc	89.9	2.6	21.5	114.0
Research facilities, University of California (LASL)	10.6	.2	2.	11.0
Laboratory facilities, Lawrence Radiation Laboratory	14 1	1.5	1.1	16.7
Total	114.6	4.3	22.8	141.7
Las Vegas				
Improvement of U.S Highway 95		1 8	2 7	4.5
Tonopah				
Research facilities, Sandia Corporation	8.6	.4	.8	9.8
Nuclear Rocket Development Station, Project Rover	33 5	13.8	20.7	68 0
Total Nevada	156 7	20 3	47 0	224 0

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work in Progress	Estimated Cost To Complete Construction Projects[1,2]	Total
	(in millions)			
NEW JERSEY				
Princeton				
Princeton-Pennsylvania proton accelerator, Princeton University	$21.6	$4.1	$7.4	$33.1
Model C stellarator facilities, Princeton University	23.8		1.7	25.5
Total	45.4	4.1	9.1	58.6
New Brunswick Laboratory, Atomic Energy Commission, New Brunswick	3.0			3.0
Total New Jersey	48.4	4.1	9.1	61.6
NEW MEXICO				
Albuquerque				
Lovelace Foundation Laboratory	2.6	.1	1.2	3.9
Sandia Laboratory, Sandia Corporation	127.3	5.1	38.9	171.3
South Albuquerque Works, ACF Industries, Inc	31.6	.1	5.0	36.7
Diagnostic aircraft support facilities, Kirkland, AFB		.3	.1	.4
Total	161.5	5.6	45.2	212.3
Los Alamos				
Los Alamos Scientific Laboratory, University of California	189.6	12.7	39.0	241.3
Community and general maintenance facilities, The Zia Company	139.2	2.6	7.6	149.4
Total	328.8	15.3	46.6	390.7
Total New Mexico	490.3	20.9	91.8	603.0
NEW YORK				
New York City				
Computing and other research facilities, New York University	1.8		.1	1.9
Accelerator and research facilities, Columbia University	3.7		.2	3.9
Health and Safety Laboratory	1.7		.1	1.8
Total	7.2		.4	7.6

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1,2]	Total
	(in millions)			
NEW YORK—Continued				
Brookhaven National Laboratory, Associated Universities, Inc., Upton	$162.9	$22.7	$43.6	$229.2
Boron plant, Page Airways, Inc., Niagara Falls	7.5			7.5
Research Laboratory, University of Rochester, Rochester	6.1		.3	6.4
Knolls Atomic Power Laboratory, General Electric Company, Schenectady and West Milton	116.8	1.1	11.4	129.3
Fuel and canning preparation areas, Sylvania Electric Products, Inc., Hicksville	2.7			2.7
Accelerator facility, Rensselaer Polytechnic Institute, Troy	2.4		.3	2.7
Total New York	305.6	23.8	56.0	385.4
OHIO				
Research facilities, General Electric Company, Cincinnati	7.7		1.2	8.9
Gaseous diffusion plant, Goodyear Atomic Corporation, Portsmouth	762.3	.4	2.7	765.4
Feed materials plant, National Lead Company, Fernald	120.3	.4	2.6	123.3
Mound Laboratory, Monsanto Chemical Company, Miamisburg	42.3	3.0	8.8	54.1
Piqua Nuclear Power Facility, City of Piqua, Piqua	8.9		.9	9.8
Feed materials facility, Reactive Metals, Inc., Ashtabula	1.6	.1	.2	1.9
Total Ohio	943.1	3.9	16.4	963.4
PENNSYLVANIA				
Bettis Atomic Power Laboratory, Westinghouse Electric Corporation, Pittsburgh	54.3	1.3	16.3	71.9
Accelerator and research facilities, Carnegie Institute of Technology, Pittsburgh	1.4			1.4
Shippingport Atomic Power Station, Duquesne Light Company, Shippingport	50.3	14.2	4.4	68.9
Astro Nuclear Laboratory, Westinghouse Electric Corporation, Large	2.1		1.1	3.2
Total Pennsylvania	108.1	15.5	21.8	145.4

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1,2]	Total
	(in millions)			
SOUTH CAROLINA				
Savannah River Plant, E. I. duPont de Nemours and Co., Inc., Aiken				
Production reactor and separation facilities	$891.8	$11.9	$26.3	$930.0
Feed materials production facilities	30.1	.8	.3	31.2
Heavy water production facilities	163.5	.2	.4	164.1
Works laboratory	60.5	1.0	2.2	63.7
General facilities	162.9	1.6	10.3	174.8
Total South Carolina	1,308.8	15.5	39.5	1,363.8
TENNESSEE				
Oak Ridge				
Research Laboratory, Oak Ridge Institute of Nuclear Studies	4.5	.1	.2	4.8
Agriculture Research Laboratory and Farm, University of Tennessee	2.1	.2	.8	3.1
Experimental Gas Cooled Reactor, TVA	2.2	46.6	11.2	60.0
Oak Ridge gaseous diffusion plant, Union Carbide Nuclear Company	835.6	1.8	5.1	842.5
Y-12 Plant, Union Carbide Nuclear Company	391.7	6.2	23.9	421.8
Oak Ridge National Laboratory, Union Carbide Nuclear Comapny	211.2	27.1	36.8	275.1
Service facilities	21.5	.2	4.8	26.5
Total	1,468.8	82.2	82.8	1,633.8
Clarksville facility, Mason and Hanger, Clarksville	2.3			2.3
Total Tennessee	1,471.1	82.2	82.8	1,636.1
TEXAS				
Pantex Plant, Mason and Hanger, Amarillo	46.3	.3	4.5	51.1
Medina facility, Mason and Hanger, San Antonio	16.1		.2	16.3
Research facility, Rice University, Houston	1.5			1.5
Total Texas	63.9	.3	4.7	68.9
UTAH				
Monticello				
Uranium ore processing plant, Lucius Pitkin, Inc.	1.1			1.1

AEC PLANT AND EQUIPMENT BY LOCATION—Continued

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT			
	Completed	Construction Work In Progress	Estimated Cost To Complete Construction Projects[1]	Total
	(in millions)			
WASHINGTON				
Hanford Works, General Electric Company, Richland				
Production reactor facilities	$714.1	$2.3	$13.8	$730.2
Separations facilities	195.7	9.3	20.8	225.8
Feed materials production facilities	30.5	.6	1.1	32.2
Works laboratory	92.2	5.9	15.6	113.7
General facilities	89.4	.8	3.2	93.4
Total Washington	1,121.9	18.9	54.5	1,195.3
WEST VIRGINIA				
Huntington pilot plant, International Nickel Company, Huntington	4.7			4.7
WISCONSIN				
Research facilities, University of Wisconsin, Madison	1.3		.1	1.4
LaCrosse Boiling Water Reactor, Genoa		3.3	8.2	11.5
Total Wisconsin	1.3	3.3	8.3	12.9
PUERTO RICO				
Puerto Rico Nuclear Center, University of Puerto Rico, Mayaguez	5.1	.1	.5	5.7
Boiling Nuclear Super Heat Reactor, Punta Higuera	9.6	1.8	1.8	13.2
Total Puerto Rico	14.7	1.9	2.3	18.9
JAPAN				
Research facilities, National Academy of Science, Hiroshima	2.2		.3	2.5
ALL OTHER				
N.S. Savannah	27.3		1.5	28.8
Weapons storage facilities	24.7			24.7
Other	23.1	3.0	44.7	70.8
Total All Other	75.1	3.0	46.2	124.3
TOTAL	$8,169.6	$408.6	$878.3	$9,456.5

[1] Includes Capital Equipment.

[2] Includes "Plant and capital equipment" authorized in Public Law 88-332 approved June 30, 1964.

U.S. ATOMIC ENERGY COMMISSION TEN-

(dollars in

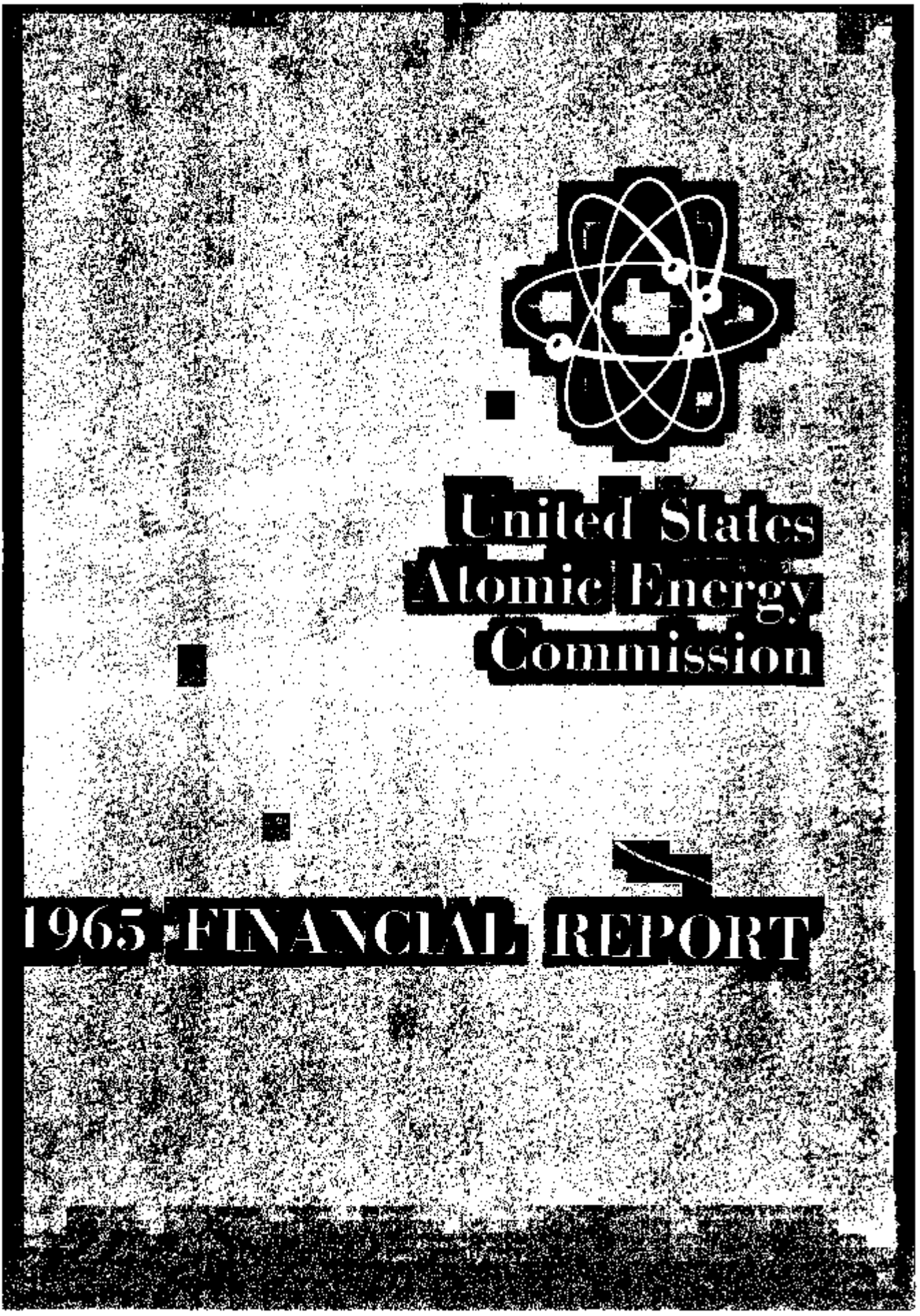
	1964	1963	1962	1961
Cost of operations	$2, 739, 058	$2, 713, 207	$2, 695, 936	$2, 612, 909
Procurement of raw materials	326, 338	477, 873	537, 363	636, 832
Production of nuclear materials	636, 366	652, 426	688, 533	732, 524
Weapons development and fabrication	804, 598	696, 866	705, 893	512, 317
Development of nuclear reactors	561, 191	507, 343	433, 150	437, 274
Physical research	215, 682	198, 526	171, 782	154, 105
Biology and medicine research	77, 352	70, 523	62, 782	53, 866
Community operations—net	4, 885	4, 958	4, 432	4, 463
Administrative expenses	72, 866	67, 068	60, 592	57, 709
Miscellaneous expenses and income—net	39, 780	37, 624	31, 409	23, 819
Plant construction and equipment costs incurred during the year	$376, 898	$409, 114	$423, 765	$432, 688
Total AEC assets excluding inventories of certain products at June 30	$8, 642, 374	$8, 589, 665	$7, 803, 222	$7, 802, 395
Plant investment at June 30 (gross)	$8, 578, 169	$8, 233, 451	$7, 869, 250	$7, 664, 736
Production plants	5, 497, 362	5, 447, 496	5, 344, 523	5, 453, 568
Research and development facilities	2, 147, 574	1, 885, 929	1, 713, 986	1, 434, 967
Other	524, 677	318, 208	306, 162	313, 403
Plant construction in progress at June 30	408, 556	581, 818	504, 579	462, 798
Funds appropriated-net	$2, 742, 661	$3, 134, 776	$2, 547, 338	$2, 666, 760
Operations	2, 342, 661	2, 872, 031	2, 351, 978	2, 456, 210
Plant and capital equipment	400, 000	262, 745	195, 360	210, 550
Appropriation expenditures	$2, 764, 565	$2, 757, 876	$2, 805, 700	$2, 713, 465
Employment at June 30	136, 620	135, 278	126, 623	122, 989
AEC employees	7, 268	7, 120	6, 863	6, 846
Operating contractor employees	117, 257	115, 012	106, 394	103, 313
Construction contractor employees	12, 095	13, 146	13, 366	12, 830

*Includes transfer to operations of $571,400,000 appropriated in prior years as plant and equipment

YEAR SUMMARY OF FINANCIAL DATA

housands)

1960	1959	1958	1957	1956	1955
$2, 619, 143	$2, 496, 648	$2, 298, 589	$1, 918, 258	$1, 607, 973	$1, 289, 535
716, 507	699, 996	596, 391	397, 813	278, 946	193, 586
731, 348	713, 247	750, 178	762, 815	730, 972	588, 445
505, 448	491, 981	443, 536	337, 183	280, 765	258, 706
399, 252	355, 600	306, 225	255, 667	168, 853	114, 557
132, 845	112, 318	87, 719	69, 657	56, 347	48, 221
48, 878	42, 781	35, 958	33, 148	29, 849	28, 898
7, 090	9, 892	11, 162	8, 897	8, 954	10, 321
51, 197	50, 135	46, 435	38, 499	38, 195	34, 027
26, 578	20, 698	20, 985	14, 579	14, 892	12, 774
$331, 516	$298, 979	$289, 744	$317, 022	$301, 682	$842, 504
$7, 689, 385	$7, 764, 770	$7, 652, 784	$7, 397, 911	$7, 368, 272	$8, 077, 836
$7, 344, 751	$7, 292, 784	$7, 110, 797	$6, 907, 896	$6, 713, 061	$6, 487, 301
5, 458, 201	5, 552, 646	5, 494, 440	5, 392, 464	5, 212, 776	4, 645, 750
1, 271, 253	1, 124, 543	937, 682	792, 633	753, 468	707, 107
288, 608	365, 838	407, 529	411, 582	499, 793	505, 492
326, 689	249, 757	271, 146	311, 217	247, 024	628, 952
$2, 649, 614	$2, 635, 335	$2, 333, 974	$1, 898, 700	$834, 227	$1, 209, 860
2, 387, 114	2, 385, 406	2, 225, 470	1, 740, 400	1, 146, 400*	1, 098, 978
262, 500	249, 929	108, 504	158, 300	(312, 173)*	110, 882
$2, 622, 838	$2, 541, 181	$2, 267, 960	$1, 931, 485	$1, 633, 549	$1, 861, 875
122, 718	121, 928	121, 059	119, 455	110, 197	112, 618
6, 907	6, 855	7, 107	6, 910	6, 637	6, 076
104, 612	105, 195	103, 290	98, 176	90, 238	82, 936
11, 199	9, 878	10, 662	14, 369	13, 322	23, 606


United States
Atomic Energy
Commission
1965 FINANCIAL REPORT

United States Atomic Energy Commission ☆

1965 FINANCIAL REPORT ☆

Office of the Controller ☆

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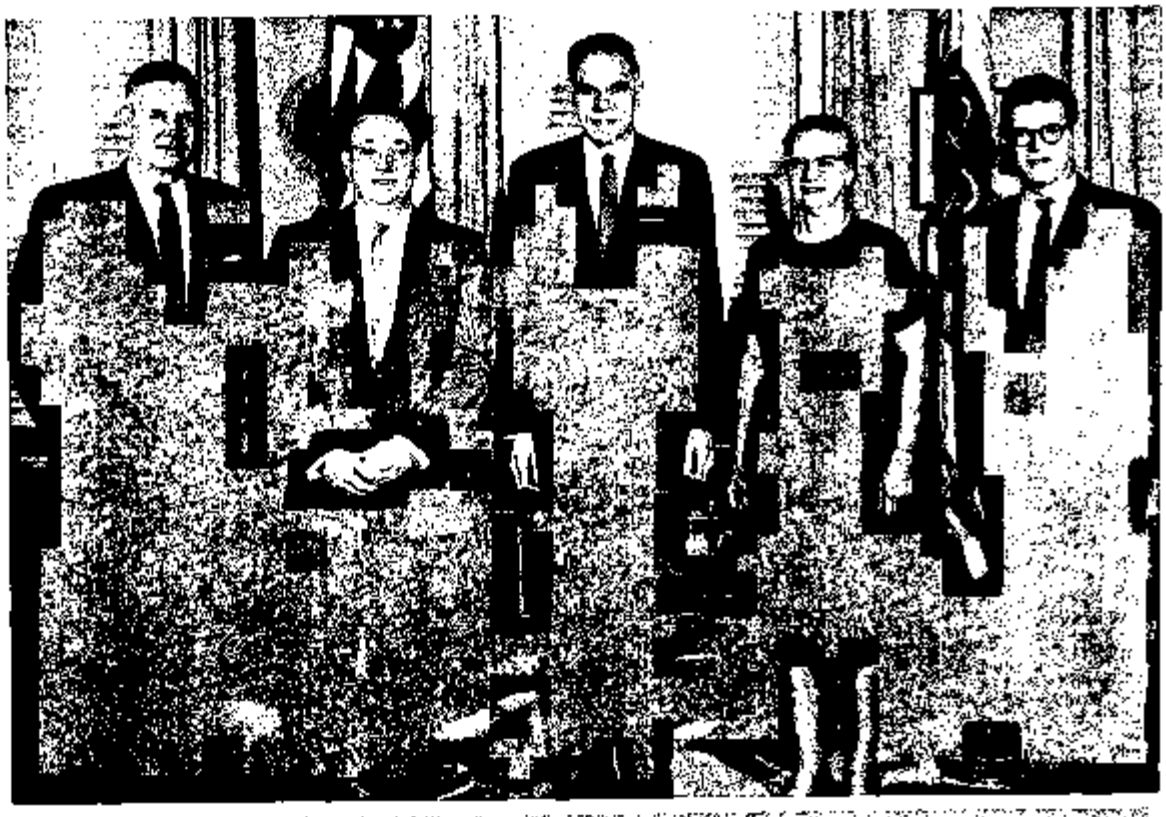


COMMISSIONER TAPE | COMMISSIONER RAMEY | CHAIRMAN SEABORG | COMMISSIONER BUNTING | COMMISSIONER PALFREY

THE UNITED STATES ATOMIC ENERGY COMMISSIO

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

September 22, 1965

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER PALFREY
COMMISSIONER RAMEY
COMMISSIONER TAPE

This is the unclassified Financial Report of the Atomic Energy Commission for fiscal year 1965. The financial statements have been examined by the AEC internal audit staff and, except for the exclusion of information relating to weapons and production inventories for security reasons, the auditors have found that the statements fairly present the financial position of AEC at June 30, 1965 and the results of operations for the year ended on that date.

John P. Abbadessa
Controller

T A B L E O F

CONTENTS

Atomic Energy Costs of Today—
An Investment In Tomorrow

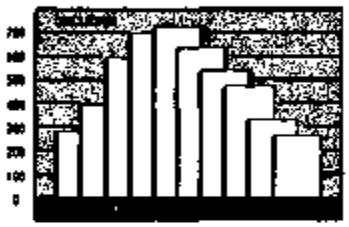
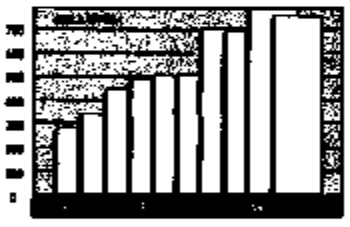
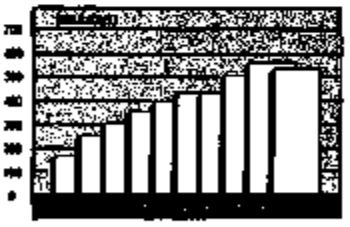
INTRODUCTION . . .

The Atomic Energy Commission is an independent agency responsible to the President and Congress. Established by the Atomic Energy Act of 1946, its functions and responsibilities were expanded by the Atomic Energy Act of 1954 to put greater emphasis on the peaceful uses of atomic energy.

Funds are provided to the AEC in two Congressional appropriations—one for construction and one for operations. The AEC accounting system, therefore, must comply with the requirements of Federal Government fund accounting. In addition, since the AEC is engaged in large industrial and research activities, those responsible for its management require knowledge of the cost of each step in its operations. The AEC accounting system, approved by the U. S. General Accounting Office, provides the essential cost information through the application of commercial accrual and cost accounting principles, including the recording of depreciation. For the AEC, both governmental and commercial accounting have been combined into a single system. Consequently, the principles of both underlie the preparation of this report.

Most of the work involved in actually achieving the AEC goals is performed by commercial firms and educational or other non-profit organizations under contract to the AEC. Government-owned facilities are operated by these contractors who maintain complete accounting records on their AEC contract activities that are an integral part of the Commission's accounting system. The report contained in the following pages is a consolidation of unclassified information obtained from financial reports made to the AEC by its contractors as well as information obtained from the AEC records.

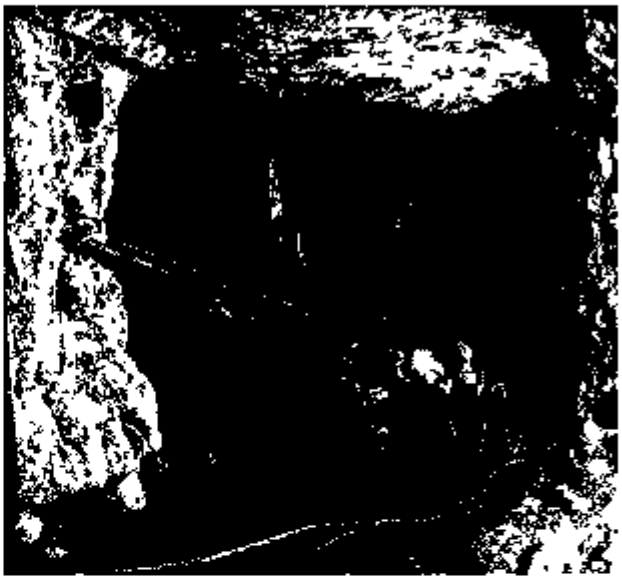
SUMMARY OF NET OPERATING COSTS

	1965 (Millions)	
 TOTAL OPERATING COSTS	$2,570	100%
 PROCUREMENT OF RAW MATERIALS	$ 261	10%
 PRODUCTION OF NUCLEAR MATERIALS	$ 571	22%
 WEAPONS DEVELOPMENT AND FABRICATION	$ 763	30%
 REACTOR DEVELOPMENT	$ 536	21%
 PHYSICAL RESEARCH	$ 237	9%
 OTHER PROGRAMS	$ 202	8%

PROCUREMENT OF RAW MATERIALS

The cost of raw material procurement continued to decline in fiscal year 1965, dropping to $261 million from a high of $717 million in fiscal year 1960. This decline is expected to continue through December 966, at which time foreign procurement will be complete and several domestic suppliers will cease operations. From 1967 through 1970, the annual cost of the program is expected to decline more slowly as domestic contractors begin deliveries which have been provided for through the stretch-out" program.

Fiscal year 1965 costs include procurement of uranium concentrates of $265 million and other costs of $1 million, less ore sales of $5 million.



Thick uranium beds allow large-scale mechanized drilling with a "jumbo" drill in the Mi Vida mine, Moab, Utah.

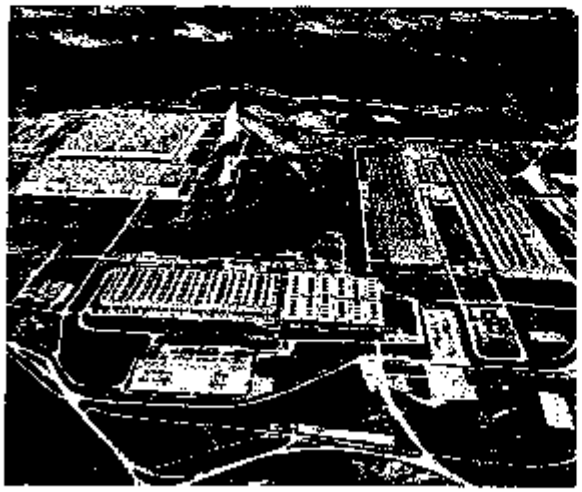
At June 30, 1965, there remained to be delivered 3,200 tons of U_3O_8 from Canadian and South African sources with an estimated cost of $67 million through December 31, 1966. Contractual commitments from domestic sources at June 30, 1965 were 43,800 tons of U_3O_8 in concentrates (including 11,500 tons in 1969-1970 resulting from completed deferral arrangements) estimated to cost $651 million through December 31, 1970. Also, the AEC had under way "stretch-out" negotiations with three additional uranium contractors for delivery deferrals which will result in an additional 4,800 tons in 1969 and 1970 at an estimated cost of $44 million. AEC may also purchase up to a maximum of 1,900 tons of U_3O_8 in concentrates from 1967 through 1970 from small independent producers at an estimated cost of $28 million.

SOURCE	Total Cost		Quantity		Average Cost	
	1965	1964	1965	1964	1965	1964
	(in millions)		(tons U_3O_8)		(dollars per lb.)	
Domestic	$182	$202	11,319	12,584	$8.03	$8.08
Canadian	21	39	1,189	2,239	8.73	8.74
Overseas	62	87	2,805	3,832	11.08	11.32
Total	$265	$328	15,313	18,655	$8.65	$8.79

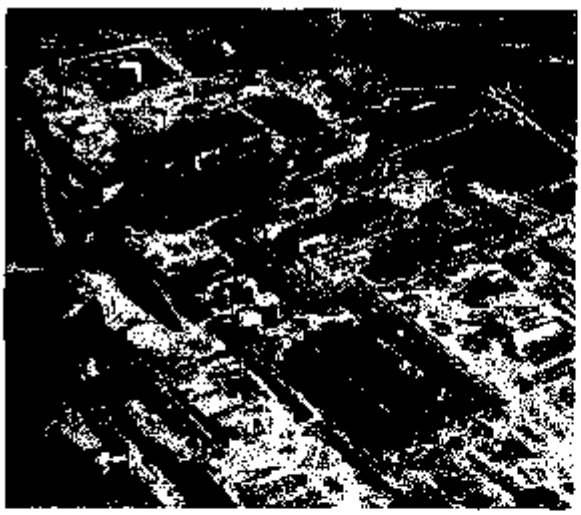
HIGHLIGHT

At June 30 the AEC was nearing completion of its contracting under the stretch-out program which will maintain Government uranium procurement at a substantial level through December 31, 1970; eight out of a total of eleven contracts had been signed, with signing of the final three expected early in the new fiscal year.

PRODUCTION OF NUCLEAR MATERIALS



The Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee.



The AEC's $200 million New Production Reactor (NPR) (left of photo) at Richland, Wash., achieved designed power of 4,000 MWT in 1965. The Washington Public Power Supply System's $125 million electrical generating plant (on the right) is scheduled for operation early in 1966. Steam from the reactor will be used by the power plant to generate 800,000 electrical kilowatts. These combined facilities constitute the largest nuclear power plant in the world.

The cost of nuclear materials production includes the cost of producing special materials required for both national defense and peaceful uses, reprocessing spent fuels from power reactors to recover the remaining uranium as well as plutonium, recovering useful radioisotopes from waste solutions, and concentrating and storing radioactive wastes.

Fiscal year 1965 costs amounted to $571 million, 10% less than fiscal year 1964 costs for producing nuclear materials. This decrease is the result principally of the decision to curtail production of special nuclear materials first announced by the President in his 1964 State of the Union message. In accordance with this decision, in fiscal year 1965 AEC shut down four plutonium-producing reactors and reduced electric power consumption at the three gaseous diffusion plants where enriched uranium is produced. In addition to the foregoing, some reductions in cost were achieved through operating efficiencies.

Uranium fuel elements being charged into a plutonium production reactor.

HIGHLIGHT

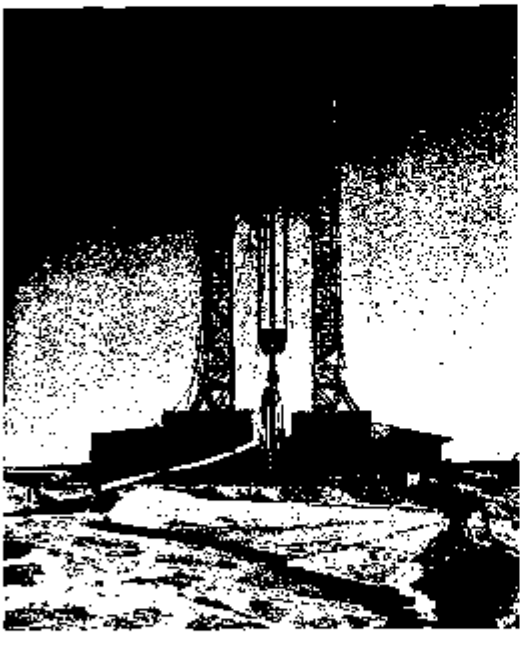
Costs decreased $63 million primarily because of the decision to curtail production of special nuclear materials which was announced by the President in his 1964 State of the Union message.

WEAPONS DEVELOPMENT AND FABRICATION

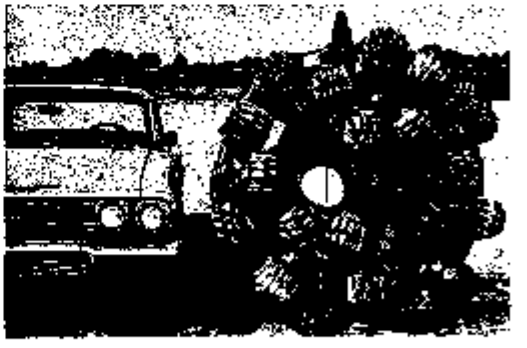
ıe weapons program, under which the :omic Energy Commission conducts e research, development, testing and brication necessary to provide the nited States with a nuclear defense pability, cost $763 million in fiscal ar 1965, a decrease of 5% from fiscal ar 1964.

ıe program placed emphasis on the ur presidential safeguards associated ith the limited test ban treaty. The feguards, in brief, are: (1) the con-ıct of comprehensive, aggressive and continuing underground nuclear test programs; (2) the maintenance of modern nuclear laboratories; (3) the maintenance of the facilities and resources necessary to resume atmospheric testing promptly; and (4) the improvement of the United States capability to monitor the treaty terms and to detect violations of the treaty.

NC–135 diagnostic aircraft supplied by the USAF and modified by the AEC provide airborne laboratories capable of performing necessary diagnostic functions during an atmospheric nuclear test.



The underground weapons test program in Nevada is providing new technology for the drilling industry. For example, the photo shows a giant dual-mast drill rig—an innovation never before used. This arrangement increases the capacity for racking pipe and makes for faster raising and lowering of the drill bit and stem. Holes up to 160 inches in diameter and as much as 5,000 feet deep are made with bits resembling the one shown on the right.



HIGHLIGHT

The Atomic Energy Commission is maintaining the country's nuclear defense capability as well as its readiness to resume atmospheric testing in the event the limited test ban treaty is abrogated.

REACTOR DEVELOPMENT

Dr. Glenn T. Seaborg, Chairman of the Atomic Energy Commission, with a model of the SNAP-10A space reactor. The SNAP-10A designed to produce 500 electrical watts for spacecraft instrumentation was launched from Vandenberg Air Force Base on April 3, 1965

The reactor development programs of the Atomic Energy Commission are highly diversified and represent about 21% of AEC's total operating costs. They deal with acquiring knowledge relating to the establishment and development of advanced nuclear systems; developing and improving nuclear power and propulsion reactors; developing reliable, compact, light-weight nuclear reactors for space, sea and land uses; and continuing research and development on safeguards in the design, construction and operation of nuclear reactors. The cost of the reactor development programs in fiscal year 1965 was $536 million which is slightly less than the fiscal year 1964 level of $561 million. Costs relating to space applications, auxiliary power sources, civilian and military reactors, cooperative power reactors, and general reactor technology are shown on the next six pages.

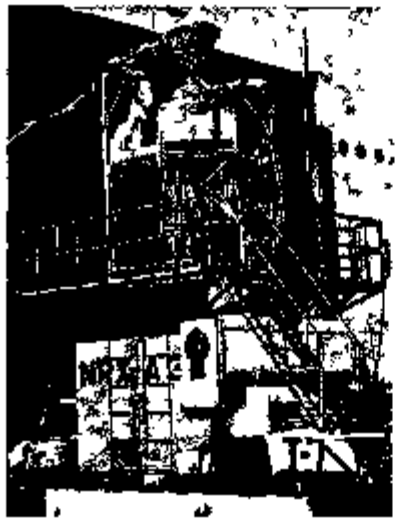
REACTOR DEVELOPMENT COSTS	Fiscal Year	
	1965	1964
	(In thousands)	
Civilian nuclear power	$ 98,127	$ 98,468
Naval propulsion	101,989	113,790
Space propulsion (Rover)	93,006	94,779
Auxiliary power sources (SNAP)	85,607	86,604
Army	9,437	10,778
Merchant ship	2,976	6,019
General research and development	140,432	136,564
Other	4,301	14,189
Total	$535,875	$561,191

HIGHLIGHT

The reduction of $25 million in costs reflects completion of fabrication of certain naval prototype cores, termination of the missile program and transfer of the N.S. Savannah to commercial operation.

SPACE APPLICATIONS

PROPULSION—ROVER



The NERVA reactor being prepared for tests at the Nuclear Reactor Development Station in Nevada. NERVA is an atomic powered propulsion system for space vehicles

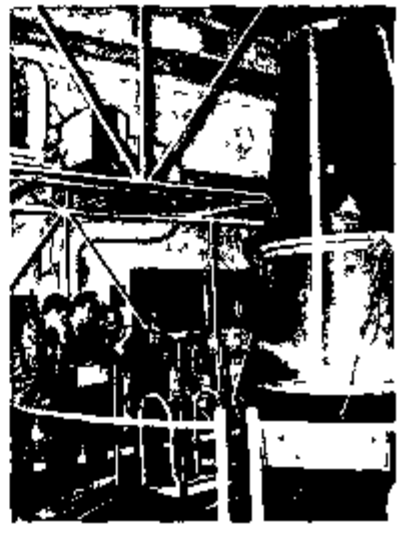
The Rover program, a joint AEC-NASA research effort to develop the technology for nuclear rocket propulsion systems that will be required for future extended space missions, accounted for 17% of the reactor development program costs. The major emphasis in the program will continue to be on developing a graphite reactor system for the nuclear rocket engine. Reactor and engine component tests to date have demonstrated the performance potential of nuclear rocket propulsion systems for future deep space missions.

SPACE PROPULSION (Rover)	Fiscal Year	
	1965	1964
	(in thousands)	
Nerva (engine development)	$47,167	$50,801
Advanced technology	32,111	11,357
Nuclear rocket development station operations	10,602	9,974
Kiwi (Rocket reactor development)	3,126	22,697
Total	$93,006	$94,779

SATELLITE AND SMALL POWER SOURCES (SNAP)

Developing and demonstrating compact nuclear electric power sources for space vehicles and specialized terrestrial applications, such as deep sea and remote surface installations, accounted for 16% of the costs of the reactor development program. Radioisotope systems are already in use in space, deep sea, and surface operations. On April 3, 1965, a satellite containing a nuclear reactor power system (SNAP-10A) was launched into space. This is the first successful operation of a nuclear reactor in orbit. On June 29, 1965, a radioisotope power system contained in a satellite completed its fourth year of operating in space. Other SNAP generators are operating on land and in the sea.

AUXILIARY POWER SOURCES (SNAP)	Fiscal Year	
	1965	1964
	(in thousands)	
Reactor power systems	$53,797	$49,021
Advanced space power systems	25,818	27,995
Radioisotope power systems	5,992	9,588
Total	$85,607	$86,604



Members of the Joint Congressional Committee on Atomic Energy are briefed by Dr Chauncey Starr, president of Atomics International, on the Space Nuclear Reactor Power System From the right are Senator John O Pastore Dr Chauncey Starr, Representative Craig Hosmer and John Conway Executive Director JCAE

REACTOR DEVELOPMENT

CIVILIAN REACTORS

The Atomic Energy Commission devoted 18% of the reactor development program costs to the civilian power reactor program, which has as its basic objective the development of a broad technology that the utility industry can use to extend fuel resources, to achieve economic generation of electricity with nuclear power plants, and to produce heat for such process heat applications as desalting sea water.

CIVILIAN NUCLEAR POWER REACTORS	Fiscal Year	
	1965	1964
	(in thousands)	
Sodium cooled	$35,384	$29,647
Pressurized light water	28,461	34,622
Gas cooled	12,039	13,827
Heavy water moderated	8,061	7,455
Boiling light water	7,365	9,003
Organic moderated	2,478	1,990
Other studies and development	3,739	2,624
Total	$98,127	$98,468

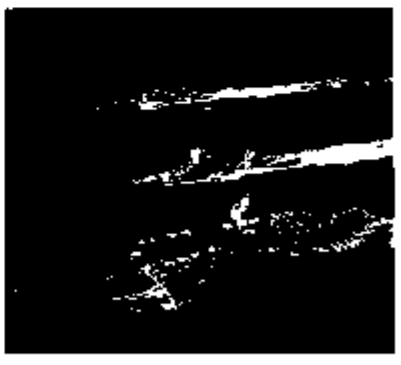
The Yankee Atomic Electric Company plant at Rowe, Massachusetts, was the first electricity generating plant to be built under the Atomic Energy Commission's power reactor demonstration program

MILITARY REACTORS

NAVAL PROPULSION

During this year, which saw the tenth anniversary of the birth of the nuclear Navy on January 17, 1965, the AEC was devoting 19% of reactor development program costs to naval propulsion reactors. Through the fiscal year 1966 shipbuilding program, Congress has approved the construction of 98 nuclear submarines and five surface ships.

NAVAL PROPULSION REACTORS	Fiscal Year	
	1965	1964
	(in thousands)	
Submarine projects	$49,135	$52,648
Surface ship projects	40,208	44,612
Operation of test facilities and other costs	12,646	16,530
Total	$101,989	$113,790



The Navy's three nuclear powered surface ships, the aircraft carrier "USS Enterprise", the cruiser "Long Beach", and the frigate "Bainbridge" made a 30,565 mile voyage around the world in 65 days without refueling

ARMY POWER REACTORS

The Army power reactor program, using 2% of reactor development costs in fiscal year 1965, has developed specialized nuclear power reactors which are now being operated by military services in some of the most remote areas of the world. These reactors largely eliminate the supply problem involving the transportation of large amounts of fossil fuel.

REACTOR DEVELOPMENT

COOPERATIVE POWER REACTOR PROJECTS

e Atomic Energy Commission cooperates with public and private organizations in advancing
: development of nuclear electric power under its cooperative power reactor demonstration
)gram.

AEC's civilian power reactor program there are fourteen atomic power projects in which
: Atomic Energy Commission and either public or private utilities share the cost. The table
ow and on the next two pages shows AEC and participants' costs incurred and estimated
· the development and construction of cooperative projects. The costs of operation, which
: not included in the table, are shared by AEC on only five projects (Elk River, Piqua,
.liam, Puerto Rico, and Dairyland). Two additional projects, a large seed and blanket re-
.or and a high temperature gas cooled reactor, were authorized by legislation in June 1965
ich provides for AEC assistance totaling $138.8 million.

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1965		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
		(in millions)			
YANKEE ATOMIC ELECTRIC CO., Rowe Mass.	August 1960 175,000 kwe				
Research and development		$ 5.0	$ .2	$ 5.0	$ .2
Plant and training of operators		....	39.2	....	39.2
Waiver of use charges		3.8	....	3.8	....
Fuel fabrication		....	1.7	....	1.7
Total		8.8	41.1	8.8	41.1
POWER REACTOR DEVELOPMENT CO., Lagoona Beach, Mich.	August 1963 60,900 kwe				
Research and development		3.2	31.4	4.3	31.4
Plant and training of operators		....	69.9	....	70.1
Waiver of use charges		4.4	....	6.2	....
Fuel fabrication		....	3.8	....	3.8
Total		7.6	105.1	10.5	105.3
RURAL COOPERATIVE POWER ASSOCIATION, Elk River, Minn.	November 1962 23,000 kwe				
Plant and training of operators		11.0	1.6	12.9	1.6
Fuel fabrication		.9	....	1.7	....
Total		11.9	1.6	14.6	1.6
DAIRYLAND POWER COOPERATIVE, Genoa, Wis.	February 1966 50,000 kwe				
Plant and training of operators		8.1	7.8	11.7	7.9
Fuel fabrication		.. .	....	3.0	....
Total		8.1	7.8	14.7	7.9

*As reported by participant

REACTOR DEVELOPMENT

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1965		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
		(in millions)			
CONSUMERS POWER CO. OF MICHIGAN, Big Rock Point, Mich.	September 1962 72,500 kwe				
Research and development		$ 3.9	$ 1.5	$ 4.6	$ 1.6
Plant and training of operators		....	26.7	....	27.5
Waiver of use charges		.6	....	1.7	....
Fuel fabrication		....	2.3	....	3.8
Total		4.5	30.5	6.3	32.9
PHILADELPHIA ELECTRIC CO., Peach Bottom, Pa.	November 1965 40,000 kwe				
Research and development		13.1	7.8	14.5	7.8
Plant and training of operators		....	28.3	....	29.9
Waiver of use charges		.7	....	2.5	....
Fuel fabrication		....	....	....	1.0
Total		13.8	36.1	17.0	38.7
CITY OF PIQUA, Piqua, Ohio	June 1963 11,400 kwe				
Research and development		3.6	....	3.6	....
Plant and training of operators		10.3	3.9	11.5	3.9
Fuel fabrication		1.2	....	2.4	....
Total		15.1	3.9	17.5	3.9
CONSUMERS PUBLIC POWER DISTRICT, Hallam, Nebr.	August 1962 79,700 kwe				
Research and development		16.7	....	16.7	....
Plant and training of operators		33.5	20.1	34.2	20.6
Fuel fabrication		6.6	....	6.7	....
Total		56.8	20.1	57.6	20.6
NORTHERN STATES POWER CO., Sioux Falls, S. D.	March 1964 62,000 kwe				
Research and development		7.6	.3	8.5	.3
Plant and training of operators		....	26.8	....	26.8
Waiver of use charges		1.1	....	1.8	....
Fuel fabrication		....	3.3	....	3.6
Total		8.7	30.4	10.3	30.7

*As reported by participant.

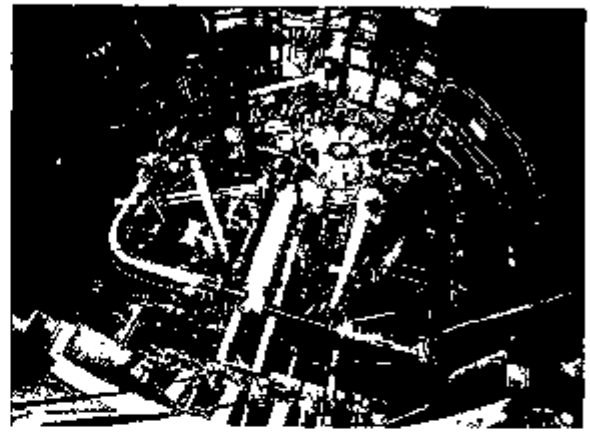
REACTOR DEVELOPMENT

REACTOR PROJECTS	Date of Criticality and Plant Capacity kwe (net)	Cumulative June 30, 1965		Total Estimated	
		AEC Assistance	Participant's Costs*	AEC Assistance	Participant's Costs*
		(in millions)			
PUERTO RICO WATER RESOURCES AUTHORITY, Punta Higuera, P. R.	April 1964 16,500 kwe				
Research and development		$ 1.3	$ .2	$ 1.3	$ .2
Plant and training of operators		13.4	5.5	15.3	5.5
Fuel fabrication		1.5	....	5.0	....
Total		16.2	5.7	21.6	5.7
CAROLINAS-VIRGINIA NUCLEAR POWER ASSOCIATION, INC., Parr, S. C.	March 1963 17,000 kwe				
Research and development		10.2	.9	12.3	1.8
Plant and training of operators		....	22.2	....	24.0
Waiver of use charges		.4	....	.9	....
Fuel fabrication		....	1.4	....	2.5
Total		10.6	24.5	13.2	28.3
CONNECTICUT YANKEE ATOMIC POWER Co., Haddam Neck, Conn.	April 1967 462,000 kwe				
Design		4.7	....	6.0	....
Plant and training of operators		....	18.3	....	88.8
Waiver of use charges		....	....	7.2	....
Fuel fabrication		....	....	....	6.7
Total		4.7	18.3	13.2	95.5
SOUTHERN CALIFORNIA EDISON AND SAN DIEGO ELECTRIC Co., San Clemente, Calif.	December 1966 375,000 kwe				
Research and development		6.1	....	6.4	.8
Plant and training of operators		....	27.9	....	100.5
Waiver of use charges		.2	....	6.6	....
Total		6.3	27.9	13.0	101.3
LOS ANGELES DEPARTMENT OF WATER AND POWER, Corral Canyon, Calif.	June 1969 463,000 kwe				
Design		1.5	....	8.0	....
Plant and training of operators		....	....	....	84.5
Waiver of use charges		....	....	8.2	....
Total		1.5	....	16.2	84.5
SUMMARY	1,908,000 kwe				
Research and Development and Design		76.9	42.3	91.2	44.1
Plant and Training of Operators		76.3	298.2	85.6	530.8
Waiver of Use Charges		11.2	....	38.9	....
Fuel Fabrication		10.2	12.5	18.8	28.1
Total		$174.6	$353.0	$234.5	$598.0

*reported by participant.

GENERAL REACTOR RESEARCH AND DEVELOPMENT

The Atomic Energy Commission conducts programs in nuclear safety and general research to develop technology applicable throughout the entire reactor development effort. Activity in the areas of fuels and materials, reactor physics, components and equipment have made possible the present status of nuclear safety and technology. The table below compares the costs incurred for fiscal years 1965 and 1964 for the various areas of general reactor research and development activity. The total fiscal year 1965 costs exceeded those of 1964 by $4 million.



The Molten Salt Reactor Experiment (MSRE), a 10,000 thermal kilowatt reactor, was developed as part of the reactor development program to investigate advanced reactor concepts having potential advantages for production of electrical power.

AREAS OF ACTIVITY	Fiscal Year 1965	Fiscal Year 1964
	(in thousands)	
TECHNOLOGY DEVELOPMENT		
Reactor fuels and materials	$ 29,687	$ 29,344
Plutonium utilization	11,106	11,761
Chemical separations	9,860	9,448
Reactor physics	9,160	8,559
Other	8,133	6,919
Total	67,946	66,031
NUCLEAR SAFETY		
Engineering field tests	14,387	15,340
Effluent controls	7,490	7,697
Reactor kinetics	6,540	5,491
Reactor containment	2,192	1,651
Other	2,201	3,070
Total	32,810	33,249
ADVANCED SYSTEMS RESEARCH AND DEVELOPMENT		
Molten salt reactor experiment	4,997	5,869
Los Alamos molten plutonium reactor program	4,469	4,481
Direct conversion	2,740	3,227
Test reactors	979	2,706
Experimental beryllium oxide reactor	1,850	1,867
Ultra high temperature reactor experiment	2,426	2,074
Other	12,859	9,367
Total	30,320	29,541
EURATOM	4,455	4,160
OPERATIONS OF SERVICE FACILITIES AND MISCELLANEOUS	4,901	3,583
TOTAL GENERAL REACTOR RESEARCH AND DEVELOPMENT COSTS	$140,432	$136,564

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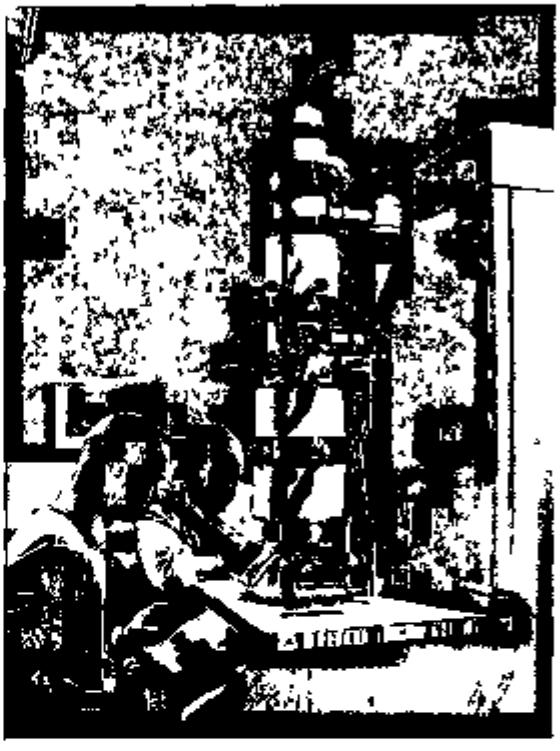
PHYSICAL RESEARCH

he Atomic Energy Commission incurred costs ' about $287 million in fiscal year 1965 for arrying on its program of research in the hysical sciences. A greater understanding of ie basic laws governing the physical world sought in order to further the development, se and control of nuclear energy. Complex esearch facilities are required for this program.

RESEARCH AREAS	Fiscal Year	
	1965	1964
	(In thousands)	
High energy physics	$ 98,816	$ 86,237
Medium energy physics	6,281	6,082
Low energy physics	25,855	24,690
Chemistry research	52,052	48,892
Metallurgy and materials research	24,644	22,269
Fusion power research	28,419	22,914
Mathematics and computer research	5,913	5,098
Total	$236,980	$215,682

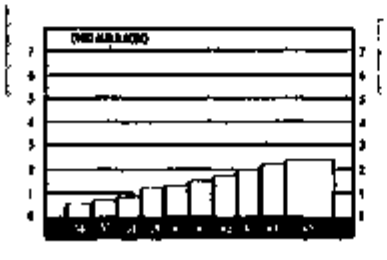


The picture above shows an electron microscope. This instrument is capable of enlargements of 200,000 times original size

A scientist at the Argonne National Laboratory studies the effects of radioactivity on graphite, an important material in the nuclear energy program. The study involves bombarding the graphite with accelerated ions

CHEMISTRY RESEARCH

Ranking next to high energy physics in cost importance in fiscal year 1965—22% of the Physical Research program—was the research directed toward increasing the knowledge of chemical science in relation to atomic energy. It includes nuclear, structural, and inorganic chemistry; physical and radiation chemistry and the study of isotope effects; systems and materials chemistry; and related special projects and the preparation of special isotopes for research.



HIGHLIGHT

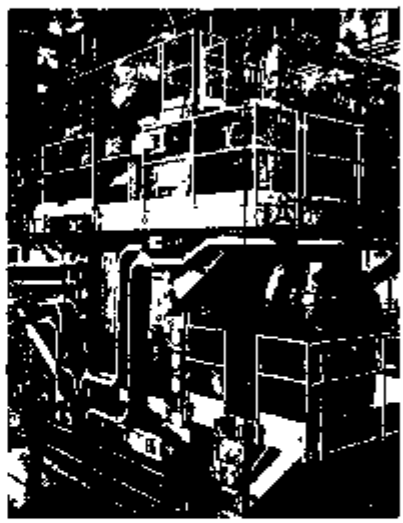
Construction of the two-mile Stanford Linear Accelerator is progressing satisfactorily. Scheduled for overall completion in 1966 at an estimated cost of $114 million, the facility was nearly two-thirds completed at the fiscal year end.

PHYSICAL RESEARCH

HIGH ENERGY PHYSICS

High energy physics research, which is directed toward a better understanding of elementary particles of matter and the interactions among them, accounted for 42% of physical research costs in fiscal year 1965. Experimental studies are conducted using large accelerators with energies above a billion electron volts. The results of these experiments are of significance in understanding the nature and behavior of the basic constituents of the physical universe.

RESEARCH COSTS	Fiscal Year	
	1965	1964
	(In thousands)	
Accelerators in Operation		
Alternating Gradient Synchrotron 33 BEV (Brookhaven)	$16,789	$14,872
Bevatron 6.2 BEV (Lawrence)	16,225	13,230
Cambridge Electron Accelerator 6 BEV	8,485	7,391
Cosmotron 3.2 BEV (Brookhaven)	5,067	5,211
Princeton-Penn Accelerator 3 BEV	7,242	6,715
Zero Gradient Synchrotron 12.5 BEV (Argonne)	15,877	12,359
	69,685	59,778
Accelerators Under Construction		
Stanford Linear Accelerator 10 to 20 BEV	8,114	5,642
Other High Energy Physics Research	21,067	20,817
Total	$98,816	$86,237



The picture above shows an 80-inch Bubble Chamber assembly at the Brookhaven National Laboratory. Particle beams are guided magnetically into the chamber and the tracks of the resultant high energy interactions are photographed.

MEDIUM ENERGY PHYSICS

Accelerators used in medium energy physics research, which accounts for about 3% of the physical research program costs, have a primary proton or electron beam energy in the range 50-1000 Mev. Experiments utilizing the primary and secondary beams of these higher energy sector-focused cyclotrons, electron linear accelerators, and synchrocyclotrons afford the opportunity to obtain new and significant information on the structure of the nucleus of the atom.

LOW ENERGY PHYSICS

Low energy physics, accounting for 11% of the physical research program costs, encompasses nuclear physics aimed at furthering the knowledge of nuclear structure and nuclear forces, and atomic and classical physics concerned with optical spectroscopy of atoms, molecules and crystals, atomic cross section measurements, low temperature research and the development of high resolution electron microscopes.

PHYSICAL RESEARCH

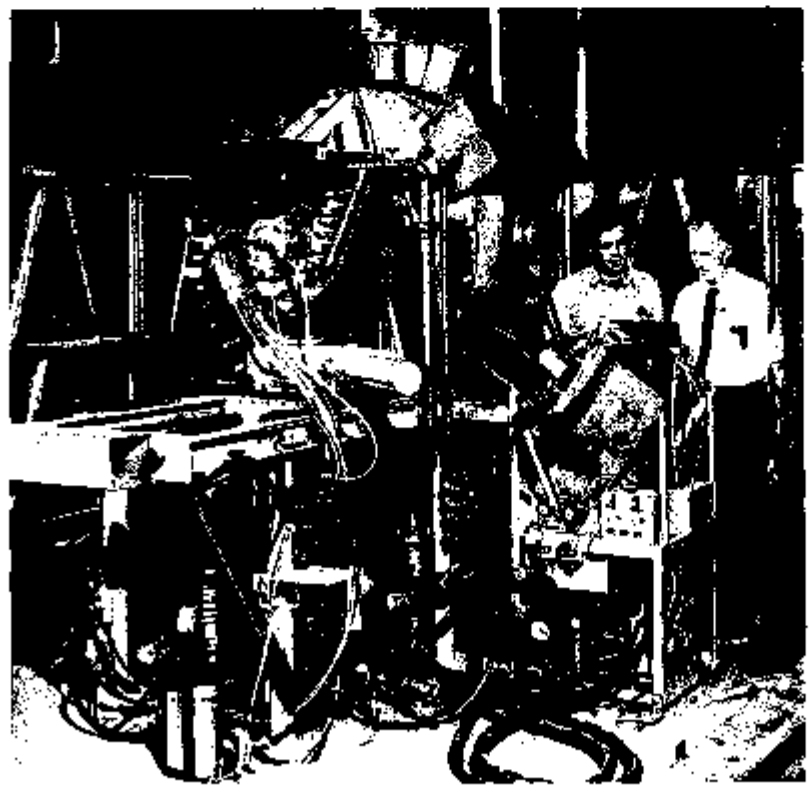
MATHEMATICS AND COMPUTER RESEARCH

Three distinct but related areas of research are included here. Mathematics research deals with investigations in those branches of mathematics which are necessary to the solution of problems in the physical sciences relative to AEC's overall mission. Computer research is concerned with the design and development of computers and their components. Programming research seeks to improve techniques of writing programs for digital computers in order to facilitate their use and increase their effectiveness. The AEC devoted 2% of the physical research program costs to these three areas in fiscal year 1965.

METALLURGY AND MATERIALS RESEARCH

The physical research program devoted 10% of its fiscal year 1965 costs to research seeking to advance the scientific understanding of the structure and properties of matter in the condensed state. Important areas of investigation included physical metallurgy and ceramics, and solid state physics.

FUSION POWER RESEARCH



The Elmo device used to study energetic electron plasmas in the fusion power program at Oak Ridge National Laboratory.

Fusion power research seeking to determine the possibility of obtaining energy from controlled thermonuclear fusion or the joining of the nuclei of light elements accounted for 10% of physical research program costs in fiscal year 1965. The energy of the sun is an example of such fusion. Successful fusion power would mean an inexhaustible fuel supply (hydrogen from the sea), and there would be no problem of disposing of radioactive wastes. A prerequisite of fusion power is the development of means to produce and confine sufficiently hot, dense ionized gas. The cost of fusion power research in fiscal year 1965 was $28.4 million compared with $22.9 million in fiscal 1964.

PEACEFUL USES FOR NUCLEAR EXPLOSIVES (PLOWSHARE)

The cost of the plowshare program, which provides for the research, development and testing necessary to develop and demonstrate peaceful uses for nuclear explosives, amounted to more than $12 million in fiscal year 1965.

During fiscal year 1965 the AEC conducted field events designed to advance nuclear excavation technology to the point where massive excavation projects can be safely accomplished. Examples of such projects might be the construction of a sea level canal across the Central American isthmus, aqueducts and harbors, or mountain passages for highways and railroads. Other engineering applications involved completely contained underground nuclear explosions to exploit natural resources. Just prior to the fiscal year end the AEC received its first formal proposal from industry for a joint underground nuclear experiment.

In the scientific applications portion of the program an experiment presented clear evidence that nuclear explosives can be used to produce new isotopes, and even new elements, through multiple neutron capture. Follow-up experiments are planned.

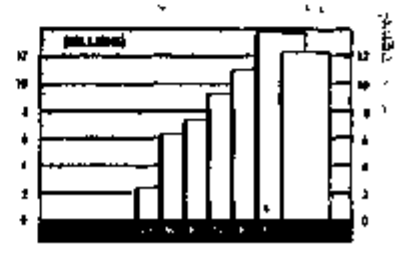
Photograph of a small-scale model of the 46 mile long Sasardi-Morti route in Panama viewed from the East. The Sasardi-Morti is one of the more frequently mentioned routes for a new trans-isthmian sea-level canal.

The photograph shows a nuclear explosive canal digging technique whereby a series of trenches are excavated on a "leapfrog" basis. After the first excavations are made, a second series of detonations would excavate the remaining sections to form a continuous sea-level canal. Much of the research work to develop the technique is being performed by the Lawrence Radiation Laboratory.

AREAS OF RESEARCH	Fiscal Year	
	1965	1964
	(in thousands)	
Applications		
Engineering	$ 3,150	$ 6,301
Scientific	2,391	1,775
Total applications	5,541	8,076
General research and development	6,775	5,845
Total	$12,316	$13,921

HIGHLIGHT

Plowshare provided support for the Atlantic-Pacific Interoceanic Canal Study Commission which was authorized by Public Law 88-609 to study sites for construction of a sea-level isthmus canal connecting the Atlantic and Pacific Oceans.



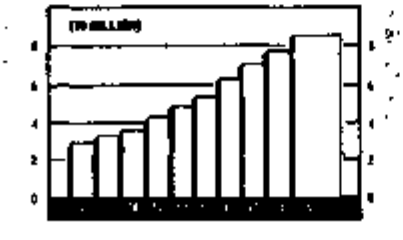
BIOLOGY AND MEDICINE RESEARCH

The picture above shows a scanning device similar to those developed in the biology and medicine program. They are now in use in a number of clinical applications.

The AEC invested $84.4 million in fiscal year 1965, $7 million more than in the previous fiscal year, toward the biological, medical and environmental research program goal of developing the scientific knowledge needed to understand fully the biological effects that may be produced by the use of nuclear energy. Emphasis is placed on overcoming the hazards involved while at the same time utilizing the great potential of radiation as a tool for learning more about the nature of life processes.

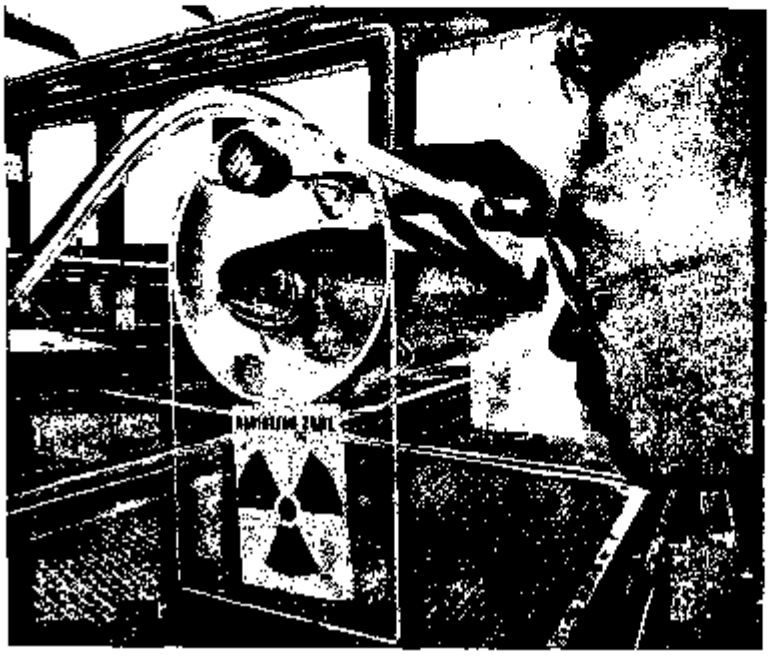
As a result of AEC supported cancer research, radiation is being used in combating some forms of leukemia with encouraging results. A procedure was developed whereby a patient's blood is drawn off through plastic tubing past a radiation source where the malignant cells are destroyed. (The malignant cells appear to be very sensitive to radiation and are more easily destroyed while other cells in the blood appear to be more resistant.) The treated blood is then returned to the patient.

AREAS OF BIOMEDICAL RESEARCH	Fiscal Year	
	1965	1964
	(in thousands)	
Somatic effects of radiation	$23,492	$22,000
Environmental radiation studies	18,521	15,315
Molecular and cellular level studies	14,476	14,212
Cancer research	5,722	5,738
Radiation genetics	6,606	6,593
Radiological and health physics and instrumentation	6,572	6,002
Combating detrimental effects of radiation	2,626	2,820
Nuclear energy weapons effects studies	2,050	1,555
Chemical toxicity	752	738
Selected beneficial applications	3,600	3,379
Total	$84,417	$77,352



HIGHLIGHT

There is a continuing application of new instruments and techniques to bio-medical research. A major advance has been the development of a device capable of physically separating biological cells according to their volume. The cells separated are virtually all alive and continue normal growth.



Fish are used in the extensive aquatic biology research program at the Pacific Northwest Laboratory, Richland, Washington. This project is designed to detect residual radioactivity in trout.

Tomato plants are being injected with a radioactive solution. By learning how plants grow, scientists hope to be able to improve desirable characteristics by increasing the yield and increasing the plants' resistance to disease.

In studies of the effects of radiation in living organisms, attempts are being made to isolate the virus responsible for transmission of leukemia in mice. The irradiation of mice has been shown to be responsible for releasing the virus that may be the cause of leukemia. Virus-like particles have been found in mice reared in a germ-free environment. This suggests that the leukemia virus may be acquired during embryonic stages rather than through later environmental contact.

In other biological experiments tumors of the blood-forming organs of laboratory animals are indicated to be of significance in evaluating the hazard of radioactive strontium 90.

Work has been carried out which shows that some organic cells contain a repair mechanism that overcomes ultraviolet light damage to the substance carrying genetic information to the next cell generation. This repair work is attributed to enzymes—one of which has now been isolated and purified to a degree never before accomplished.

Research has been conducted to show the effects of radiation on life in ponds. The results have indicated that most of the radioactivity settles into the bottom sediment while much smaller amounts are taken up by plant and animal life.

ISOTOPE DEVELOPMENT

Radioisotopes are processed in shielded "hot cells" and are used for many purposes. They may provide power for lonely arctic weather stations or orbiting satellites, destroy tumors in cancer cells, assist industry in quality control, eradicate insect pests or prolong the storage life of perishable foods

The purpose of the isotopes development program is to conduct research and to develop and demonstrate applications of isotopes and radiation technology. The costs for fiscal year 1965 were $9.9 million.

AREAS OF RESEARCH	Fiscal Year	
	1965	1964
	(In thousands)	
Isotopic power and heat source	$2,607	$2,586
Process radiation development	1,917	1,832
Radioisotope production and separations	1,867	1,592
Radioisotope technology	2,317	1,488
Radiation technology on preservation of foods	1,145	1,023
Total	$9,853	$8,521

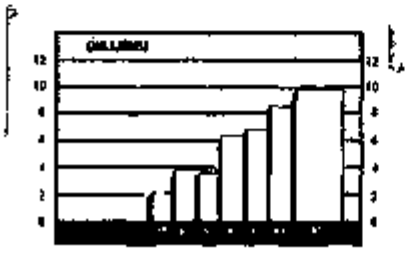
RESEARCH ON FOOD PRESERVATION

The AEC is conducting research to establish the feasibility of extending the refrigerated storage life of selected marine products and fruits by radiation pasteurization. This process can also reduce transportation spoilage and lengthen the marketing period for these and other foods.

AREAS OF RESEARCH	Fiscal Year	
	1965	1964
	(In thousands)	
Radiation technology	$1,145	$1,023
Wholesomeness*	521	428
Total	$1,666	$1,451

* Performed as part of the biology and medicine program

Fresh fish fillets are placed in a Cobalt 60 irradiator for radio pasteurization in experiments to prolong the shelf life of fish



HIGHLIGHT

One significant application of the technology developed in this program has been the building of a silver ore detection unit (Silver Snooper). This truck-mounted unit can speed up the location of silver-bearing ore and help to build up our dwindling silver reserves.

EDUCATION AND TRAINING

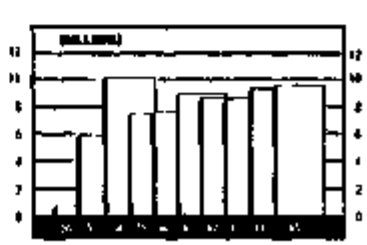
The education and training program is designed to improve the quality and quantity of scientific and engineering manpower available for the nuclear fields. Assistance is provided to both individuals and institutions and includes fellowships and traineeships; financial grants to schools for the purchase of nuclear laboratory equipment; the conducting of specialized courses and faculty training institutes; and assistance to colleges and universities in establishing nuclear curricula. The fiscal year 1965 costs for the program were $9.5 million.

This montage represents a cross-section of several of the varied activities of the education and training program. Here are depicted scenes of classroom instruction, laboratory instruction, school children's tours of atomic energy facilities, and visitors viewing atomic energy museum exhibits.

TYPES OF ASSISTANCE	Fiscal Year 1965	Fiscal Year 1964
	(in thousands)	
Training courses at AEC locations	$ 2,048	$ 2,629
Faculty institutes and university-AEC laboratory cooperation	2,588	2,471
Grants to colleges and universities for the purchase of equipment	1,399	1,518
Fellowships and traineeships	2,691	1,878
Other costs	810	825
Total cost	9,536	9,221
Waiver of use charges	333	736
Total assistance	$10,869	$9,957

HIGHLIGHT

A pilot program, traineeships in nuclear engineering, was started in fiscal year 1965. Approximately 50 trainees will enter universities in September 1965.



RESEARCH LABORATORIES

major portion of AEC research and development is conducted in government-owned boratories. On June 30, 1965, the investment in major laboratories was $1.6 billion. The EC's investment in research facilities totaled $2.4 billion. These facilities include research actors, particle accelerators, general laboratory buildings, equipment and research devices. ıe research and development work conducted in AEC-owned laboratories includes civilian actor design and development, research in the physical and life sciences, nuclear weapons velopment, peaceful applications for nuclear explosives, and research to improve nuclear aterials, processes, and techniques.

Los Alamos Scientific Laboratory in the Jemez Mountains in northern New Mexico.

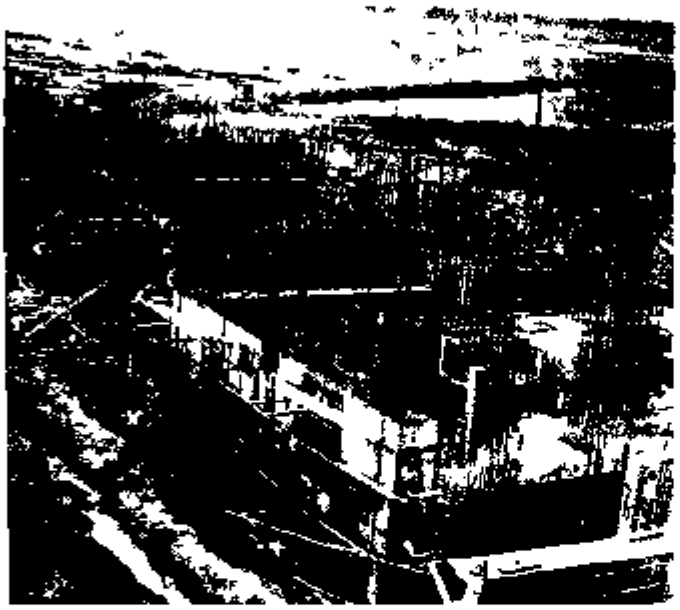
he ten laboratories listed below are the principal AEC-owned research centers. The operating sts of these laboratories together with the costs incurred at other AEC-owned installations nd the cost of the work performed in facilities owned by universities, industrial, and other rivately-owned organizations are included in the costs of the various research areas shown roughout this report.

LABORATORIES	Cost of Completed Plant June 30, 1965	Operating Costs Fiscal Year	
		1965	1964
		(in thousands)	
Ames Research Laboratory	$ 13,282	$ 7,864	$ 6,777
Argonne National Laboratory[1]	272,311	77,942	70,868
Bettis Atomic Power Laboratory[1]	128,575	62,599	72,124
Brookhaven National Laboratory	188,252	52,708	47,689
Knolls Atomic Power Laboratory[1]	137,191	51,781	54,224
Lawrence Radiation Laboratory[2]	253,143	151,684	154,997
Los Alamos Scientific Laboratory[2]	211,584	97,588	96,838
Oak Ridge National Laboratory	237,541	78,668	74,819
Pacific Northwest Laboratory[3]	82,458	28,038	26,261
Savannah River Laboratory	61,240	15,246	16,893

Includes facilities at NRTS, Idaho.
Includes facilities at Mercury, Nevada.
[3] Prior to January 1, 1965 this facility was known as Hanford Laboratory.

INTERNATIONAL ACTIVITIES

The Atomic Energy Commission's international program includes the supplying of nuclear materials for reactors and for use in medicine, agriculture, industry and basic research, the exchange of technical information, and cooperative research and development activities with other nations and international organizations.



The picture taken in June 1965 shows the turbine building area of the Tarapur Reactor Project in the process of construction. Located about sixty two miles north of Bombay, India, the reactor is scheduled to produce 380,000 kilowatts of electricity and to be operational in 1968. The United States is assisting India in this project under a 30-year agreement, including lending her $80 million for expenditures in the United States for design and construction. The AEC will sell the enriched uranium fuel for the reactor.

MAJOR ITEMS SUPPORTED BY FUNDS APPROPRIATED TO AEC	Fiscal Year 1965
	(In thousands)
Joint Euratom research and development	$4,455*
Cooperation with Canada in research on heavy water reactors	624
Advisory and consultant services	83

* For research and development performed domestically as the U. S. share in operative programs.

Fiscal year 1965 was marked by increased international interest in the development of nuclear power. Increased manufacturing experience, reductions in the capital costs of nuclear plants and the passage of legislation permitting the toll enrichment of nuclear fuels have improved the position of the United States as a marketer of reactors and nuclear fuels and materials to other nations. Eleven power reactors completed or under construction in other countries, and five more in the planning stages, will provide a cumulative power rating of 2,878 electrical megawatts abroad in reactors fueled with U.S.-supplied enriched uranium.

The AEC has completed arrangements to sell up to 414.5 kilograms of plutonium to the European Atomic Energy Community (EURATOM), at a price of approximately $17 million, for the Community's fast reactor program, and to provide enriched uranium of approximately equal value on short-term lease with purchase option.

Deferred payment sales contracts have been negotiated for the fueling of four enriched uranium reactors abroad. These contracts cover periods of 20 to 25 years and provide for a ten-year deferral of payment on inventory.

MATERIALS AVAILABLE TO FOREIGN COUNTRIES	Nuclear Materials	Heavy Water	Isotopes	Total
	(In millions)			
Sales during fiscal year 1965	$6.1	$3.9	$.8	$10.8
Value of materials held by foreign governments under long-term credit arrangements	20.0			20.0
Value of materials leased at June 30, 1965	34.2	9.1	3	43.6

SALES OF MATERIALS AND SERVICES

President Johnson signed the bill on August 26, 1964, authorizing private ownership of special nuclear materials.

Revenue from sales of materials and services for fiscal year 1965 amounted to $34.2 million as compared with $15.4 million for fiscal year 1964. Foreign sales during the year amounted to $13.7 million, more than double the $5.9 million for fiscal year 1964. The table shows the major sources of income.

MAJOR SOURCES OF INCOME	Fiscal Year	
	1965	1964
	(in thousands)	
Source and special nuclear materials	$15,989	$ 9,163
Heavy water	4,067	1,558
Radioisotopes	1,877*	1,619*
Other materials	8,293	1,135
Services	3,942	2,025
Total	$34,168	$15,400

* Includes $278 thousand for packaging and handling in 1965 and $240 thousand in 1964.

MATERIALS LEASED

Materials on lease with licensees and foreign governments increased to $175.0 million at June 30, 1965 from $132.2 million at June 30, 1964. The amounts represent the established value of the materials. The following table compares the value of materials leased by type of organizations at June 30, 1965 and 1964. It also shows the value of such material that was subject to use charges and the value of material that was exempt from use charges. Use charges earned in 1965 were $3.8 million. Use charges waived during fiscal year 1965 were $3.2 million.

SOURCE AND SPECIAL NUCLEAR MATERIALS AND HEAVY WATER LEASED	Total		Subject to 4¼% Use Charge		Exempt from Use Charge	
	June 30		June 30		June 30	
	1965	1964	1965	1964	1965	1964
	(in thousands)					
Domestic						
Industrial organizations	$105,759	$ 80,657	$55,990	$38,867	$49,769	$41,790
Educational and research institutions	19,053	16,145	273	189	18,780	15,956
Other Federal Agencies	6,529	3,458	. .		6,529	3,458
Foreign countries	43,645	31,964	43,375	31,758	270	206
Total	$174,986	$132,219	$99,638	$70,814	$75,348	$61,405

SALES OF RADIOISOTOPES

Radioisotope sales in fiscal year 1965 amounted to $1.6 million as compared to $1.3 million for fiscal year 1964. The increase was primarily due to increased demand for Cesium–137, Carbon–14, Cobalt–60 and Polonium–210. However, this increase was partially offset by the withdrawal by the AEC from routine distribution of Calcium–45, Iron–59, Antimony–125, Selenium–75, Tin–113, Zinc–65 and Strontium–85 during fiscal year 1965.

RADIOISOTOPES	Quantity Fiscal year		Dollars Fiscal year	
	1965	1964	1965	1964
	(curies)		(in thousands)	
Barium-133	(*)	(*)	$ 18	$ 6
Calcium-45	2	3	26	41
Calcium-47	(*)	(*)	47	40
Carbon-14	59	43	251	196
Cesium-137	335,740	57,792	192	50
Chlorine-36	(*)	(*)	16	24
Cobalt-60	297,567	130,824	153	69
Hydrogen-3 (Tritium)	118,534	112,430	128	125
Iodine-129	17**	9**	14	8
Iodine-131	61	178	16	40
Iron-59	1	2	35	46
Krypton-85	5,971	4,682	35	59
Mercury-203	14	19	15	19
Nickel-63	3	2	19	15
Phosphorous-32	43	61	47	58
Polonium-210	5,028	3,200	135	88
Promethium-147	5,138	2,903	28	12
Strontium-89	3	2	10	6
Strontium-90	933	3,995	3	11
Sulphur-35	14	14	27	15
Technetium-99	73**	52**	6	5
Thallium-204	2	19	2	13
Xenon-133	267	236	9	7
Other			319	326
Total			$1,601	$1,279

*Less than 1 curie.
**In grams.

In addition, in fiscal year 1965, quantities of radioisotopes produced and distributed for use within AEC were as follows: 1,180,000 curies of Cobalt–60 and 15,000 curies of Cesium–137. These compare with 1,219,000 curies of Cobalt–60 and 224,000 curies of Cesium–137 in fiscal year 1964.

UNITED STATES ATOMIC

BALANCE

ASSETS

	1965	1964
	JUNE 30 (in thousands)	JUNE 30 (in thousands)
CASH		
Funds in U.S. Treasury	$1,559,105	$1,559,316
Cash on hand and with contractors	21,398	22,496
Transfers from other agencies	7,777	19,994
	1,588,280	1,601,906
ACCOUNTS RECEIVABLE		
Federal agencies	36,143	25,501
Other	27,342	17,589
	63,485	43,090
INVENTORIES		
Source and nuclear materials leased and at research installations	789,528	707,503
Special reactor materials	102,605	101,496
Stores	84,896	102,844
Isotopes	33,662	27,795
Other special materials	14,385	15,374
	1,024,971	955,008
PLANT		
Completed plant and equipment	8,470,362	8,109,615
Less—Accumulated depreciation	2,914,498	2,532,223
	5,555,869	5,577,392
Construction work in progress	400,677	408,556
	5,956,546	5,985,948
OTHER	56,618	66,428
TOTAL ASSETS	$8,689,900	8,652,374

ENERGY COMMISSION

SHEET

LIABILITIES AND AEC EQUITY*

	1965 JUNE 30 (in thousands)	1964 JUNE 30 (in thousands)
LIABILITIES		
Accounts payable and accrued expenses	$ 300,759	$ 324,910
Advances from other agencies	18,585	33,275
Funds held for others	14,979	19,501
Accrued annual leave of AEC employees	9,290	8,629
Deferred credits	11,709	6,465
TOTAL LIABILITIES	355,322	392,780
AEC EQUITY, JULY 1	8,257,591	8,192,933
ADDITIONS		
Funds appropriated—net	2,624,555	2,712,661
Nonreimbursable transfers from other agencies	13,535	56,147
	2,638,090	2,767,808
DEDUCTIONS		
Net cost of operations—after special items	2,541,249	2,711,472
Nonreimbursable transfers to other agencies	19,838	21,633
Funds returned to U.S.Treasury	16	45
	2,561,103	2,733,150
AEC EQUITY, JUNE 30	8,334,578	8,257,591
TOTAL LIABILITIES AND AEC EQUITY	$8,689,900	$8,642,374

*The notes on the following page are an integral part of this statement.

NOTES TO THE BALANCE SHEET

. **The Balance Sheet does not include in assets:**

a. Certain inventories for security reasons.

b. 64,751,316 troy ounces of silver loaned to AEC by the Treasurer of the United States for use as electrical conductors in plants. Of this amount, 280,500 troy ounces have been lost in usage and are, therefore, not returnable. Based on market quotations at June 30, 1965, the value of the silver on loan was $83,723,000. The value of silver lost and the cost of recovering and processing that on hand and returning it to the Treasury is estimated at $678,000.

c. Plant and equipment on loan from other Federal Agencies at June 30, 1965 amounting to $32,804,000.

d. Contested claims against others of $3,150,000.

2. **The Balance Sheet does not include in liabilities:**

a. Contingent liabilities related to contracts for the supply of electric power and natural gas for the Oak Ridge, Paducah and Portsmouth production facilities. If cancellation notice had been given at June 30, 1965, the estimated liabilities would have amounted to $219,871,000.

b. Contingent liabilities as guarantor of loans to the extent of $6,057,491.

c. Contingent liabilities for claims against AEC of approximately $57,204,000.

d. Commitments for an estimated 52,700 tons of U_3O_8 at an estimated cost of $790,000,000 (see page 2 for details).

e. Commitments under section 56 of the Atomic Energy Act of 1954, as amended, for the acquisition of plutonium and uranium enriched in the isotope 233. Estimated commitments of $2,216,000 for fiscal year 1966 are based upon projected quantities of plutonium and uranium enriched in the isotope 233 to be produced by domestic licensees and delivered to AEC during this period. There is also additional liability, difficult to estimate accurately at this time, for purchase under section 56 of additional quantities of reactor-produced plutonium and uranium enriched in the isotope 233 which may be delivered to the AEC in future years but prior to January 1, 1971.

f. Outstanding contracts, purchase orders and other commitments of $1,079,000,000.

STATEMENT OF OPERATIONS

	FISCAL YEAR 1965	1964
	(in thousands)	
Production		
Procurement of raw materials	$ 261,082	*$ 326,338*
Production of nuclear materials	571,301	*636,366*
Weapons development and fabrication	763,128	*804,598*
	1,595,511	*1,767,302*
Research and development		
Development of nuclear reactors	535,875	*561,191*
Physical research	236,980	*215,682*
Biology and medicine research	84,417	*77,352*
Peaceful application for nuclear explosives	12,316	*13,921*
Isotopes development	9,853	*8,521*
	879,441	*876,667*
Community operations		
Expenses	8,903	*10,591*
Revenues	(5,341)	*(5,706)*
	3,562	*4,885*
Sales of materials and services		
Cost	28,615	*14,251*
Revenue	(34,168)	*(15,400)*
	(5,553)	*(1,149)*
Education and training	9,536	*9,221*
AEC administrative expenses	80,258	*72,866*
Security investigations	5,286	*6,282*
Other expenses	9,271	*9,954*
Other income	(7,514)	*(6,970)*
Net cost of operations*	2,569,798	*2,739,058*
Special items		
Adjustments to costs of prior years—net	91,814	*(3,575)*
Transfers to inventories—net	(120,363)	*(24,011)*
Net cost of operations—after special items*	$2,541,249	*$2,711,472*

*Includes depreciation of $324 million in 1965 and $302 million in 1964.

U.S. GOVERNMENT INVESTMENT

IN THE ATOMIC ENERGY PROGRAM FROM JUNE 1940 THROUGH JUNE 1965

	(In millions)	
Appropriation Expenditures:		
National Defense Research Council	$ .5	
Office of Scientific Research and Development	14.6	
War Department (including Manhattan Engineer District)	2,218.3	
		$ 2,233.4
Atomic Energy Commission:		
Fiscal Years Prior to 1956	9,980.2	
Fiscal Year 1956	1,638.5	
Fiscal Year 1957	1,931.5	
Fiscal Year 1958	2,268.0	
Fiscal Year 1959	2,541.2	
Fiscal Year 1960	2,622.8	
Fiscal Year 1961	2,713.5	
Fiscal Year 1962	2,805.7	
Fiscal Year 1963	2,757.9	
Fiscal Year 1964	2,764.6	
Fiscal Year 1965	2,625.0	
		34,648.9
Total		36,877.3
Unexpended balance of funds in U.S. Treasury June 30, 1965		1,559.1
Total funds appropriated		38,436.4
Less:		
Collections paid to U.S. Treasury	54.9	
Property and services transferred to other Federal agencies without reimbursement, net of such transfers received from other Federal agencies	226.0	
Cost of operations (including depreciation and obsolescence) from June 1940 through June 30, 1965	29,820.9	
		30,101.8
AEC Equity at June 30, 1965 as shown on Balance Sheet		$ 8,334.6

PLANT AND EQUIPMENT

AEC-owned plant and equipment includes plants for the preparation of feed materials, gaseous diffusion plants for the separation of the fissionable isotope uranium–235 from the stable isotope uranium–238; reactors for the production of plutonium, isotopes and other reactor products; facilities for the fabrication and testing of weapons; reactors for testing materials and equipment components; reactor prototypes; and research laboratories. Completed plant, at cost, amounted to $8,470 million at June 30, 1965, an increase of $300 million over June 30, 1964.

The estimated cost of plant under construction and projects authorized but not started at June 30, 1965, totaled $1,181 million. Costs incurred through June 30, 1965 on plant under construction amounted to $401 million, leaving the estimated costs to be incurred subsequent to June 30, 1965 at $780 million. A major portion of this authorized plant expansion is for construction of reactors and related facilities and of facilities to be used in high energy physics research.

INVESTMENT IN PLANT AND EQUIPMENT BY TYPE OF FACILITY

June 30, 1965

TYPE OF FACILITY	Acquisition Cost	Accumulated Depreciation	Net Investment In Plant
		(in thousands)	
PRODUCTION			
Raw materials	$ 3,288	$ 1,212	$ 2,076
Feed materials	274,221	92,496	181,725
Gaseous diffusion plants	2,343,005	845,095	1,497,910
Alloy development plant	157,684	42,296	115,388
Production reactors and separation areas	1,814,515	711,379	1,103,136
Weapons production and storage	648,846	224,776	424,070
Heavy water	163,865	60,807	102,558
Other production facilities	59,118	28,826	30,292
Total Production	5,464,042	2,006,887	3,457,155
RESEARCH AND DEVELOPMENT			
Laboratories	1,360,378	465,094	895,284
Reactors	579,780	117,265	462,515
Accelerators	300,104	51,397	248,707
Other research facilities	129,941	35,595	94,346
Total Research	2,370,203	669,351	1,700,852
COMMUNITIES	77,688	30,131	47,557
GENERAL PURPOSE	558,429	208,124	350,305
	$8,470,362	$2,914,493	5,555,869
CONSTRUCTION WORK IN PROGRESS			400,677
TOTAL			$5,956,546

AEC PLANT AND EQUIPMENT BY LOCATION

(AT COST)

June 30, 1965

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
CALIFORNIA				
Lawrence Radiation Laboratory, University of California				
Berkeley	$ 93.4	$ 3.0	$ 11.6	$108.0
Livermore	151.7	8.1	49.8	209.1
Total	245.1	11.1	60.9	317.1
Stanford University, Palo Alto				
Linear electron accelerator	26.8	39.2	48.0	114.0
Other research facilities	3.9	.9	8.0	12.8
Total	30.7	40.1	56.0	126.8
Research facilities, Sandia Corporation, Livermore	19.9	.6	2.1	22.6
Medical research facilities, University of California, Los Angeles	1.6		.1	1.7
Research facilities, California Institute of Technology, Pasadena	2.2		2.0	4.2
Reactor and research facilities, Atomic International Division, North American Aviation, Inc., Canoga Park—Santa Susana	48.7	7.4	7.8	58.4
Bio-Med research facilities, University of California—Davis	3.1	.1	.9	4.1
Reactor Facilities, Aerojet-General, San Ramon	.9		.3	1.2
Reactor Facilities, Aerojet-General, Sacramento	.8			.8
Total	72.2	8.1	12.7	93.0
Total California	348.0	59.3	129.6	536.9
COLORADO				
Uranium handling, sampling and general facilities, Lucius Pitkin, Inc., Grand Junction	4.1		.1	4.2

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
COLORADO—Continued				
Rocky Flats Plant, Dow Chemical Company, Boulder	$103.4	$ 8.5	$ 21.4	$133.3
University of Colorado, Boulder	1.4		.1	1.5
Total Colorado	108.9	8.5	21.6	139.0
CONNECTICUT				
Pratt and Whitney, Middletown	67.7	1.0	2.3	71.0
Linear accelerator, Yale University, New Haven	4.6	2.3	2.2	9.1
Submarine reactor facilities, Combustion Engineering, Inc., Windsor	15.1			15.1
Total Connecticut	87.4	3.3	4.5	95.2
FLORIDA				
Pinellas Plant, General Electric Company, Clearwater	16.1	.5	3.3	19.9
IDAHO				
Idaho Falls				
National Reactor Testing Station, Phillips Petroleum Company				
Chemical processing plant	56.6	.1	.9	56.6
Waste storage facility	7.8	.7	.9	9.4
Advanced test reactor	.2	41.9	9.9	52.0
Materials test reactor	15.0	.2	.2	15.4
Engineering test reactor	15.8			15.8
MTR-ETR facilities	20.4	.1	.6	21.1
Nuclear safety engineering test facilities	5.0	2.4	17.0	24.4
Reactor facilities	37.5	1.1	10.5	49.1
General facilities	51.0	.2	3.8	55.0
Total	208.3	46.7	43.8	298.8
Westinghouse Electric Corporation				
Large ship reactor	35.7	.3		36.0
Submarine thermal reactor	16.1	1.4		17.5
Other research facilities	15.9	1.7	4.3	21.9
Total	67.7	3.4	4.3	75.4

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,3]	Total
IDAHO—Continued				
Reactor facilities, Argonne National Laboratory	$ 28.6	$17.8	$22.6	$ 64.0
Knolls Atomic Power Laboratory, General Electric Company	19.8		.5	20.8
Experimental Beryllium Oxide Reactor, General Atomics	2.0	8.8	.5	11.8
Total	45.4	26.6	23.6	95.6
Total Idaho	321.4	76.7	71.7	469.8
ILLINOIS				
Argonne National Laboratory, University of Chicago, Argonne	248.7	19.5	76.1	344.3
Argonne Cancer Research Hospital, University of Chicago, Chicago	5.3	.1	1.0	6.4
University of Illinois, Urbana	2.3	.1	1.2	3.6
Total Illinois	256.3	19.7	78.3	354.3
INDIANA				
Radiation Laboratory, University of Notre Dame, Notre Dame	2.4		.4	2.8
IOWA				
Research facilities, Ames Research Laboratory, Ames	13.3	5.8	2.9	22.0
Iowa Ordnance Plant, Mason and Hanger, Burlington	37.3	.3	3.3	40.9
Total Iowa	50.6	6.1	6.2	62.9
KENTUCKY				
Paducah				
Gaseous diffusion plant, Union Carbide Nuclear Company	756.0	.5	1.2	757.7
Feed materials plant, Union Carbide Nuclear Company	31.2			31.2
Total Kentucky	787.2	.5	1.2	788.9

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
MARYLAND				
AEC Headquarters, Germantown	$ 21.3		$ .4	$ 21.7
MASSACHUSETTS				
Cambridge electron accelerator, Harvard University, Cambridge	18.2	$ .2	4.0	22.4
Research facilities, Edgerton, Germeshausen & Grier, Inc., Boston	17.2	.8	3.7	21.7
Research facilities, Massachusetts Institute of Technology, Cambridge	4.4		5.7	10.1
Total Massachusetts	39.8	1.0	13.4	54.2
MINNESOTA				
Linear accelerator, University of Minnesota, Minneapolis	1.9	2.3	1.3	5.5
Elk River Reactor, Rural Cooperative Power Association, Elk River	9.2		2.0	11.2
Total Minnesota	11.1	2.3	3.3	16.7
MICHIGAN				
Research facilities, University of Michigan, Ann Arbor	.6	1.1	.4	2.1
Research facilities, Michigan State University, East Lansing			.6	.6
Total Michigan	.6	1.1	1.0	2.7
MISSOURI				
Kansas City Plant, The Bendix Corporation, Kansas City	61.8	4.2	14.5	80.5
Feed materials plant, Mallinckrodt Chemical Works, Weldon Spring	62.3	.2	1.1	63.6
Total Missouri	124.1	4.4	15.6	144.1
NEBRASKA				
Hallam Nuclear Power Facility, Consumers Public Power District, Hallam	33.4		.6	34.0

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
NEVADA				
Mercury:				
Nevada Test Site, Reynolds Electrical and Engineering Co., Inc.	$111.8	$2.2	$19.1	$132.6
Laboratory facilities, Lawrence Radiation Laboratory	8.0			8.0
Total	119.8	2.2	19.1	140.6
Jackass Flats:				
Nuclear Rocket Development Station, Project Rover				
Los Alamos Scientific Lab	11.9	.8	4.8	17.0
Pan American World Airways, Inc.	30.6	19.5	7.7	57.8
Other research facilities	1.6	1.4	1.8	4.8
Total	44.1	21.7	13.8	79.6
Las Vegas				
Improvement of U.S. Highway 95	4.0		.5	4.5
Tonopah				
Research facilities, Sandia Corporation	9.0	.6	1.4	11.0
Total	13.0	.6	1.9	15.5
Total Nevada	176.4	24.5	34.8	235.7
NEW JERSEY				
Princeton				
Princeton-Pennsylvania proton accelerator, Princeton University	27.8	1.9	5.8	35.0
Model C stellarator facilities, Princeton University	24.2		1.7	25.9
Total	52.0	1.9	7.0	60.9
New Brunswick Laboratory, Atomic Energy Commission, New Brunswick	3.0			3.0
Total New Jersey	55.0	1.9	7.0	63.9
NEW MEXICO				
Albuquerque				
Lovelace Foundation Laboratory	3.8		.6	4.4
Sandia Laboratory, Sandia Corporation	144.6	4.7	34.5	183.8

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
NEW MEXICO—Continued				
South Albuquerque Works, ACF Industries, Inc.	$33.5	$1.1	$3.0	$37.6
Diagnostic aircraft support facilities, Kirtland AFB	.9			.9
Total	182.8	5.8	38.1	226.7
Los Alamos				
Los Alamos Scientific Laboratory, University of California	199.7	15.7	39.1	254.5
Community and general maintenance facilities, The Zia Company	143.8	2.4	10.4	156.6
Total	343.5	18.1	49.5	411.1
Total New Mexico	526.3	23.9	87.6	637.8
NEW YORK				
New York City				
Computing and other research facilities, New York University	1.0		.1	1.1
Accelerator and research facilities, Columbia University	3.9		.2	4.1
Health and Safety Laboratory, Atomic Energy Commission	1.8		.3	2.1
Total	6.7		.6	7.3
Brookhaven National Laboratory, Associated Universities, Inc., Upton	188.2	17.1	46.8	252.1
Boron plant, Page Airways, Inc., Niagara Falls	7.1		.1	7.2
Research Laboratory, University of Rochester, Rochester	6.3	.1	.2	6.6
Knolls Atomic Power Laboratory, General Electric Company, Schenectady and West Milton	117.4	1.2	10.3	128.9
Fuel and canning preparation areas, Sylvania Electric Products, Inc., Hicksville	2.8			2.8
Accelerator facility, Rensselaer Polytechnic Institute, Troy	2.4		.3	2.7
Total	324.2	18.4	57.7	400.3
Total New York	330.9	18.4	58.3	407.6

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
OHIO				
Research facilities, General Electric Company, Cincinnati	$ 8.8	$ .1	$ .9	$ 9.8
Gaseous diffusion plant, Goodyear Atomic Corporation, Portsmouth	763.8	.9	2.4	766.6
Feed materials plant, National Lead Company, Fernald	118.4	.8	1.8	121.0
Mound Laboratory, Monsanto Chemical Company, Miamisburg	45.8	4.1	13.2	63.1
Piqua nuclear power facility, City of Piqua, Piqua	8.9		1.2	10.1
Feed materials facility, Reactive Metals, Inc., Ashtabula	1.6	.1	.1	1.8
Total Ohio	946.8	6.0	19.6	972.4
PENNSYLVANIA				
Bettis Atomic Power Laboratory, Westinghouse Electric Corporation, Pittsburgh	60.8	9.3	10.3	80.4
Accelerator and research facilities, Carnegie Institute of Technology, Pittsburgh	1.5			1.5
Shippingport Atomic Power Station, Duquesne Light Company, Shippingport	47.3	6.1	1.8	55.2
Astro Nuclear Laboratory, Westinghouse Electric Corporation, Large	3.0	.6	3.1	6.7
Total Pennsylvania	112.6	16.0	15.2	143.8
SOUTH CAROLINA				
Savannah River Plant, E. I. duPont de Nemours and Co., Inc., Aiken				
Production reactor and separation facilities	899.6	5.0	16.8	921.4
Feed materials production facilities	29.7	.6	.3	30.6
Heavy water production facilities	163.4	.3		163.7
Works laboratory	61.2	1.3	1.1	63.6
General facilities	166.3	2.5	7.6	176.4
Total South Carolina	1,320.2	9.7	25.8	1,355.7
TENNESSEE				
Oak Ridge				
Research Laboratory, Oak Ridge Institute of Nuclear Studies	4.8	.1	.4	5.3

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
TENNESSEE—Continued				
Oak Ridge				
Agriculture Research Laboratory and Farm, University of Tennessee	$ 2.8	$ .1	$ .6	$ 3.0
Experimental Gas Cooled Reactor, TVA	2.6	54.5	2.8	59.9
Oak Ridge gaseous diffusion plant, Union Carbide Nuclear Company	830.4	1.9	4.8	837.1
Y–12 Plant, Union Carbide Nuclear Company	388.2	6.8	12.2	407.2
Oak Ridge National Laboratory, Union Carbide Nuclear Company	237.5	17.3	39.1	293.9
Service facilities	10.5		.6	11.1
Total	1,476.8	80.7	60.5	1,617.5
Clarksville facility, Mason and Hanger, Clarksville	2.3			2.3
Total Tennessee	1,478.6	80.7	60.5	1,619.8
TEXAS				
Pantex Plant, Mason and Hanger, Amarillo	49.2	1.3	3.6	54.1
Medina facility, Mason and Hanger, San Antonio	16.0			16.0
Research facility, Rice University, Houston	1.5			1.5
Total Texas	66.7	1.3	3.6	71.6
UTAH				
Monticello				
Uranium ore processing plant, Lucius Pitkin, Inc.	.5			.5
WASHINGTON				
Richland				
Hanford Works, General Electric Co.				
Production reactor facilities	715.7	$ 5.1	$11.8	732.6
Separation facilities	200.2	4.0	12.6	216.8
Feed materials production facilities	21.5	1.2	.6	23.3
General facilities	118.4	1.8	3.1	123.3
Total	1,055.8	12.1	28.1	1,096.0

AEC PLANT AND EQUIPMENT BY LOCATION

LOCATION AND CONTRACTOR	AUTHORIZED PLANT AND EQUIPMENT (in millions)			
	Completed	Construction Work In Progress	Estimated Cost to Complete Construction Projects[1,2]	Total
WASHINGTON—Continued				
Pacific Northwest Laboratory, Battelle Memorial Institute	$82.5	$9.9	$8.6	$101.0
Total Washington	1,138.8	22.0	86.7	1,197.0
WEST VIRGINIA				
Huntington pilot plant, International Nickel Company, Huntington	4.9			4.9
WISCONSIN				
Research facilities, University of Wisconsin, Madison	1.2		.1	1.3
LaCrosse boiling water reactor, Genoa		7.8	3.7	11.5
Total Wisconsin	1.2	7.8	3.8	12.8
PUERTO RICO				
Puerto Rico Nuclear Center, University of Puerto Rico, Mayaguez	5.8		.5	5.8
Boiling nuclear super heat reactor, Punta Higuera	10.1	2.7	.8	13.6
Total Puerto Rico	15.4	2.7	1.3	19.4
JAPAN				
Research facilities, National Academy of Science, Hiroshima	2.6	.1	.3	3.0
ALL OTHER				
N. S. Savannah	26.2		1.4	27.6
Weapons storage facilities	28.7			28.7
Other	35.5	2.3	73.0	110.8
Total All Other	85.4	2.3	74.4	162.1
TOTAL	$8,470.4	$400.7	$780.0	$9,651.1

[1] Includes capital equipment.
[2] Includes "plant and capital equipment" authorized in Public Law 89-32, approved June 2, 1965.

AEC COSTS INCURRED BY

COLLEGES AND UNIVERSITIES

In addition to the activities of the AEC laboratories (shown on page 20), some of which are operated for AEC by universities or associations of universities, the AEC had other contracts with 304 colleges or universities for atomic energy work. The table below shows that the cost of this work totaled about $108 million in fiscal year 1965 and identifies each university where costs in excess of $500,000 were incurred.

COLLEGES AND UNIVERSITIES	Fiscal Year 1965	
	Rank by Dollar Volume of Costs Incurred	Total Costs* (in thousands)
Brown University	89	$ 545
California Institute of Technology	11	2,480
California, University of	4	5,485
California, University of, at Los Angeles	10	2,704
Carnegie Institute of Technology	17	1,762
Case Institute of Technology	25	1,039
Chicago, University of	18	1,459
Colorado, University of	31	772
Columbia University	5	4,541
Cornell University	22	1,332
Duke University	30	790
Florida State University	27	880
Harvard University	3	6,236
Illinois Institute of Technology	36	620
Illinois, University of	7	4,318
Johns Hopkins University	28	876
Maryland, University of	26	1,001
Massachusetts Institute of Technology	2	7,295
Michigan State University	33	713
Michigan, University of	12	2,135
Minnesota, University of	19	1,427
New York University	15	2,166
Notre Dame, University of	23	1,201
Ohio State University	41	514
Pennsylvania State University	34	638
Pennsylvania, University of	13	2,161
Princeton University	1	15,765
Puerto Rico, University of	14	2,167
Purdue University	21	1,359
Rensselaer Polytechnic Institute	24	1,162
Rice University	35	637
Rochester, University of	6	4,501
Southern California, University of	40	522
Stanford University	37	617
Tennessee, University of	20	1,365
Texas, University of	32	752
Utah, University of	29	848
Virginia, University of	38	559
Washington, University of	16	1,969
Wisconsin, University of	9	2,820
Yale University	8	3,230
Other (263 colleges or universities)		14,207
Total		$107,630

* These costs exclude depreciation and include construction and capital equipment.

AEC COSTS INCURRED BY

PRINCIPAL PRIME INDUSTRIAL CONTRACTORS

ivate industrial organizations working under contract with the AEC perform most of
e production and much of the research and development work accomplished by the AEC. In
al year 1965, the AEC's principal prime industrial contractors accomplished work amounting
some $1,766 million. The following table lists the industrial, supply, production, and re-
rch and development contractors who incurred costs exceeding five million dollars.

INDUSTRIAL ORGANIZATIONS	Fiscal Year 1965	
	Rank by Dollar Volume of Costs Incurred	Total Costs* (in thousands)
ACF Industries, Incorporated	14	$ 27,047
Aerojet-General Corporation	10	44,398
American Metal Climax, Inc.	34	6,555
Anaconda Company	25	12,084
Atlas Corporation	18	29,677
Atomics International Division, North American Aviation, Inc.	8	61,775
Bendix Corporation	4	100,033
Catalytic Construction Company	31	8,321
Combustion Engineering Corporation	35	6,457
Dow Chemical Company	12	38,078
Edgerton, Germeshausen & Grier, Inc.	15	26,280
E. I. duPont de Nemours & Company	6	89,141
Federal-Radcrock-Gas Hills Partners	37	5,650
Fluor Corporation, Ltd.	27	9,850
General Atomic Division, General Dynamics Corp.	26	10,009
General Electric Company	3	196,458
Goodyear Atomic Corporation	7	68,393
H. K. Ferguson Co.	32	8,056
Holmes & Narver, Inc.	17	24,150
Homestake-Sapin Partners	22	18,186
Kermac Nuclear Fuels Corp.—Kerr-McGee Oil Industries, Inc.	16	25,068
Mallinckrodt Chemical Works	30	8,986
Mason & Hanger—Silas Mason Company	20	19,582
Mines Development, Inc.—Susquehanna Corp.	33	7,639
Monsanto Research Corp.—Monsanto Company	19	22,195
National Lead Company	13	23,267
Pan American World Airways, Inc.	24	13,367
Petrotomics Company	36	5,789
Phillips Petroleum Company	11	40,267
Pratt & Whitney Aircraft Division of United Aircraft Corporation	21	19,028
Reynolds Electrical and Engineering Company, Inc.	5	96,829
Sandia Corp.—Western Electric Company, Inc.	2	217,919
Union Carbide Corporation	1	218,100
United Nuclear Corporation	28	15,952
Utah Construction & Mining Company	29	9,421
Western Nuclear, Inc.	28	9,749
Westinghouse Electric Corporation	9	61,089
Other		166,502
Total		$1,766,257

* These costs exclude depreciation and include construction and capital equipment.

AEC COSTS INCURRED BY

GEOGRAPHICAL LOCATIONS

The following table shows the costs incurred by the AEC in fiscal year 1965. Allocations of costs are made in accordance with the physical location of contractors and AEC offices but do not necessarily represent funds spent in those locations.

LOCATION	Operations [1]	Plant and Capital Equipment	Total
		(in thousands)	
Alabama	$ 128	$ 1	$ 129
Alaska	45	.....	45
Arizona	8,666	.....	8,666
Arkansas	1,290	.....	1,290
California	275,551	74,723	350,274
Colorado	62,836	8,692	71,528
Connecticut	26,520	3,743	30,263
Delaware	63	3	66
District of Columbia	11,263	1,174	12,437
Florida	16,903	1,787	18,690
Georgia	962	.....	962
Hawaii (Including Pacific Test Area)	21,679	.....	21,679
Idaho	61,821	27,621	89,442
Illinois	75,096	19,506	94,602
Indiana	6,785	75	6,860
Iowa	15,819	3,774	19,593
Kansas	468	.....	468
Kentucky	66,069	1,259	67,328
Louisiana	360	.....	360
Maine	271	.....	271
Maryland	39,243	216	39,459
Massachusetts	25,108	6,013	31,121
Michigan	3,993	807	4,800
Minnesota	3,772	30	3,802
Mississippi	149		149
Missouri	103,187	6,977	110,114
Montana	28	.....	28
Nebraska	1,456	411	1,867
Nevada	146,096	28,455	174,551
New Hampshire	108	.....	108
New Jersey	15,351	3,596	18,947
New Mexico	379,043	50,979	430,022
New York	102,492	22,893	125,385
North Carolina	1,302	155	1,457
North Dakota	19	.....	19
Ohio	121,890	8,834	130,724
Oklahoma	185	.....	185
Oregon	681	.....	681
Pennsylvania	89,227	8,714	97,941
Puerto Rico	2,673	1,760	4,433

See footnote at end of table.

AEC COSTS INCURRED BY

GEOGRAPHICAL LOCATIONS

LOCATION	Operations [1]	Plant and Capital Equipment	Total
		(in thousands)	
Rhode Island	$ 670	....	$ 670
South Carolina	81,448	$ 10,846	92,294
South Dakota	4,817	. . ..	4,817
Tennessee	214,715	40,497	255,212
Texas	12,921	4,321	17,242
Utah	26,537	70	26,607
Vermont	27	18	45
Virginia	2,639	.....	2,689
Washington	135,278	21,020	156,298
West Virginia	175	.....	175
Wisconsin	3,809	4,606	8,415
Wyoming	34,957	.....	34,957
Foreign Countries	88,396	339	88,735
TOTALS	$2,294,937	$363,915	$2,658,852

[1] Excludes depreciation.

TEN - YEAR

SUMMARY

U. S. ATOMIC ENERGY COMMISSION TEN-

(DOLLARS IN

	1965	1964	1963	1962
Cost of operations	$2,569,798	$2,789,058	$2,713,207	$2,695,936
Procurement of raw materials	261,082	326,338	477,873	537,363
Production of nuclear materials	571,301	636,366	652,426	688,583
Weapons development and fabrication	768,128	804,598	696,866	705,893
Development of nuclear reactors	535,875	561,191	507,343	433,150
Physical research	236,980	215,682	198,526	171,782
Biology and medicine research	84,417	77,352	70,523	62,782
Community operations—net	3,562	4,885	4,958	4,482
Administrative expenses	80,258	72,866	67,068	60,592
Miscellaneous expenses and income—net	33,195	39,780	37,624	31,409
Plant construction and equipment costs incurred during the year	$371,513	$376,898	$409,114	$423,765
Total AEC assets excluding inventories of certain products at June 30	$8,689,900	$8,642,874	$8,589,665	$7,803,222
Plant investment at June 30 (gross)	$8,871,089	$8,578,169	$8,283,451	$7,869,250
Production plants	5,464,042	5,497,362	5,447,496	5,344,523
Research and development facilities	2,370,203	2,147,574	1,885,929	1,713,986
Other	636,117	524,677	318,208	306,162
Plant construction in progress at June 30	400,677	408,556	581,818	504,579

Funds appropriated-net	$2,624,555	$2,742,661	$3,134,776	$2,547,338
Operations	2,261,555	2,342,661	2,872,031	2,351,978
Plant and capital equipment	363,000	400,000	262,745	195,360
Appropriation expenditures	$2,624,996	$2,764,565	$2,757,876	$2,805,700

Employment at June 30	133,912	136,620	135,278	126,623
AEC employees	7,329	7,268	7,120	6,863
Operating contractor employees	114,783	117,257	115,012	106,394
Construction contractor employees	11,800	12,095	13,146	13,366

EAR SUMMARY OF FINANCIAL DATA

(OUSANDS)

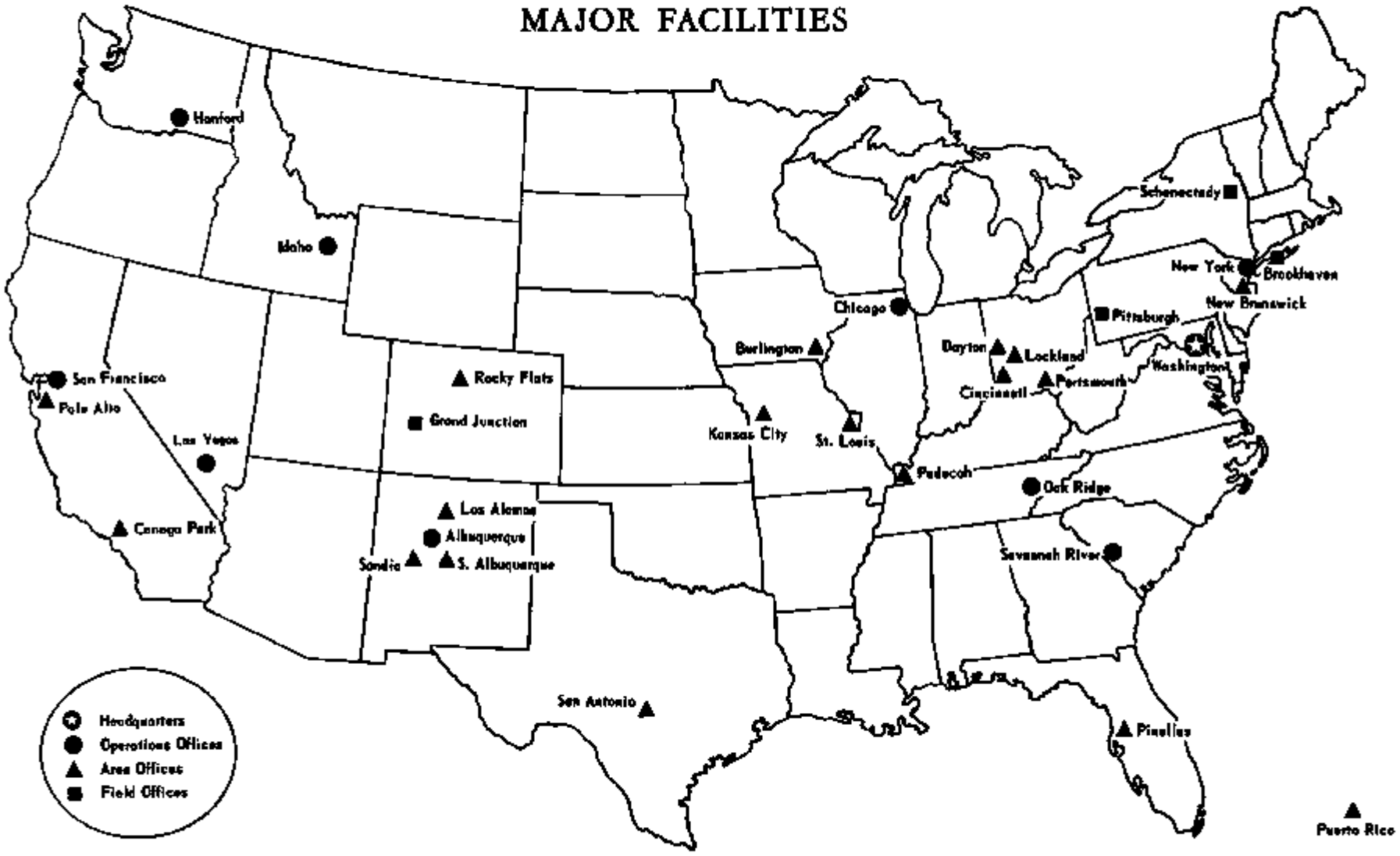
1961	1960	1959	1958	1957	1956
$2,612,909	$2,619,143	$2,496,648	$2,298,589	$1,918,258	$1,607,978
636,832	716,507	699,996	596,891	897,813	278,946
732,524	781,848	718,247	750,178	762,815	730,972
512,817	505,448	491,981	443,536	337,188	280,765
487,274	399,252	355,600	306,225	255,667	168,858
154,105	132,845	112,818	87,719	69,657	56,547
53,866	48,878	42,781	35,958	33,148	29,849
4,463	7,090	9,892	11,162	8,897	8,954
57,709	51,197	50,185	46,435	38,499	38,195
23,819	26,578	20,698	20,985	14,579	14,892
$432,688	$331,516	$298,979	$289,744	$317,022	$301,682
$7,802,395	$7,689,386	$7,764,770	$7,652,784	$7,897,911	$7,368,272
$7,664,736	$7,844,751	$7,292,784	$7,110,797	$6,907,896	$6,713,061
5,453,568	5,458,201	5,562,646	5,494,440	5,392,464	5,212,776
1,434,967	1,271,258	1,124,543	937,682	792,638	753,468
313,403	288,608	365,838	407,529	411,582	499,793
462,798	326,689	249,757	271,146	311,217	247,024

$2,666,760	$2,649,614	$2,635,335	$2,333,974	$1,898,700	$834,227
2,456,210	2,387,114	2,385,406	2,225,470	1,740,400	1,146,400 *
210,550	262,500	249,929	108,504	158,300	(312,173) *
$2,713,465	$2,622,888	$2,541,181	$2,267,960	$1,931,485	$1,633,549

122,989	122,718	121,928	121,059	119,455	110,197
6,846	6,907	6,855	7,107	6,910	6,637
103,313	104,612	105,195	108,290	98,176	90,238
12,830	11,199	9,878	10,662	14,369	13,322

ncludes transfer to operations of $571,400,000 appropriated in prior years as plant and equipment.

MAJOR FACILITIES



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