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An Analysis of the Carter Administration's FY 1978 ERDA Budget to Congress

by
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I. The Proposed FY 1978 Budget

As seen from Table 1, the total Energy Research and Development Administration (ERDA) budget for 1978 is \$6.4 billion (\$7.8 billion).^{1/} The portion of the budget earmarked for Energy Research, Development and Demonstration is \$3.1 billion (\$3.9 billion), or 49% (51%).^{2/} The remainder is for High Energy Physics, Space Technology, Uranium Enrichment Activities, National Security and Program Support (administration activities).

Table 2 gives the budget for each of the major energy technologies, namely, conservation, fossil, solar, geothermal, fusion and fission. The categories "Liquid Metal Fast Breeder Reactor" and "Nuclear Fuel Cycle and Safeguards" are, of course,

1/ In this analysis the first figure cited will be budget outlays; the figure in parentheses following budget outlays will be budget authority.

2/ If the \$305 million (\$297 million) for program support were prorated among the various programs the total Energy R&D budget would be \$3.3 billion (\$4.1 billion) or 51 percent (53%).

U. S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST (CARTER ADMINISTRATION)

	(In Millions) BUDGET AUTHORITY			(In Millions) BUDGET OUTLAYS		
	FY 1977	FY 1978	Increase	FY 1977	FY 1978	Increase
<u>Energy Research, Development & Demonstration</u>						
Energy RD&D Programs	\$2,643	\$3,201	\$ 558	\$2,179	\$2,750	\$ 571
Supporting Research.	337	390	53	312	362	50
Financial Incentive Activities	30	330	330	4	10	6
Subtotal.	<u>3,010</u>	<u>3,921</u>	<u>911</u>	<u>2,495</u>	<u>3,122</u>	<u>627</u>
<u>Basic Research and Technology Development</u>						
High Energy Physics.	224	269	45	200	237	37
Nuclear Physics.	81	86	5	75	84	9
Life Sciences and Biomedical Applications.	44	39	-5	42	38	-4
Naval Reactor Development.	200	243	43	241	248	7
Space Applications and Other	24	36	12	24	30	6
Subtotal.	<u>573</u>	<u>673</u>	<u>100</u>	<u>582</u>	<u>637</u>	<u>55</u>
<u>Uranium Enrichment Activities</u>						
Uranium Enrichment Activities.	1,482	1,685	203	1,246	1,407	161
Revenues	-699	-966	-267	-699	-966	-267
Subtotal.	<u>783</u>	<u>719</u>	<u>-64</u>	<u>547</u>	<u>441</u>	<u>-106</u>
<u>National Security</u>						
Weapons Activities	1,184	1,466	282	1,146	1,316	170
Special Materials Production	551	671	120	442	597	155
Subtotal.	<u>1,735</u>	<u>2,137</u>	<u>402</u>	<u>1,588</u>	<u>1,913</u>	<u>325</u>
<u>Program Management and Support</u>	<u>288</u>	<u>303</u>	<u>15</u>	<u>163</u>	<u>306</u>	<u>143</u>
GRAND TOTAL	<u><u>\$6,389</u></u>	<u><u>\$7,753</u></u>	<u><u>\$1,364</u></u>	<u><u>\$5,375</u></u>	<u><u>\$6,419</u></u>	<u><u>\$1,044</u></u>

TABLE 2

U. S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

FY 1978 BUDGET REQUEST (CARTER ADMINISTRATION)

ENERGY RESEARCH, DEVELOPMENT AND DEMONSTRATION PROGRAMS

	(In Millions)			(In Millions)		
	BUDGET AUTHORITY			BUDGET OUTLAYS		
	<u>FY 1977</u>	<u>FY 1978</u>	<u>Increase</u>	<u>FY 1977</u>	<u>FY 1978</u>	<u>Increase</u>
<u>I. Energy RD&D Programs</u>						
Conservation	\$ 161	\$ 318	\$ 157	\$ 125	\$ 244	\$ 119
Fossil Energy	483	640	157	445	519	74
Solar Heating and Cooling.	86	90	4	61	86	25
Solar Electric and Other	204	215	11	122	164	42
Geothermal Energy.	55	88	33	49	68	19
Fusion Power Development	416	433	17	322	392	70
Liquid Metal Fast Breeder Reactor.	686	656	-30	595	651	56
Nuclear Fuel Cycle and Safeguards.	406	611	205	336	486	150
Other Fission.	146	148	2	122	137	15
Special Foreign Currency Funds	0	2	2	2	3	1
Subtotal.	<u>2,643</u>	<u>3,201</u>	<u>558</u>	<u>2,179</u>	<u>2,750</u>	<u>571</u>
<u>II. Supporting Research</u>						
Environmental and Biomedical Research.	181	215	34	175	200	25
Basic Energy Sciences.	156	175	19	137	162	25
Subtotal.	<u>337</u>	<u>390</u>	<u>53</u>	<u>312</u>	<u>362</u>	<u>50</u>
<u>III. Financial Incentive Activities</u>						
Geothermal Resources Development Fund.	30	30	0	4	7	3
Synthetic Fuels Projects	0	300	300	0	3	3
Subtotal.	<u>30</u>	<u>330</u>	<u>300</u>	<u>4</u>	<u>10</u>	<u>6</u>
Total Energy Research, Development and Demonstration Programs.	<u>\$3,010</u>	<u>\$3,921</u>	<u>\$ 911</u>	<u>\$2,495</u>	<u>\$3,122</u>	<u>\$ 627</u>

Source: ERDA FY 1978 Budget to Congress, Statistical Highlights (February, 1977), pp. 2-3

fission energy R&D. Additional funds that could be identified with each of the major energy technologies are aggregated in the remaining categories, i.e. Environmental Control Technology, Environmental Research and Basic Energy Sciences. If one combines the "Liquid Metal Fast Breeder Reactor," "Nuclear Fuel Cycle and Safeguards" and "Other Fission" into one category, the total energy R&D budget breaks down as follows:

Table 3

<u>Technologies</u>	<u>FY 1978</u>		<u>Percentage of Total</u>	
	<u>B/A</u>	<u>B/O</u>	<u>B/A</u>	<u>B/O</u>
	(\$ in millions)			
Conservation	318	244	8.1	7.8
Fossil ^{3/}	940	522	24.0	16.7
Solar	305	250	7.8	8.0
Geothermal ^{4/}	118	75	3.0	2.4
Fusion	433	392	11.0	12.6
Fission ^{5/}	1,415	1,274	36.1	40.8
Other (Special Foreign Currency Fund & Supporting Research)	<u>392</u>	<u>365</u>	<u>10.0</u>	<u>11.7</u>
TOTAL	\$3,921	\$3,122	100.0	100.0

3/ Includes \$300 million in budget authority and \$3 million in budget outlays for synthetic fuels demonstration projects.

4/ Includes \$30 million in budget authority and \$7 million in budget outlays for the Geothermal Resources Development Fund (loan guarantees).

5/ Excluded are funds for Uranium Enrichment Activities (Category III, in Table 1).

The best means of gauging ERDA's relative emphasis of the various energy programs is focusing on the amounts allocated directly to those programs. In Table 4 the percentage funding going to each technology is presented with the unallocated "Other" category in Table 3 omitted. This is equivalent to assuming that the funds in the Table 3 "Other" category are allocated among the six technologies on a pro rata basis, an assumption which should be reasonably accurate.

Table 4

	FY 1978		Percentage of Total	
	B/A	B/O	B/A	B/O
Conservation	318	244	9.0	8.9
Fossil ^{6/}	940	522	26.6	18.9
Solar	305	250	8.6	9.1
Geothermal ^{7/}	118	75	3.3	2.7
Fusion	433	392	12.3	14.2
Fission ^{8/}	<u>1,415</u>	<u>1,274</u>	<u>40.1</u>	<u>46.2</u>
TOTAL	3,529	2,757	100.0	100.0

Table 4 indicates that 46% (40%) of ERDA's support for the six energy technologies is allocated to nuclear fission, whereas only 21% (21%) is allocated to conservation, solar and geothermal combined. While President Carter called for use of atomic power

6/ Same as fn. 3 in Table 3, p. 4.

7/ Same as fn. 4 in Table 3, p. 4.

8/ Same as fn. 5 in Table 3, p. 4.

as a "last resort only", the R&D expenditures for nuclear fission energy have been reduced by only 7% (14%) over FY-1978 budget levels proposed by the Ford Administration. President Carter's proposed funding level for the nuclear fission technologies is still twice that of conservation, solar and geothermal technologies combined.

A. Conservation

Nine percent of the energy R&D budget is allocated to energy conservation (Table 4). Of this, as seen from Table 5, 67% (69%) of the energy conservation budget is directed toward end use conservation and technology to improve efficiency. Thus, end use conservation represents only 5.9% (6.2%) of the energy R&D budget. Admirably, President Carter has doubled the budget authority of this program over the level recommended by the Ford Administration. The Carter budget is actually slightly higher than the funding request of the conservation program within ERDA (see Table 10, p. 16).

B. Fossil

\$420.5 million (\$526.7 million) of the fossil energy funding, or 81.0% (82.3%), is directed toward coal R&D.^{9/} Petroleum and natural gas represent 12.2% (11.2%) and in-situ technology (oil shale, in-situ coal gasification, etc.) represents the remaining 6.7% (6.5%). The Carter Administration has increased funding for the near- and mid-term fossil energy supply option by \$19.3 million (\$41.6 million) over the funding level proposed by the Ford Administration.

C. Solar

While President Carter called for a strong shift in energy R&D toward solar energy and conservation, the Carter Administration has given the solar program a mere cost of living increase over FY 1977 funding levels: proposed budget authority for FY 1978 is increased only 5% over FY 1977. As seen from Table 6, 55.4% (57.6%) of the solar funding is for solar electric applications. Only 37.6% (32.9%) of the solar budget is directed toward direct thermal

Table 5

FY 1978 ERDA BUDGET TO CONGRESS (CARTER ADMINISTRATION)
PROGRAM TOTAL

	(In Millions)			
	FY77 Estimate		FY78 Estimate	
	<u>B/A</u>	<u>B/O</u>	<u>B/A</u>	<u>B/O</u>
Conservation Research and Development				
Electric Energy Systems and Energy Storage				
Electric Energy Systems	\$ 26.5	\$ 20.7	\$ 40.3	\$ 34.0
Energy Storage Systems	<u>33.5</u>	<u>27.5</u>	<u>50.1</u>	<u>41.0</u>
Total Electric Energy Systems and Energy Storage	60.0	48.2	90.4	75.0
End Use Conservation and Technology to Improve Efficiency				
Industrial Energy Conservation	15.4	12.4	25.5	18.6
Buildings and Community Systems	26.6	22.6	52.2	43.0
Transportation Energy Conservation	27.7	24.0	86.5	56.0
Improved Conversion Efficiency	<u>23.7</u>	<u>12.7</u>	<u>55.7</u>	<u>45.6</u>
Total End Use Conservation and Technology to Improve Efficiency	93.4	71.7	219.9	163.2
Energy Extension Service	<u>7.5</u>	<u>5.0</u>	<u>8.0</u>	<u>6.0</u>
Total Conservation Research and Development	\$160.9	\$124.9	\$318.3	\$244.2

Source: ERDA, FY 1978 Budget to Congress, Statistical Highlights (February 1977), p. 6.

Table 6

FY 1978 ERDA BUDGET TO CONGRESS (CARTER ADMINISTRATION)
PROGRAM TOTAL

	FY77 Estimate		FY78 Estimate	
	<u>B/A</u>	<u>B/O</u>	<u>B/A</u>	<u>B/O</u>
SOLAR ENERGY DEVELOPMENT				
THERMAL APPLICATIONS				
HEATING AND COOLING OF BUILDINGS	\$ 86.5	\$ 61.0	\$ 89.9	\$ 86.2
AGRICULTURAL AND INDUSTRIAL PROCESS HEATING	7.8	5.0	10.3	7.6
TECHNOLOGY SUPPORT AND UTILIZATION	11.5	7.2	9.0	6.0
SOLAR ELECTRIC APPLICATIONS . . .	174.9	105.4	175.8	138.2
FUELS FROM BIOMASS	9.7	4.5	20.0	11.6
TOTAL SOLAR ENERGY DEVELOPMENT	<u>\$290.4</u>	<u>\$183.1</u>	<u>\$305.0</u>	<u>\$249.6</u>

Source: ERDA, FY 1978 Budget to Congress, Statistical Highlights (February 1977), p. 9.

applications (space heating and cooling). In other words, only about one-third of the solar budget is directed toward R&D with more near-term application. President Carter has increased the funding for thermal applications by \$25 million (\$25 million) over the Ford Administration proposed budget level. Unfortunately, instead of shifting funds from the massive nuclear programs, Carter has chosen to reduce the funding for solar electric applications to provide these additional funds.

D. Geothermal

If one excludes the \$7 million (\$30 million) for the geothermal resources development fund (loan guarantees), only 2.4% (2.5%) of total energy R&D is devoted to geothermal R&D and resource exploration (Table 4). The Carter Administration made no effort to increase funding for geothermal R&D over the level requested by the Ford Administration.

E. Fusion

Of the total fusion budget, \$272.4 million (\$310.9 million) or 69% (72%) is for magnetic confinement technology. The remaining 31% (28%) is for laser fusion R&D. The principal application of the laser fusion technology is for military purposes, i.e. weapons effects simulation, weapons physics modeling, and military power systems. President Carter has reduced the fusion budget by \$38.5 million (\$80 million) over the budget level proposed by the Ford Administration.

F. Fission

As seen from Table 7, the Liquid Metal Fast Breeder Reactor (LMFBR) program budget is \$651 million (\$656 million) representing

TABLE 7

FISSION ENERGY R&D

FY 1978 ERDA BUDGET TO CONGRESS (CARTER ADMINISTRATION)
PROGRAM TOTAL (w/o Pending Supplementals)

	(IN MILLIONS)			
	FY77 ESTIMATE		FY78 ESTIMATE	
	<u>B/A</u>	<u>B/O</u>	<u>B/A</u>	<u>B/O</u>
<u>LIQUID METAL FAST BREEDER REACTOR</u>				
LARGE PLANTS	\$ 7.8	\$ 7.5	\$ 0.0	\$ 0.0
CLINCH RIVER BREEDER REACTOR PROJECT	237.6	171.0	150.0	208.7
FAST FLUX TEST FACILITY	53.9	51.1	56.6	54.6
TEST FACILITIES	93.8	87.7	108.6	95.7
SAFETY	59.8	57.0	94.1	65.3
ENGINEERED COMPONENTS	50.1	53.0	62.3	55.6
PHYSICS	10.7	10.5	11.3	11.1
MATERIALS	11.4	11.3	12.4	11.6
FUELS	121.4	120.8	127.8	105.8
REACTOR ANALYSIS	16.5	15.8	23.6	19.8
OTHER CAPITAL EQUIPMENT	22.7	8.5	9.3	22.8
TOTAL LIQUID METAL FAST BREEDER REACTOR	<u>\$685.7</u>	<u>\$594.2</u>	<u>\$656.0</u>	<u>\$651.0</u>
<u>NUCLEAR FUEL CYCLE AND SAFEGUARDS RESEARCH AND DEVELOPMENT</u>				
<u>FUEL CYCLE RESEARCH AND DEVELOPMENT</u>				
URANIUM RESOURCE ASSESSMENT	\$ 36.0	\$ 29.8	\$ 64.8	\$ 54.7
SUPPORT OF NUCLEAR FUEL CYCLE	59.0	52.4	140.0	105.6
WASTE MANAGEMENT (COMMERCIAL)	87.7	68.1	175.0	122.0
TOTAL FUEL CYCLE RESEARCH AND DEVELOPMENT	182.7	150.3	379.8 ^{*/}	282.3 ^{*/}
U-235 PROCESS DEVELOPMENT	96.4	77.7	138.6	105.9
ADVANCED ISOTOPE SEPARATION TECHNOLOGY	47.2	42.2	52.1	49.0
NUCLEAR MATERIALS SECURITY AND SAFEGUARDS	31.4	29.4	40.7	36.7
TOTAL NUCLEAR FUEL CYCLE AND SAFEGUARDS RESEARCH AND DEVELOPMENT	<u>\$357.7</u>	<u>\$299.6</u>	<u>\$611.2</u>	<u>\$473.9</u>

*/ See footnote at bottom of next page.

TABLE 7 - continued

FISSION ENERGY R&D

FY 1978 ERDA BUDGET TO CONGRESS (CARTER ADMINISTRATION)
PROGRAM TOTAL (w/o Pending Supplementals)

	(IN MILLIONS)			
	FY77 ESTIMATE		FY78 ESTIMATE	
	B/A	B/O	B/A	B/O
<u>OTHER FISSION</u>				
WATER COOLED BREEDER REACTOR. . .	\$ 48.9	\$ 38.3	\$ 41.6	\$ 43.6
GAS COOLED THERMAL REACTOR. . . .	16.4	16.1	17.0	16.0
GAS COOLED FAST BREEDER REACTOR .	13.6	13.1	16.0	14.0
LIGHT WATER REACTOR TECHNOLOGY. .	12.5	10.0	13.0	11.6
TECHNOLOGY DEVELOPMENT AND SPECIAL PROJECTS	12.9	11.9	16.1	14.7
NUCLEAR ENERGY ASSESSMENTS. . . .	7.7	6.7	16.3	12.4
NRC SAFETY FACILITIES	28.3	21.0	27.8	22.6
TOTAL OTHER FISSION.	<u>\$140.3</u>	<u>\$117.6</u>	<u>\$147.8</u>	<u>\$134.9</u>
 Pending Supplemental Nuclear Energy Assessment	6.0	4.0	-0-	2.0

*/ The amounts for the fuel cycle research and development program (on the previous page) reflect the funding contained in the Ford Administration's FY-1978 budget submitted to Congress on January 17, 1977. This program is under review by the Carter Administration and the details or any adjustments required will be provided after this review is completed.

51% (46%) of the fission energy budget (including Fuel Cycle and Safeguards R&D). The Carter Administration, however, has launched an intensive review of the LMFBR program in general, and the Clinch River Breeder Reactor (CRBR) project in particular, to reassess the role of LMFBR's in the Nation's energy future. The funding level for the LMFBR program could be reduced to about one-half the present level were the Carter Administration to decide to cancel the CRBR and to cut the program back to a long-term basic R&D effort. On the other hand, if the new Administration stays with the presently proposed funding level, the LMFBR program alone would absorb 21% (17%) of the entire energy R&D budget of \$3.1 billion (\$3.9 billion) (Table 3). The true figures would be somewhat higher. Hidden in the category "Nuclear Fuel Cycle and Safeguards R&D" are substantial sums directly and indirectly supportive of the LMFBR program. Also the Environmental Research and Basic Energy Sciences budgets should be prorated among the various technologies. A significant fraction of these funds is identified with the nuclear programs, including the LMFBR. All told, pending review, the LMFBR program is allocated about one-fifth to one-fourth of all energy R&D funding for FY 1978.

A second noteworthy feature of ERDA's proposed fission energy budget is the potential for an essentially new and, if continued, multibillion dollar program aimed at supporting fuel reprocessing and plutonium recycling. Of the \$379.8 million budget for Nuclear Fuel Cycle R&D proposed by the Ford Administration, at least \$78 million is allocated to this new program.^{10/}

^{10/} Office of Management and Budget, Issues '78 (January 1977), p. 38. \$78 million is allocated to "Reprocessing R&D and Facility Designs."

For over a year the nuclear division at ERDA has been searching for a way to launch this new program of support for the back (or plutonium) end of the nuclear fuel cycle. ERDA's plan stalled temporarily last year when it became widely appreciated that the technologies to be promoted by the plan would greatly increase the risk of nuclear weapons proliferation by making plutonium, the principal nuclear bomb material, far more accessible to both national and subnational groups. Through some twist of logic ERDA, under the Ford Administration, succeeded in promoting its plan as an antiproliferation measure. This disturbing conclusion is reflected in the September 7, 1976, report of the White House Nuclear Policy Review Group ("Fri Report"), which was stimulated by the growing concern about the relationship between nuclear power and nuclear proliferation. The Fri Report reportedly offered President Ford two options, one of which called for the "contained spread of reprocessing" and multibillion dollar federal support to assist industry to gain experience with reprocessing and plutonium use. This "contained spread" option (and not the alternative non-reprocessing option favored by arms control experts) was apparently the one selected by President Ford in the closing days of his Administration and has received strong support in the FY 1978 ERDA budget. The funds for alternative fuel cycle R&D compare so pitifully with those earmarked for reprocessing that the Arms Control & Disarmament Agency's outgoing Chief remarked that the Ford budget still followed "the traditional track we have been pursuing for the last 20 years." (See attached news reports.)

When the Ford budget was reviewed by the Carter Administration, the State Department and the Arms Control and Disarmament Agency (ACDA) proposed an alternative fuel cycle R&D budget that placed a substantially higher priority on alternatives to reprocessing and plutonium recycle, principally spent fuel storage, both temporary and permanent. Since both the State/ACDA and the ERDA budget proposals had about the same total funding levels for the programs in dispute, due to the limited budget review time the Carter Administration decided to leave the total funding for Fuel Cycle R&D at the level proposed by the Ford Administration, and decide how these funds will be allocated after Carter's non-proliferation policy review is completed and these fuel cycle programs have been further studied.

One likely recipient of federal aid, should ERDA's program be continued as proposed by the Ford Administration, is the Barnwell Nuclear Fuel Plant, a fuel reprocessing plant now being built near Barnwell, South Carolina, by Allied Chemical, Gulf Oil and Royal Dutch/Shell. In terms of required funding, the plant is about one-fourth finished and Allied and its partners have asked the federal government to pay the \$750 million necessary to complete the facility.

II. Comparison With FY 1977 Budget

Unlike some other federal agencies, ERDA was permitted a substantial budget increase for FY 1978. In terms of outlays its proposed FY 1978 budget for Energy RD&D Programs (Category I in Table 2) is \$571 million higher than in FY 1977. The rates at which its various energy programs absorbed this increase are shown in the following table, the data for which are taken from Table 2, above:

Table 8

	<u>% of Increase</u>
Conservation	20.8%
Fossil	13.0
Solar	11.7
Geothermal	3.3
Fusion	12.3
Fission	38.7
LMFBR	(9.8)
Fuel Cycle and Safeguards	(26.3)
Other Fission	(<u>2.6</u>)
	100%

As can be seen, nuclear fission programs absorbed about 40% of ERDA's budget increase despite President Carter's pledge to treat nuclear fission as a last resort. While energy conservation has received a substantial increase in funding, new funding is not being allocated preferentially to previously underfunded solar and geothermal technologies. These percentages however, are subject to change pending the review of the LMFBR program. More than anything else, the nuclear fuel cycle is responsible for the increase in fission reactor R&D funding.

III. Cuts in ERDA Division Requests for FY 1978

Table 9 presents information on the FY 1978 funding requested for each ERDA program by the responsible division within ERDA, the ERDA request to the Office of Management and Budget (OMB) under the Ford Administration, the Ford Administration's January 17, 1977 request to Congress, and the revised Carter Administration budget. It is very instructive to compare the varying degrees to which ERDA division requests were cut back (or increased) during this series of budget reviews. Table 10 presents percent cut back in the amount sought by each ERDA program.

Table 9 ^{11/}

ERDA FY 1978 BUDGET REQUESTS

<u>Program</u>	<u>Budget Outlays (\$ millions)</u>			
	<u>ERDA Division Request</u>	<u>ERDA Request To OMB</u>	<u>Ford Admin. Request To Congress</u>	<u>Carter Admin. Request To Congress</u>
Conservation	\$238	\$218	\$140	\$244
Fossil	757	650	500	519
Solar	304	292	235	250
Geothermal ^{12/}	96	96	68	68
Fusion	503	479	431	392
LMFBR	759	758	736	651 ^{14/}
Nuclear Fuel Cycle R&D ^{13/}	319	319	282	282

11/ Source: ERDA, FY 1978 Budget History ("Holifield") Tables: Comparing Division Requests With Requests Submitted To the Office of Management and Budget and To the Congress.

12/ Excludes budget outlays for the Geothermal Resources Development Fund (loan guarantees) which were reduced from \$7.1 million (division and ERDA requests) to \$6.6 million (OMB request).

13/ The budget summary in the Holifield Tables is different from the summary in the Statistical Highlights. The Holifield Tables do not include U-235 Process Development, Advanced Isotope Development or Nuclear Materials Security and Safeguards in this summary estimate, accounting for the difference between \$282 here and the \$490.9 in Table 7.

14/ Pending review of the program.

Table 10

<u>Program</u>	<u>% By Which Division Request Cut</u>
Conservation	-2.5
Fossil	31
Solar	18
Geothermal	29
Fusion	22
LMFBR	14 ^{15/}
Nuclear Fuel Cycle R&D	12

As these figures indicate, all aspects of the ERDA energy R&D program experience cuts in program expectations except for energy conservation which actually increased slightly. Here the Carter Administration essentially restored the budget cuts made by the Ford Administration. With respect to the energy supply alternatives, the smallest budget cuts are still in the nuclear fission programs although this is supposed to be the last resort technology. Although the geothermal program experienced the second most severe budget cut in terms of outlays, the Carter Administration did not increase funding for this program over the level proposed by the Ford Administration.

15/ Pending review of the LMFBR program.

Cost of Ford's Plan for Combating Spread of Nuclear Arms Is Put at \$2.8 Billion Over the Next 3 Years

By DAVID BURNHAM
Special to The New York Times

WASHINGTON, Jan. 16—An unusual analysis by the White House Office of Management and Budget estimates that the Ford Administration's plan to reduce the spread of nuclear weapons to nations around the world would cost \$2.8 billion over the next three years.

The projected expenditure spelled out in the analysis—a copy of which has been obtained by The New York Times—has stirred some objections by officials within the Administration and critics outside it.

The plan to combat the proliferation of nuclear armaments was announced publicly by President Ford three days before the November election after a lengthy and sometimes heated debate within the Administration that pitted the nuclear advocates in the Energy Research and Development Administration against the Arms Control and Disarmament Agency.

The central stated policy of the plan—which, if carried out, might lead eventually to a diminution of the use of nuclear power—was President Ford's statement "that the United States should no longer regard reprocessing of used nuclear fuel to produce plutonium as a necessary and inevitable step in the nuclear fuel cycle."

Shortage of Cheap Uranium Seen

Because of the anticipated shortage of cheap natural uranium and the planned development of the fast breeder reactor that is designed to use plutonium as its basic fuel, the reprocessing of used nuclear fuel to extract its plutonium has been regarded as an essential element in long-term use of nuclear reactors. However, plutonium can also be used in making nuclear weapons.

According to the analysis of the Office of Management and Budget, the various Government actions required to carry out President Ford's policy would cost \$531 million during the current fiscal year, slightly more than \$1 billion in the 1978

fiscal year and \$1.2 billion in the fiscal year 1979.

The largest part of this expense, according to the analysis, is the \$1.2 billion the Federal Government plans to spend in enlarging its plants that enrich or strengthen natural uranium to the point where it can be used to fuel reactors. This enlargement is viewed as necessary mainly to discourage other nations from feeling they must build their own reprocessing plants, a step that moves them closer to the ability to make nuclear weapons.

Safe Waste-Disposal Necessary

Another major part of the cost of the Ford Administration proposal is the \$521 million the Office of Management and Budget estimated would be required in the next three years to develop a program to demonstrate measures for the safe long-term disposal of nuclear wastes.

Like the President's policy statement last fall, the budget to put the program into effect was a subject of considerable

dispute among the various agencies of the Administration that are concerned about nuclear power and proliferation of nuclear arms.

In response to an inquiry, for example, Fred C. Ikle, the outgoing director of the Arms Control and Disarmament Agency, said he was disappointed by some parts of the budget compromise worked out by the White House. "The budget recommendations continue to reflect the more traditional track we have been pursuing for the last 20 years," Dr. Ikle said in an interview last week.

"We in the Arms Control and Disarmament Agency would have liked a much more vigorous thrust for such areas as alternative nuclear technologies, spent fuel storage capacity and funds to help the less-developed countries find nuclear sources of energy," he said.

J. Gustav Speth, a lawyer in the Washington office of the Natural Resources Defense Council, said the proposed bud-

get "contradicts the signal that the President tried to send out to the American people and the world just before the election."

Mr. Speth, whose organization has played a major role in legal challenges to the use of plutonium, also charged that the budget for the antiproliferation program "seems designed to commence the use of plutonium a year or two from now rather than immediately as had been originally planned."

Mr. Speth, in an interview, was particularly critical of \$90 million set aside by the Administration plan to continue development of technologies for separating plutonium from spent fuel and the \$150 million allotted for designing facilities for such purposes as solidifying nuclear wastes.

Both Mr. Speth and Dr. Ikle criticized as far too small the \$3 million the State Department will use to help less-de-

veloped nations develop nonnuclear energy resources and the \$69 million the energy agency was granted to conduct research on alternative methods of extracting energy from spent fuel without producing plutonium.

Mr. Speth also made a broader criticism. "How can the Ford Administration say it is trying to curb the proliferation of nuclear weapons when it spends so much money developing the technology that surely will lead to the spread of plutonium?" he asked.

An official at the Office of Management and Budget, who asked not to be identified, defended President Ford's proposals and the projected budget for carrying them out. "This is a balanced effort to deal with an extremely complex world problem," he said.

He added that it was not proper "to make the assumption that reprocessing spent fuel is antithetical to the nonproliferation of weapons."

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p. A4

OMB Urges Ford To Aid Private Atomic-Fuel Plant

By Robert Gillette
Los Angeles Times

White House budget officials have recommended that President Ford approve a \$12 million program for next year to help a private corporation complete a nuclear fuel reprocessing plant in South Carolina that many authorities regard as a white elephant.

The plant, located at Barnwell, near Columbia, S.C., is designed to process the highly radioactive spent fuel of nuclear power reactors by chemically extracting plutonium and leftover uranium from it. The plutonium and uranium could then be recycled into new reactor fuel.

Owned by Allied General Nuclear Services, Inc., a joint venture of the Allied Chemical Corp. and the General Atomic Co. (itself a subsidiary of Gulf Oil and Royal Dutch Shell), the plant is the only one of its kind in the United States likely to be operating in the next decade. The plant has cost \$270 million and its future is much in doubt.

Industry and government experts see the economics of such recycling as marginal at best. In addition, the prospect of a commercial plutonium industry here and abroad has brought fears that trade in plutonium may stimulate the spread of nuclear weapons.

On Oct. 23, President Ford cited the "special dangers associated with plutonium" and urged other nations to "exercise maximum restraint" in using and selling plutonium technology.

To meet Nuclear Regulatory Commission regulations, Allied General will need two supplementary facilities at its plant, estimated to cost \$525 million, before it can receive an operating license from the NRC. The \$12 million program tentatively approved by the White House Office of Management and Budget would allow the Energy Research and Development Administration to begin planning and design work on the two additional facilities as a federal demonstration project.

One facility, expected to cost \$400 million, would solidify highly radioactive wastes, prior to eventual shipment to a federal repository, which does not yet exist. The second facility, to cost \$125 million, would convert liquid plutonium nitrate into solid plutonium oxides, a form considered safer and more convenient for storage.

The \$12 million program is subject to final approval by President Ford as well as to alteration by the incoming Carter administration.

OMB officials declined to comment on the proposal.