DNA1.940920.041

DEFENSE ATOMIC SUPPORT AGENCY
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
BETHESDA, MARYLAND 20014

RMO

20 MAY 1969

SUBJECT: Review of FY 1971 - FY 1975 Programs

Director
Defense Atomic Support Agency
ATTN: COMP-3
Washington, D.C. 20305

Forwarded herewith is Program change proposal prepared in accordance with letter, your Headquarters, dated 30 April 1968, subject as above.

Incl
as

HUGH B. MITCHELL
Colonel, USAF, MC
Director

HRE-0540

PROGRAM CHANGE PROPOSAL		PROGRAM CHANGE REQUEST NUMBER N/A
PROGRAM ELEMENT TITLE: Nuclear Weapons Effect Research	GUIDANCE	
TYPED NAME AND TITLE OF PRINCIPAL ACTION OFFICER: Beech Maury	TELEPHONE NUMBER: 295-1286	PROGRAM ELEMENT NUMBER: 61102H

SUMMARY

DASA letter subject, Review of FY1971 - FY 1975 Programs, dated 30 April 1969.

Subject letter provided approved FYDP manpower levels. The levels indicated for civilian personnel are substantially lower than those recommended by the Joint Chiefs of Staff Manpower Survey. Internally conducted programatic reviews have decreased personnel requirements below those established by the JCS Survey, without impairment of scientific programs. However, any further reductions in the levels cited in the DASA FY1971 - FY1975 program would have immediate and adverse effects on this Institute's capability to conduct priority DOD research.

Total Obligational Authority (TOA) provided for Fiscal Years beyond 1970 is not consistent with manpower authorization. It is requested that TOA be increased to support manpower authorization and maximize utilization of facilities and scientific equipment, previously funded and soon to become operational.

Analysis of the requested TOA increases are provided as inclosure one. Inclosure two outlines scientific program requirements that justify continuation of manpower levels currently approved, plus the additional funds requested in inclosure one.

(If more space is needed use plain paper and add "page 2 of ___" etc.)

PROPOSED CHANGE SUMMARY *(Net Change)*	FY 70	FY 71	FY 72	FY 73	FY 74	FY 75
TOA ~~*(Millions of dollars)*~~ Thousands R & D	-0-	+ 191	+ 406	+ 504	+ 536	+ 568
TOA *(Millions of dollars)* Investment						
TOA *(Millions of dollars)* Operations						
MANPOWER - MILITARY	-0-	-0-	-0-	-0-	-0-	-0-
MANPOWER - CIVILIAN	-0-	-0-	-0-	-0-	-0-	-0-

SUBMITTING DOD COMPONENT SIGNATURE: Hugh B. Mitchell

DATE SIGNED: 19 May '69

DD FORM 1 NOV 67 1570 REPLACES EDITION OF 1 JUL 66 WHICH IS OBSOLETE.

PROGRAM CHANGE REQUEST COST DETAIL	PROGRAM CHANGE REQUEST NUMBER N/A					PROGRAM ELEMENT NO. 61102H
	TOA IN $ THOUSANDS					
	FY 70	FY 71	FY 72	FY 73	FY 74	FY 75
APPROVED / R & D / ROT & E	2,500	2,500	2,500	2,500	2,500	2,500
MIL CON	-0-	-0-	-0-	-0-	1,500	-0-
Milpers	787	836	884	884	884	884
TOTAL R & D	3,287	3,336	3,384	3,384	4,884	3,384
INV / PROC						
PROC						
PROC						
MIL CON						
TOTAL INVESTMENT						
OPER / OPERATIONS, ACTIVE FORCE						
TOTAL OPERATIONS						
TOTAL APPROVED						
PROPOSED / R & D / ROT & E	2,500	2,691	2,906	3,004	3,036	3,068
MIL CON	-0-	-0-	-0-	--0	1,500	-0-
Milpers	787	836	884	884	884	884
TOTAL R & D	3,287	3,527	3,790	3,888	5,420	3,952
INV / PROC						
PROC						
PROC						
MIL CON						
TOTAL INVESTMENT						
OPER / OPERATIONS, ACTIVE FORCE						
TOTAL OPERATIONS						
TOTAL PROPOSED						
CHANGE / R & D / ROT & E	-0-	+ 191	+ 406	+ 504	+ 536	+ 568
MIL CON	-0-	-0-	-0-	-0-	-0-	-0-
Milpers	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL R & D	-0-	+ 191	+ 406	+ 504	+ 536	+ 568
INV / PROC						
PROC						
PROC						
MIL CON						
TOTAL INVESTMENT						
OPER / OPERATIONS, ACTIVE FORCE						
TOTAL OPERATIONS						
TOTAL CHANGE	-0-	+ 191	+ 406	+ 504	+ 536	+ 568

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PROGRAM CHANGE REQUEST MANPOWER DETAIL	PROGRAM CHANGE REQUEST NUMBER N/A	PROGRAM ELEMENT NO. 61102H

			FY 70	FY 71	FY 72	FY 73	FY 74	FY 75
APPROVED	END STRENGTH	OFFICER		40	42	42	42	42
		ENLISTED		27	29	29	29	29
		TOTAL MILITARY		67	71	71	71	71
		DIRECT HIRE, U. S.		191	198	199	199	199
		DIRECT HIRE, FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN		191	198	199	199	199
	MAN YEARS	OFFICER						
		ENLISTED						
		TOTAL MILITARY						
		DIRECT HIRE, U. S.						
		DIRECT HIRE, FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN						
PROPOSED	END STRENGTH	OFFICER						
		ENLISTED						
		TOTAL MILITARY						
		DIRECT HIRE, U. S.						
		DIRECT HIRE, FOREIGN						
		CONTRACT, FOREIGN						
		TOTAL CIVILIAN			NO	CHANGE		
	MAN YEARS	OFFICER						
		ENLISTED						
		TOTAL MILITARY						
		DIRECT HIRE, U. S.						
		DIRECT HIRE, FOREIGN						
		CONTRACT FOREIGN						
		TOTAL CIVILIAN						
CHANGE	TOTAL P.E. END STRENGTH	MILITARY						
		CIVILIAN						
	TOTAL P.E. MAN YEARS	MILITARY						
		CIVILIAN						
	TOTAL CEILING END STRENGTH	MILITARY						
		CIVILIAN						
	TOTAL FOREIGN END STRENGTH	MILITARY						
		CIVILIAN						

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Increase in the cost of communications is projected as a result of increase in personnel.

Costs of Purchased Equipment Maintenance is projected to increase due to aging and the requirement for updating of equipment.

Cost of printing is projected to increase because of anticipated increase in volume of reports to be printed.

Cost of other purchased services will increase as a result of additional facilities to be maintained and aging of the facility.

Cost of supplies is projected to increase in proportion to increase in personnel. In addition, FY71 thru FY75 includes $30,000 each year for replacement of Reactor fuel elements.

Equipment requirements for FY70 and FY71 are based on firm requirements at this time. Equipment for FY72 is based on a projected replacement factor of 6% of current plant equipment value ($2,146,000). The replacement factor is expected to increase gradually to FY75 and level off at 10% thereafter.

ANALYSIS BY EXPENSE ELEMENT

	70	71	72	73	74	75
Civilian Personnel	1663	1752	1874	1925	1925	1925
Travel	25	28	30	30	30	30
Transportation	2	2	2	2	2	2
Utilities & Rents	104	109	109	109	109	109
Communications	47	48	49	50	50	50
Purchased Equip Maintenance	46	49	52	55	58	61
Printing	7	8	10	10	10	10
Other Purchased Services	237	248	258	263	263	263
Supplies	333	350	375	385	385	385
Equipment	36	97	129	157	186	215
TOTAL	2500	2691	2906	3004	3036	3068

Civilian personnel costs indicated above are calculated as follows:

Average salary for FY69 is $10,186

FY 71 authorized beginning strength 171. Ending authorized strength 191 - Average 181 less 5% lapse (9) = 172 MY X $10,186

FY 72 authorized beginning strength 191. Ending authorized strength 198 - Average 194 less 5% lapse (10) = 184 MY X $10,186

FY 73, 74 & 75 authorization 199 less 5% lapse (10) = 189 MY X $10,186

Travel costs are projected to increase as a result of increase in personnel.

A slight increase in costs for utilities and rents is projected for FY71 and subsequent years.

PROGRAMMATIC INFORMATION

The AFRRI Research Program for FY70 and FY71 incorporated hard core work units which could be accomplished within the budgetary constraints imposed on the Institute, and the requirements of CIVRED. However, these dollar and CIVRED (personnel) constraints have delayed implementation of high priority DASA radiobiology research; are hampering effective conduct of AFRRI's current research program, and will if sustained, result in inefficient utilization of the Institute's soon to be completed physical plant. Specifically, failure to provide the additional funds requested and to raise AFRRI's CIVRED ceiling will reduce or eliminate the manpower and materials resources required to conduct research in such areas as described below.

Prediction of Individual Radiosensitivity for Incapacitation: Investigations performed at AFRRI have enabled investigators to predict, of a group of animals exposed in the midlethal range, which animals are most susceptible to irradiation. Variation in behavioral response is much wider than that in the mortality response, but at present there is no method available of predicting individual radiosensitivity for performance decrement. The lability or stability of the cardiovascular system may indicate the individual sensitivity of animals to incapacitating doses of radiation. The development of a procedure for testing individual radiosensitivity for incapacitating doses warrants immediate consideration.

Inter-Species Comparison of Incapacitation Response: In the incapacitation/performance decrement area, AFRRI has been investigating the post-irradiation behavioral responses of the beagle, miniature swine and primates. Our data have indicated that there are consistent, qualitative differences in the postirradiated behavioral responses between species. For example, the dog does not exhibit an early transient incapacitation. Swine exhibit a much prompter incapacitation following irradiation and with much more severe neurological symptoms than primates. The response of the dog to head shielding is qualitatively different than the response of the head shielded monkey. Determinations of the physiological response of incapacitating doses of radiation in the dog and swine to account for the differences in behavioral responses is essential for accurate extrapolation of behavioral responses from animals to man.

Incapacitation Occurring in Hostile Environments: Another work unit would examine behavioral performance at temperatures of 33° F and 110° F, both of which might be encountered in different military situations. This work unit should be activated for a one-year period to obtain preliminary data. Depending on the results obtained, detailed examinations of the case of environmental factors on behavior may be warranted.

Incl 2 to Incl 1

Localization of Brain Sites Responsible for Incapacitation: There are areas in the brain that have been postulated to be specific radio-sensitive sites involved in the development in the incapacitation syndrome. Although the determination of neurophysiological signal changes in these specific brain areas may be studied in whole-body irradiated, or head irradiated animals, ultimately focal irradiations of specific brain areas will be required to specifically identify these sites. Focal brain irradiations are required to determine whether the physiological changes observed postirradiation are secondary to changes in specific brain areas or whether alterations in signals are secondary to cardiovascular changes induced by a yet undefined mechanism. Implementation of this research will, while making use of AFRRI's linear accelerator, require development of a practical design of electron focusing to deposit the radiation in a limited brain area.

Incapacitation Related Training and Testing Procedures: Currently, learning and training procedures for studying behavioral responses in animals are accomplished using shock avoidance motivation. Since shock avoidance is a negative reward, it makes even the simplest of task difficult to teach; the physical stimulus of the electrical shock complicates the interpretation of performance postirradiation and finally, shock avoidance is not similar to the motivational drives which stimulate humans to perform. The use of brain stimulation may provide a reasonable alternative. Research to determine whether brain stimulation can be used as a positive motivational training and testing procedure is required.

Correlation of the Clinical Course of Human Nuclear Accident Data: There are a substantial number of human accident cases who have received various doses from sublethal to supralethal levels. Much of the subjective clinical and behavioral responses of the human accident cases are not available in the literature. Such information could only be collected by personal interviews with the patients, where available, and/or the attending medical staff. Such a compilation of the human data was attempted by an investigator outside of DASA auspices, but was not completed. It is essential for DASA to support the compilation of the human accident cases, which could be accomplished by a medical officer assigned at AFRRI.

Biological Dosimetry: Recent preliminary results at AFRRI indicate that the appearance of peptides in urine, and perhaps in plasma, may provide a good biological dosimeter for radiation doses in the order of a 1000 rads or less. These preliminary results indicate a signal to noise ratio of the order of 15 for an absorbed dose of about 1200 rads in rats. Analysis of individual specimens may be performed in about half an hour. Thus the phenomena indicates a desirable sensitivity and method of analysis which may be useful in dose range where recovery is possible.