

8 April 1965

## MEMORANDUM FOR THE RECORD

SUBJECT: FY 65 Administrative Costs for AFRRRI

1. Previous estimates of AFRRRI FY 65 administrative costs indicated a requirement for \$90,000 DASA NWER funds in addition to current Navy funding.

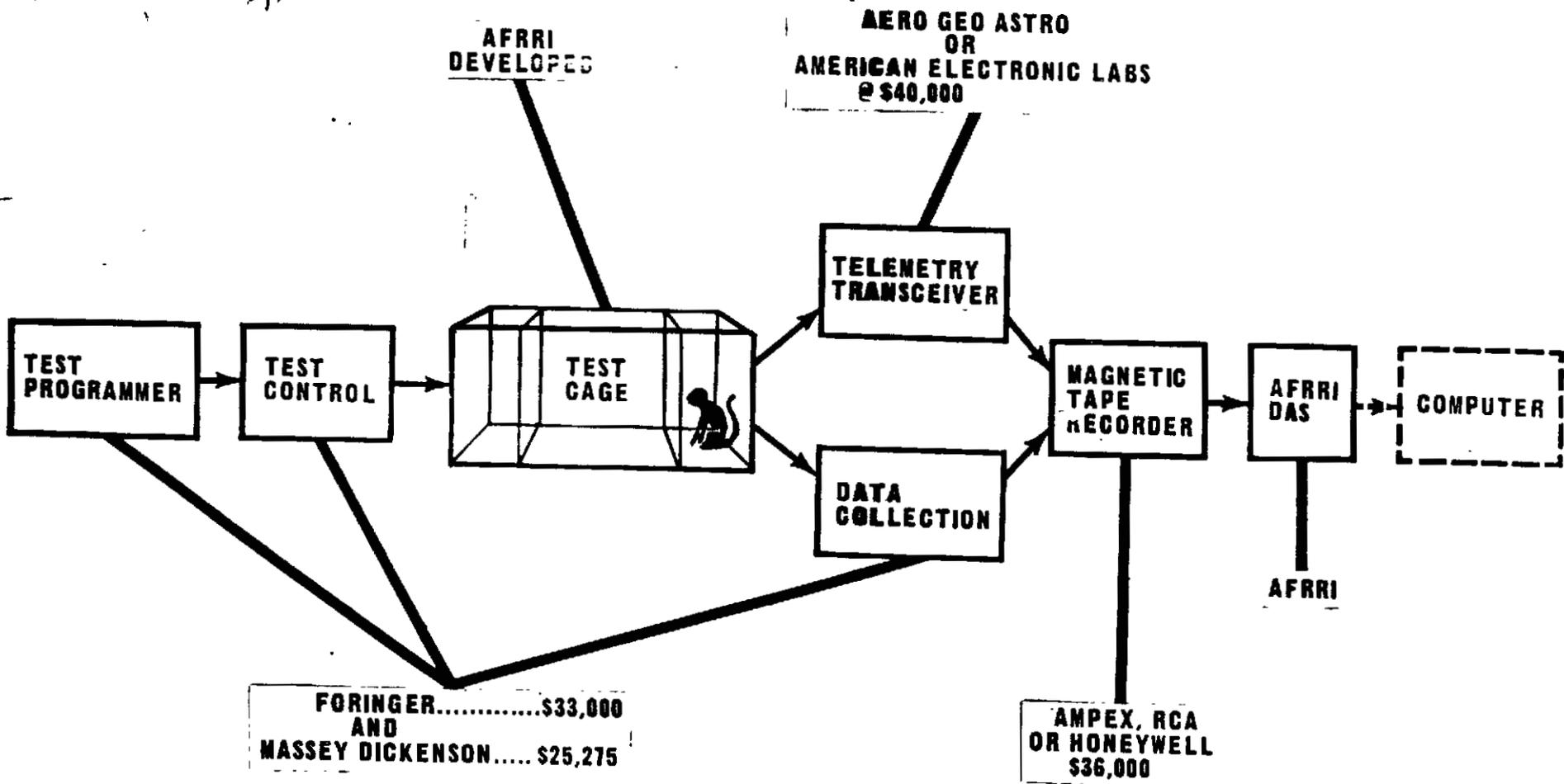
2. In a conversation with Mr. B. Maury, AFRRRI, 8 April 1965, it was agreed that AFRRRI would endeavor to live within the current level of FY 65 Navy funding. Should additional dollars be required, a written request will be submitted to DASA identifying amounts and areas of deficit. A strong possibility exists that additional funds will not be required.

3. Should additional funds be required, NWER Biomedical funds may be reprogrammed to cover said costs. (Per communication with Capt Knipp, APRS and Cdr Gade, STMD on 9 April 1965.)

RICHARD D. WEBB  
Budget Analyst  
Comptroller

HRE-0735

AFRRI  
File



AFRRI DEVELOPED

AERO GEO ASTRO  
OR  
AMERICAN ELECTRONIC LABS  
@ \$40,000

TEST PROGRAMMER

TEST CONTROL



TELEMETRY TRANSCEIVER

DATA COLLECTION

MAGNETIC TAPE RECORDER

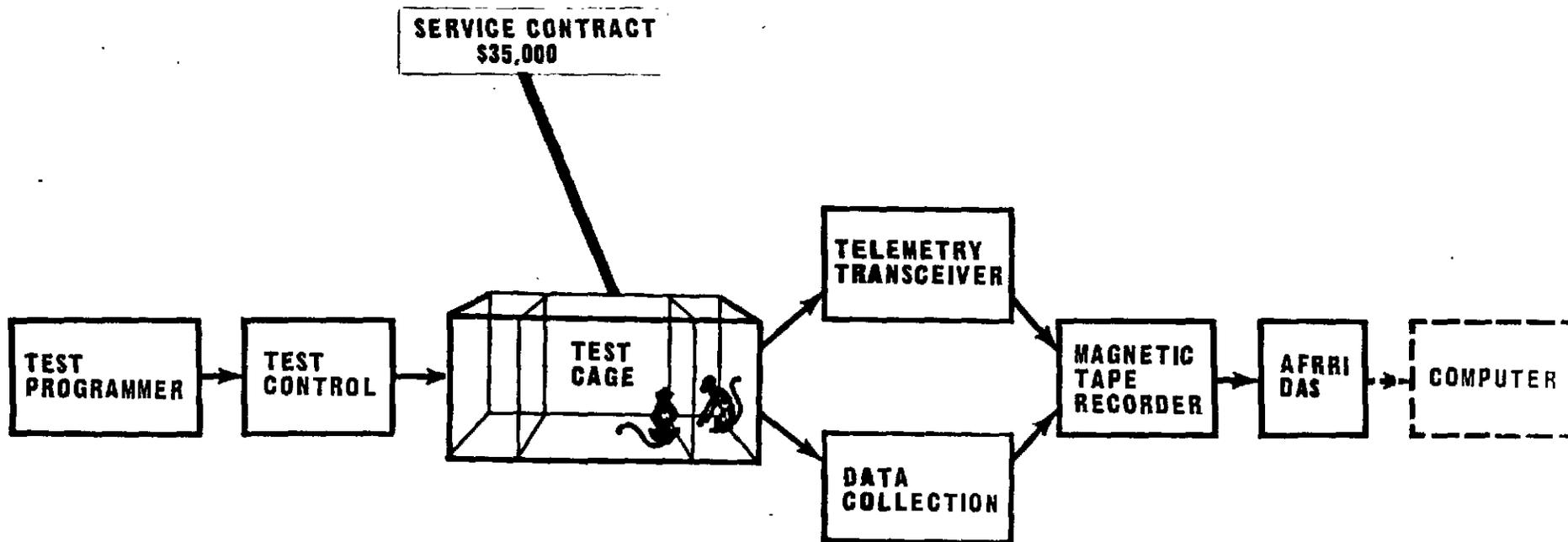
AFRRI DAS

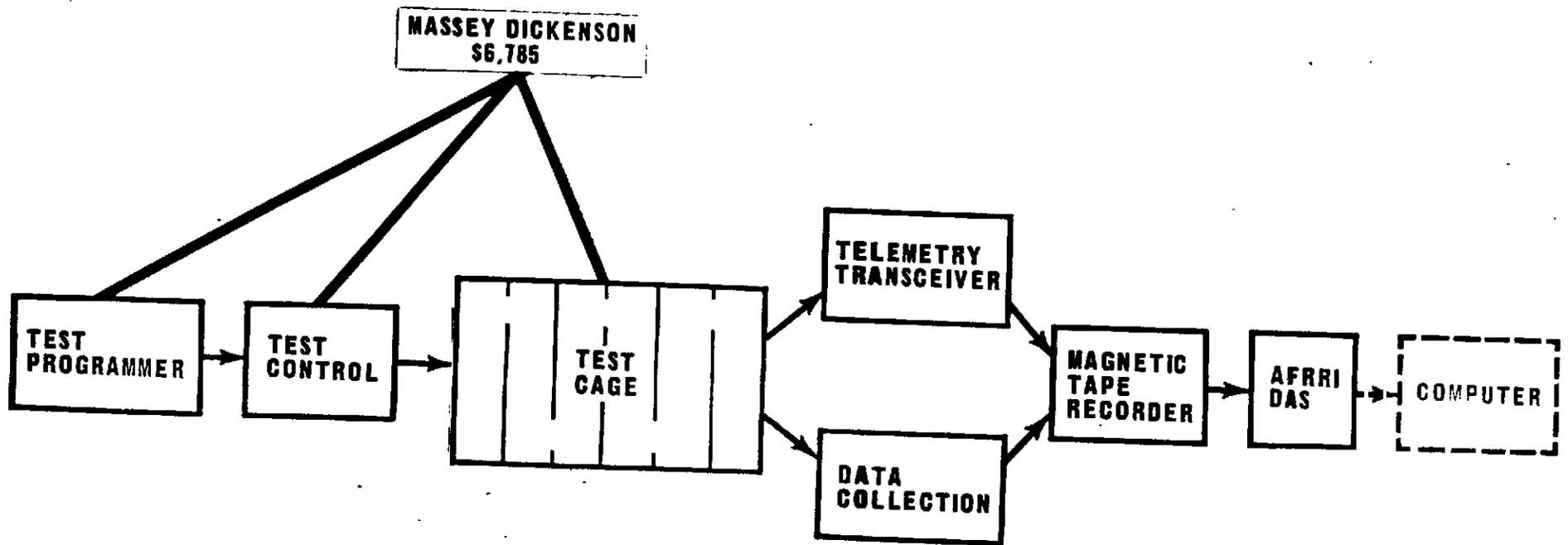
COMPUTER

FORINGER.....\$33,000  
AND  
MASSEY DICKENSON..... \$25,275

AMPEX, RCA  
OR HONEYWELL  
\$36,000

AFRRI





COMP-904-AS

SUBJECT: Emergency Construction Project for Parking Facility

Ref - DF, OALG, 25 Jan 65

TO: OALG

FROM: COMP

DATE: 18 February 1965    CONSENT NO: 4  
Captain Gove/mj/22350

Assuming you have ok'd the use of EDT&E funds for this purpose, I called Mr. Maury and confirmed that no additional funds are required for this purpose beyond the funds already in hand at AFERI.

2 Incl

1. M/c
2. RAC sheet 61876  
w/correspondence not  
previously listed

JOHN M. GOVE  
Captain, SC, USN  
Comptroller

**OALG**

**Emergency Construction Project for Parking Facility**

**COMP**

**OALG**

**28 Jan 65**  
**Mr. Taten/rl/71353**

The attached SD Form 1391 proposing the construction of a parking lot to support the Reactor complex at the APERI appears to be in order and justified provided funds in the amount of \$25,000 may be made available. Information is requested regarding whether or not appropriate funds are available for projects of this type.

**1 Incl**  
**as**

**COMP 904-A3 (OALG) SUBJECT: Emergency Construction Project for Parking Facility**

**TO: OALG FROM: COMP DATE: 11 Feb 1966 COMMENT NO: 2  
Capt. Gore/nj/82850**

1. There are no Mil Con funds that I know of available for the parking lot project at AFPRRI. There are no RDT&E Research (NWER) funds in the headquarters for such a project, if indeed it were legal to use them.

2. I have always considered OALG the command authority on the decision as to legality or illegality of use of Mil Con funds vis-a-vis size and nature of construction projects. I believe this responsibility is inherent in the particular relationship BASA bears to the Army Chief of Engineers in these matters. Thus, it would be up to OALG to decide, at the staff level, whether RDT&E funds were properly used in incremental construction or as supplement to Mil Con projects, as may be the case in the matter of the parking lot.

3. The subject EW implies a choice of funding by Comptroller and must be interpreted as:

a. It does not matter whether RDT&E funds or Mil Con funds are used, or

b. It is a Comptroller function to determine which is proper.

If the latter interpretation is correct, a reorientation of organizational responsibility between OALG and COMP is in order and should be settled.

1 Incl  
n/c

**JOHN M. GORE**  
Captain, SC, USN  
Comptroller

---

**TO: COMP**

**FROM: OALG**

**11 Feb CMT 3**

1. Reference para 1, Cmt 2; the AFPRRI staff indicates that funds are available from RDT&E funds available to AFPRRI for support of maintenance and operations activities.

2. Request comment on availability of RDT&E funds available to support this project on that basis.

**JOHN E. MINAHAN**  
Colonel, USA  
Chief of Logistics Division

DEC 1964

PCO-7300

SUBJECT: Funding Procedures for AFRRRI

TO: Director  
Defense Atomic Support Agency  
Washington, D. C.

1. In the past, funds available to the AFRRRI have evolved from two separate and distinct sources. Funding for activities usually regarded as "Operations and Maintenance" were provided by the Navy, Bureau of Medicine and Surgery, while funds for research were provided by DASA as a result of AFRRRI's participation in the Biomedical Research Program. It has long been recognized that funds furnished by the Bureau of Medicine and Surgery were not adequate to defray costs incurred through operations and maintenance activities, as reflected in Section I of DASA Circular 20-1. Cogent examples of these activities are Acquisition of Capital Equipment and Alterations and Improvements. Accordingly, considerable O&M activity costs were programmed under RDT&E (NWER) funds.

2. This action, though essential, placed AFRRRI in a difficult position, competitively speaking, with respect to other participants in the DASA Biomedical Research Program.

3. The Host/Tenant Agreement, which is effective 1 December 1964, results in the withdrawal of Bureau of Medicine and Surgery funding support. AFRRRI will be, in the foreseeable future, completely dependent upon DASA for financial support.

4. In order to properly structure AFRRRI activities in accordance with DASA Circular 20-1, it is recommended, effective FY 1967, that budgetary requirements be submitted and programmed in two separate increments, one for RDT&E (NWER) activities, the other for O&M support.

5. To exemplify, a revision of the AFRRRI FY 1965 budget, developed according to these criteria, would result in the following:

PCO-7300

SUBJECT: Funding Procedures for AFRRI

|                     |             |
|---------------------|-------------|
| a. RDT&E Activities | \$1,253,575 |
| b. O&M Support      | \$1,057,925 |
| Total               | \$2,311,500 |

6. Budgeting in this manner should not result, however, in a system that is inflexible so as to result in any restriction of activities caused by unforeseen developments or errors in forecasting. Hopefully, a single funding document would be issued against which AFRRI would process all costs. The AFRRI cost coding system has been designed so that costs can be accumulated and a comparison made of programmed versus actual obligations. This information would be made available to DASA. Its primary value, however, would be its application to, and improvement of, future budget planning.

C. G. BRATENAHL  
Captain MC USN  
Acting Director

ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA, MARYLAND - 20014

PCO-7100

2042  
2 NOV 1964

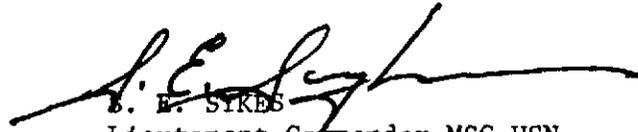
SUBJECT: Summary of Executive Civilian Positions in Fiscal  
Years 1963, 1964, 1965 and 1966

TO: Director  
Defense Atomic Support Agency  
ATTN: COMP  
Washington, D. C.

1. Reference telephone call from Mr. Johnson, DASA, COMP,  
30 October 1964, requesting subject summary.
2. Inclosure 1 is forwarded as requested in referenced  
telephone call.

FOR THE DIRECTOR:

1 Incl  
Subj Summary (6 cys)

  
B. E. SYKES  
Lieutenant Commander MSC USN  
Administrative Officer

ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE

SUMMARY OF EXECUTIVE CIVILIAN POSITIONS  
IN FISCAL YEARS 1963, 1964, 1965 AND 1966

Appropriation: RDT&E Defense Agencies

| <u>Grade</u>              | <u>Actually filled in FY 1963</u> | <u>Estimated FY 1964</u> | <u>Actually filled in FY 1964</u> | <u>Estimated in Budget for FY 1965</u> | <u>Current Estimate for FY 1965</u> | <u>Proposed for FY 1966</u> | <u>FY 1966 vs FY 1964</u> |
|---------------------------|-----------------------------------|--------------------------|-----------------------------------|--|-------------------------------------|-----------------------------|---------------------------|
| Statutory - Levels 1 - 5  | -                                 | -                        | -                                 | -                                      | -                                   | -                           | -                         |
| Authorized by P.L. 80-313 | 1                                 | 2                        | 2                                 | 3                                      | 3                                   | 5                           | +3                        |
| <u>General Schedule</u>   |                                   |                          |                                   |  |                                     |                             |                           |
| GS-18                     | -                                 | 1                        | -                                 | -                                      | -                                   | -                           | -                         |
| GS-17                     | -                                 | 2                        | -                                 | -                                      | -                                   | -                           | -                         |
| GS-16                     | -                                 | -                        | -                                 | -                                      | -                                   | -                           | -                         |
| GS-15                     | 1                                 | 4                        | 2                                 | 2                                      | 2                                   | 3                           | +1                        |
| GS-14                     | 1                                 | 2                        | 3                                 | 6                                      | 6                                   | 9                           | +6                        |
| <u>Ungraded</u>           | -                                 | -                        | -                                 | -                                      | -                                   | -                           | -                         |

Justifications for Additional Positions

P.L. 80-313 - Chief Scientist. To advise the Director on plans for AFRRRI's fundamental research, scientific investigations and developmental work in the field of radiobiology and the allied sciences.

P.L. 80-313 - Accelerator Physicist. To advise the Chairman, Physical Sciences Department on all matters pertaining to the AFRRRI accelerator complex.

P.L. 80-313 - Nuclear Medical Officer. To assist the Chairman, Radiation Biology Department in the administration, execution and supervision of research in nuclear medicine.

11/1/66

Justification for Additional Positions (Continued)

GS-15 - Nuclear Physicist. To assist the Chairman, Physical Sciences Department in all research involving nuclear reactor sources.

GS-14 - Psychologist. To assist the Chairman, Behavioral Sciences Department in planning and conducting studies relating to the formation, complexity and disruption of social organization among experimental animals in a radiation environment.

GS-14 - Physicist. To be a supervisory research physicist in the Physical Sciences Department and to be responsible for the radiation dosimetry program for the linear, positive ion and other accelerators.

GS-14 - Research Mathematician. To assist the Chairman, Analysis Department in the interdisciplinary problems of radiation, biology and mathematical statistics.

GS-14 - Research Chemist. To assist the Chairman, Physical Sciences Department in the development and conduct of radiochemical instrumentation.

GS-14 - Radiobiologist. To assist the Chairman, Experimental Pathology Department in the multi-disciplinary approaches and fundamental principles of physiology, hematology, electron microscopy and immunology.

GS-14 - Nuclear Engineer. To advise the Chairman, Physical Sciences Department on the construction, installation, operation and maintenance of nuclear hardware.

| MEMO ROUTING SLIP  |  | NEVER USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS | ACTION                |
|--|--|---|-----------------------|
| 1 TO   | <i>Mr. Johnson</i>   | INITIALS  | CIRCULATE             |
|  |  | DATE  | COORDINATION          |
| 2  |  |   | FILE                  |
|  |  |   | INFORMATION           |
| 3  |  |   | NOTE AND RETURN       |
|  |  |   | PER CONVERSATION      |
| 4  |  |   | SEE ME                |
|  |  |   | SIGNATURE             |
| REMARKS  |  |   |                       |
| <p><i>Copies of documents per your conversation with Mr. Mavry this morning.</i></p> |  |   |                       |
| FROM   | <i>Mrs Schutte<br/>Program Coordination Office<br/>AFPRJ</i> |   | DATE<br><i>21 Oct</i> |
|  |  |   | PHONE<br><i>7198</i>  |

DD FORM 1 OCT 60 95

REPLACES DD FORM 94, 1 FEB 60 AND DD FORM 95, 1 FEB 60 WHICH WILL BE USED UNTIL EXHAUSTED





*Return to MUI*

ADM *dy*  
DDN *654*  
PCO *54*

BUMED-71:JFP/ml  
9 Oct 1964

*Whitman MUI*  
*Crawford*

**From:** Chief, Bureau of Medicine and Surgery  
**To:** Deputy Chief of Naval Operations (Development)

**Subj:** Armed Forces Radiobiology Research Institute, Fiscal Year 1965  
 EDT&E Navy Funding of Management and Support

**Ref:** (a) DOD DIRECTIVE 5105.31 of 22 Jul 1964, "Defense Atomic Support Agency"  
 (b) DASA INSTRUCTION of 28 Aug 1964 "Mission and Responsibilities, Director, Armed Forces Radiobiology Research Institute Defense Atomic Support Agency"  
 (c) BUMED ltr BUMED-711/mrk of 11 Mar 1964 "Department of the Navy Program objectives FY 1964"  
 (d) BUMED ltr BUMED-711/mrk of 26 Mar 1964 "FY 1965 Program/Budget Submission; report of"

**Encl:** (1) Copy, AFRI ltr Ser 2339 of 23 Sep 1964 w/enc "Budget for BUMED Support of AFRI, FY 1965"

1. Reference (a) assigned command and administrative control of AFRI to the Defense Atomic Support Agency.
2. In accordance with reference (b), the Bureau of Medicine and Surgery is transferring the management of AFRI to DASA in toto, and providing support in accordance with an NMEC-AFRI Host-Tenant Agreement. In making this transfer of management responsibility, the Navy is responsible for the FY-65 funding of management and support. DASA will assume this responsibility in FY 66.
3. In accordance with references (c) and (d), the Bureau of Medicine and Surgery gave AFRI a FY-65 planning figure of \$618,000. This amount was based on a well substantiated growth pattern for facilities, staff, and projects.
4. In the FY-65 apportionment of NAVY EDT&E funds, the Bureau of Medicine and Surgery received \$280,000 in category 6.3 funds for AFRI, and this amount was passed on to the NMEC.
5. Enclosure (1) gives the current funding situation for management and support of AFRI. This Bureau is unable to reprogram to meet this deficiency having no other funds in this element. To provide the minimum administrative support of \$361,577 outlined in enclosure (1), additional funds in the amount of \$181,500 are requested.

Copy to:  
 CO, NMEC  
 Director, AFRI

J. P. POLLARD  
 By direction

H27-13-da  
7100  
11 September 1964

File

Hildred Whitman, Program Coordination Office

**Discussion of Revision of the FY 1965 BuMed Budget for AFRI**

1. A meeting was held in the Conference Room of the NMMC Comptroller at 8:30 A.M., 10 September 1964. Those present were CDR Bauerschmidt, NMMC Comptroller; Mr. Jack Sanders, Deputy Comptroller; Mrs. Keller, NMMC; Mr. Maury and Mrs. Whitman, Program Coordination Office, AFRI.
2. Background of the Meeting. In February 1964, when AFRI was given a target figure of \$405,000 for budgeting BuMed funds for FY 65, a budget was submitted at that total target figure. However, AFRI, in its cover letter submitting the budget, stated that \$570,000 would appear to be a more realistic figure for our FY 65 BuMed costs. BuMed (for reasons unknown) stated they would support AFRI in the amount of \$618,000. Later AFRI was advised that this figure was to be downgraded by \$238,000, i.e., to a total of \$380,000. Discussions at DASA had indicated that DASA might be in a position to supplement this BuMed figure by approximately \$90,000.
3. CDR Bauerschmidt informed the Program Coordination Office this week that he had had a request from BuMed Comptroller to justify readjusting the FY 65 BuMed budget figure for AFRI's \$470,000. The breakdown by Object Class (totaling \$470,000), which had been forwarded to CDR Bauerschmidt from BuMed, were those which the PCO had provided to DASA in August 1964. Upon request of this rejustification of AFRI-BuMed budget, the PCO reanalyzed AFRI's anticipated FY 65 costs, by Object Class, and arrived at a total of approximately \$587,000, a close approximation to the \$570,000 figure estimated last February. A detailed discussion followed on line items by object class:
  - a. Civilian Payroll. The civilian payroll has been recalculated at the new pay rate effective July 5, 1964. Step increases and additional personnel to become effective during this Fiscal Year were also taken into consideration. To the total net payroll was added 7% for contributions and 1% for overtime, plus an allowance for the June 1965 portion of next summer's student program. The payroll estimate of \$247,000 was agreed upon as being reasonable.
  - b. Travel. Although FY 65 obligations for travel against BuMed funds had approximated \$16,000, a budget figure for FY 65 was set at \$10,000. Some of the Directorate's travel is in support of research objectives and are, therefore, chargeable to DASA.

c. Rent and Utilities. A total of \$10,000 was being budgeted for this Object Class to include rentals of the trailers, duplicating equipment and telephone tolls. Other utilities will be provided from the Y&D funds.

d. Services. Services are expected to total approximately \$88,000 to include:

|   |          |
|---|----------|
| Custodial Services  | \$25,000 |
| Drivers   | 16,500   |
| Dry Cleaning and Laundry                                    | 3,000    |
| M&R Office Equipment  | 1,900    |
| Contract Training   | 1,000    |
| Library Services<br>(binding & Congressional Library cards) | 2,600    |
| Host/Tenant Services  | 38,000   |
| Computer  | \$ 6,000 |
| Fiscal & Accounting   | 10,000   |
| Purchasing  | 7,900    |
| Personnel   | 8,900    |
| Garbage Disposal  | 4,600    |

e. Supplies. The projection for costs of supplies for FY 65 totals \$60,000 as follows:

|                 |          |
|-----------------|----------|
| Command Support | \$15,000 |
| Library         | 20,000   |
| Rad Safety      | 25,000   |

It should be noted that the term "supplies" is not exactly applicable to the Library costs as their supply costs are primarily generated by the purchase of periodicals and soft bound books.

Obligations of supplies during FY 64 were approximately \$12,500 for Command Support, \$10,000 for Library and \$18,500 for Rad Safety. Last year's expenses for supplies for the Library were felt to have been low due to the extended absence of the Chief Librarian.

f. Equipment. Estimated equipment requirements totaled \$76,800 (detailed listing available from PCO). After review of the equipment list and discussion in detail, CDR Bauerschmidt agreed to submit a total budget figure of \$43,500 for equipment. An estimate of \$52,000 had been previously submitted by PCO to DASA in order to arrive at a compressed total budget figure of \$470,000.

g. Building Improvements. As Y&D funds are supposed to support AFERI's routine maintenance for FY 65 and as a great deal of the work

performed by maintenance people is estimated by the NEMC Comptroller to be applicable and, therefore, chargeable to our DASA research project funds, it was thought that the primary expense that AFRI will incur from BuMed funds in the area of "maintenance" will be in terms of improvements and alterations to the buildings. \$20,000 is being budgeted for this purpose; however, it should be pointed out that when such services do occur accounting procedures will obligate them primarily under the Object Class of Services.

4. There was a discussion of the need of approximately \$9,500 for an additional parking lot. It is PCO's intention to start procurement procedures for this facility immediately. CDR Bauerschmidt pointed out that as Admiral Galloway (who would probably favor such a parking lot procurement) will be retiring in January, it would be well to push this through as soon as possible. CDR Bauerschmidt stated he doubted that AFRI would be able to secure BuMed R&D funds for the parking lot facility. The money would probably have to be obtained on a special project basis through Y&D (Public Works).

5. The total of the Object Class budget figures, discussed above, is \$478,500, which CDR Bauerschmidt will present to the BuMed Comptroller. In addition, CDR Bauerschmidt will present a recommendation for an additional \$83,200, the latter figure to include \$20,000 for furnishings for AFRI's new building (Phase II construction), \$7,200 for an intrusion system (security system), \$23,000 for AEC Microfiche Reports, and \$33,000 for library equipment (includes books). In presenting the figure of \$83,200 CDR Bauerschmidt will point out that the appropriation for the construction of the Phase II building did not make provision for collateral equipment. He will also point out that the \$23,000 for the Microfiche has already been committed from FY 65 funds. At the time AFRI's Equipment Committee reviewed and authorized the purchase of the Microfiche Reports, AFRI had been informed that the BuMed funding support in FY 65 was to be \$618,000.

6. Before leaving the meeting, PCO was asked to estimate the fiscal impact of the new pay raise upon our BuMed funded payroll. This information was required for a report to be given by NEMC to BuMed. PCO recalculated the current and potential payroll for FY 65 on the basis of the old pay rates and reported to Mrs. Keller (NEMC) that the pay increase has generated a variance of approximately \$8,259. This is the net variance and does not take into consideration the additional increases on contributions.

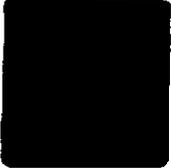
MILDRED WHITMAN

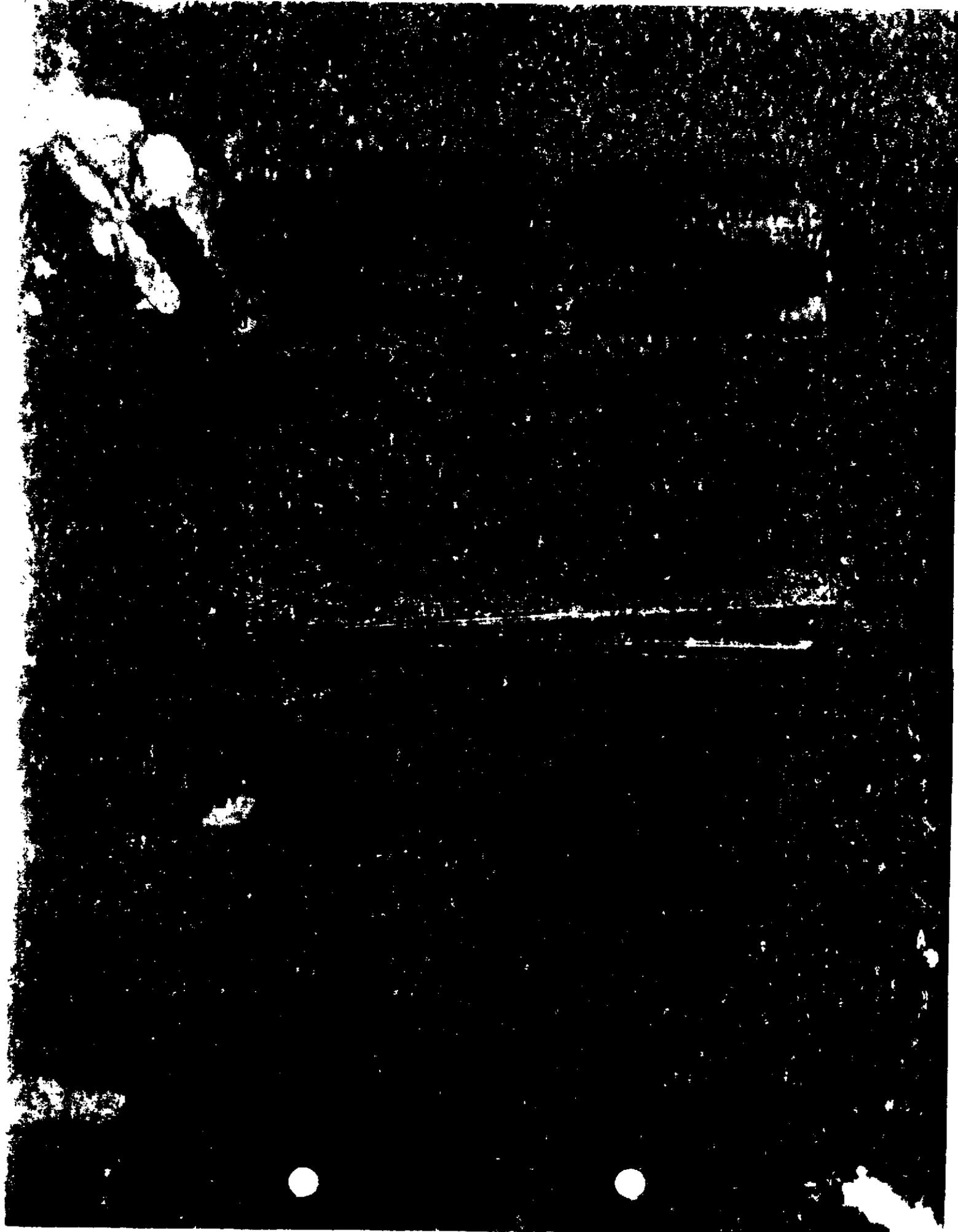


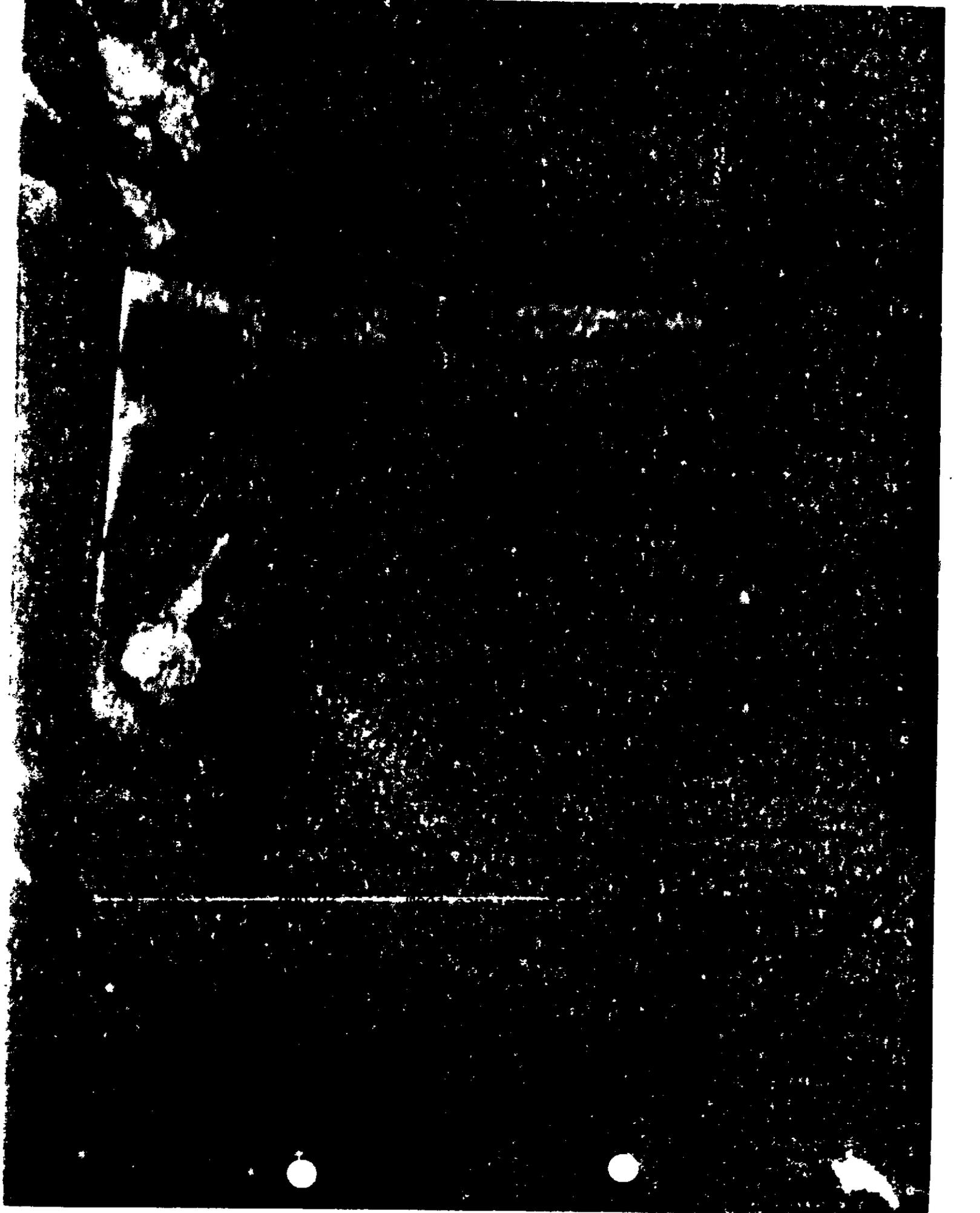
Captain GORE,

Per phone conversation with Captain  
GOOLSBY.

Mr. B. H. DEPENBROCK  
OP-702F  
Rm 5C732  
X-73081  
Pentagon







ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA, MARYLAND - 20014

2329  
22 SEP 1964

ADM-12300

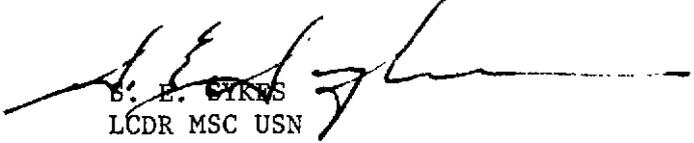
SUBJECT: Estimated Distribution of AFRRRI's Personnel Strength FY 1966

TO: Director  
Defense Atomic Support Agency  
ATTN: Comptroller  
Washington, D. C.

Inclosure 1 is forwarded to verify personnel information given by telephone conversation to your office on 22 September 1964.

FOR THE DIRECTOR:

1 Incl  
Est Dist of AFRRRI's  
Personnel Strength FY 66

  
E. E. CYRUS  
LCDR MSC USN  
Administrative Officer

ESTIMATED DISTRIBUTION OF AFRI's PERSONNEL STRENGTH FY 1966

| <u>GRADES</u> | <u>JOINT TABLE OF DISTRIBUTION</u> | <u>ESTIMATED AVERAGE STRENGTH FY 66</u> |
|---------------|------------------------------------|---|
| PL 313        | 6                                  | 3                                       |
| 15            | 1                                  | 2                                       |
| 14            | 4                                  | 7                                       |
| 13            | 11                                 | 9                                       |
| 12            | 10                                 | 6                                       |
| 11            | 17                                 | 16                                      |
| 9             | 28                                 | 23                                      |
| 7             | 27                                 | 19                                      |
| 6             | 4                                  | 3                                       |
| 5             | 35                                 | 25                                      |
| 4             | 14                                 | 9                                       |
| 3             | 23                                 | 9                                       |
| 2             | 1                                  | 2                                       |
| W/B           | 20                                 | 8                                       |
|               | <hr/>                              | <hr/>                                   |
|               | 201                                | 141                                     |

FROM: Capt PRUETT  
TO: Cap GORE - DASA RM1B729  
FOR INFO & RETENTION

OP-07E/cj  
2 September 1964

MEMORANDUM

From: Assistant for Medical and Allied Sciences (OP-07E)  
To: Director Research Division, Bureau of Medicine & Surgery (Code 71)  
Subj: AFRRI

1. The revised draft dtd 20 August 1964 of the Host - Tenant Agreement between the NNMC and AFRRI has been reviewed by myself and Captain Goolsby, OP-76B and appears to be quite satisfactory.
2. The Navy (BuMed) FY-65 RDT&E management and support funding of AFRRI has not yet been completely agreed to by Navy-DASA Headquarters. In order to arrive at an equitable and satisfactory solution the center controller in conjunction with AFRRI should prepare a FY-65 spending plan which will match the CROSS SERVICING - COMMON SERVICING COSTS as estimated by Commander Hunt in his memo of 10 August 1964 with the following budget figures received from DASA Headquarters (Captain Gore - Mr. Johnson).

FY-65 AFRRI MANAGEMENT & SUPPORT

|                           |                  |       |                          |
|---------------------------|------------------|-------|--------------------------|
| Personnel                 | \$233,000        | BuMed |                          |
| Travel                    | 10,000           | "     |                          |
| Rentals                   | 14,000           | "     | \$380,000                |
| Services                  | 91,000           | "     | Allocated                |
| Supplies                  | 45,000           | "     | By BuMed                 |
| Equipment                 | 52,000           | "     | to Center                |
| Building Maint. (Alterat) | 75,000           |       |                          |
|                           | <u>\$470,000</u> |       |                          |
| Telephone                 | \$17,000         | Y&D   |                          |
| Utilities                 | 60,000           | Y&D   | \$142,000                |
| Maint.                    | 65,000           |       | Understood               |
|                           | <u>\$142,000</u> |       | to be in hands<br>of Y&D |

3. The following questions should be answered:

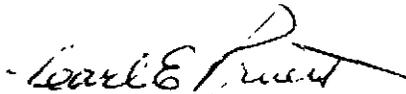
- a. How much BuMed RDT&E 6.5 management & support funding will the center require to get AFRRI thru FY-65?

904A 3

b. Is the center anticipating any Navy RDT&E funds to cover the common service items in FY-66? or will this cost be included in the center O&M budget.

c. How will Y&D's (telephone - utilities and maintenance) money be budgeted for and handled in FY-66? Will AFRRI deal with the NNMC or with the Public Works Center controller?

4. Once the FY-65 funding is worked out the transfer of AFRRI management to DASA should be a closed book.

  
CARL E. PRUETT

29 JUL 1964

1017 .1

Request for additional design funds for third floor addition to Animal Clinic and Laboratory Building, AF J, Bethesda, Maryland (FBI Reimbursable Project W 25)

Chief, Bureau of Parks and Monuments  
Army Department  
Interagency Construction Division  
Code C 513  
Washington, D. C. 20390

1. Reference letter Wby-4793(33), HQ.10 P. Hiseft, Area Public Works Officer, Chesapeake, PJ July 1964, subject as above, copy of which was furnished your office.

2. The request for the use of funds, as indicated in paragraphs 5 and 6 of referenced letter, is approved.

FOR THE DIRECTOR:

W. A. GRAY  
Lt Colonel, USA  
Acting Chief, Logistics Div

Copy furnished: M/R: Control 53907. By referenced letter ARWOC indicated that the urgent minor construction project for construction of the third story addition to the Animal Clinic and Laboratory Building at the AFJ caused the redesign of the existing roof, which is estimated to increase the design costs by \$2,500. In the total amount of design funds furnished for the project, there is currently an excess of \$10,000 available in AFJ, C. ARWOC is requesting that they be given authority to use \$2,500 of this \$10,000 to cover the redesign of the roof on which the third floor addition will be constructed. This action

approves the request and grants the authority.

COMPTROLLER (BUDGET BRANCH)

DALE

COMP

DDJA

PAAD

1964

MRB

10/1/64

be

187LL

713 3



AREA PUBLIC WORKS OFFICE  
and  
OFFICE OF OFFICER IN CHARGE OF CONSTRUCTION  
CHESAPEAKE  
BLDG. 57, U.S. NAVAL STATION  
(Washington Navy Yard Annex)  
WASHINGTON, D. C. - 20390

53907

IN REPLY REFER TO  
NBy-46793(33)  
40.1C PGB:sjt

23 JUL 1964

From: Area Public Works Officer, Chesapeake  
To: Chief, Defense Atomic Support Agency, Washington, D. C.  
Subj: Third Floor Addition to Animal Clinic and Laboratory Building,  
AFRRI, Bethesda, Maryland (MCON Reimbursable Project UA25);  
request for additional design funds for

1. By previous action, funds in the amount of \$12,000 were made available to the Area Public Works Officer, Chesapeake to accomplish the required engineering and design of final plans and specifications for subject project.
2. On 21 July 1964, fee negotiations were completed with the Architect-Engineer selected to do the above described work. The accepted fee was \$10,100 which is considered fair and reasonable.
3. Of the \$12,000 made available, there are only \$7,500 to cover the A&E fee as follows:

|  |            |              |
|--|------------|--------------|
| a. Total available   |            | \$12,000     |
| b. Less: (1) A&E fee for conversion of original roof to floor slab | \$ 1,750   |              |
| (2) Reserved for estimated AFWO, Chesapeake in-house costs.        | 2,500      |              |
| (3) Reserved for estimated reproduction costs.                     | <u>250</u> |              |
|  | 4,500      | <u>4,500</u> |
| c. Available for A&E Contract for third story addition             |            | \$ 7,500     |

4. Additional funds in the amount of \$2,600 as per below are requested so that the A&E contract may be awarded:

|              |              |
|--------------|--------------|
| a. Total fee | \$ 10,100    |
| b. Available | <u>7,500</u> |
| c. Deficit   | \$ 2,600     |

NBy-46793(33)  
40.1C PGB:sjt

5. Attention is invited to the fact that of the funds originally made available for the construction of the first increment of the AFRRRI (Medical Research Nuclear Reactor and Laboratory Facility, MCON Reimbursable Project Z-320), \$10,000 have been assigned as a line item for the preparation of the LINAC plans and specifications. The current working estimate to cover the APWO, Chesapeake requirements is \$2,500.

6. In view of paragraph (5), the APWO, Chesapeake suggests that the Chief, D:SA approve the use of a portion of the available balance to cover the deficit shown in paragraph (4) in lieu of forwarding any additional funds.



W. E. BURDICK  
By direction

Copy to:  
BUDOCKS

10 AUG 63

DASAND 942.2

SUBJECT: Authorization to Expend Funds

TO: Director  
Armed Forces Radiobiology Research Institute  
National Naval Medical Center  
Washington, D. C. 20314

1. Reference is made to the following:

a. DASAND letter 942.2, subject "Funding by DASA for Nuclear Weapons Effects Research at the Armed Forces Radiobiology Research Institute", dated 29 November 1961.

b. Your letter NR7-0700-pf, 4800, dated 25 July 1963, subject, "Authorization to Expend Funds as Directed in DASAND 942.2 dated 29 November 1961".

2. Approval is hereby granted for the expenditure of approximately \$2,500.00 for the purchase of a Mikroc Model VE-10 Automatic Valving Vacuum Evaporator, complete, an item of Capital Equipment which is required in support of the NWR project 03.064.

3. It is understood that a review of the DASA Catalog of Research, Development, Test and Evaluation Equipment has been made and such specialized equipment is not presently available. It is further understood that sufficient uncommitted funds are available under Nuclear Weapons Effects Research No. 03.064 for this purchase.

R. J. ...  
Major ...  
Chief

M/R: This is authorization to expend funds for purchase of Capital Equipment required for training and research at AFRI. Money is available at AFRI under NWR 03.064 authorized funds; total approximation of cost is \$2,500.00. ~~XXXXXXXXXX~~

78. DASACH

|        |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|--------|
| DASAND | DASAET | DASACT | DASALG | DASAND | DASACS | DASAAR |
|        | CDR    | GABE   |        | mls    | 1B695  | 77615  |

1 Aug 63

DASACT COPY

20301

18 AUG 1963

**DARAND 942.2**

**SUBJECT: Authorization to Expend Funds**

**TO: Director  
Armed Forces Radiobiology Research Institute  
National Naval Medical Center  
Washington, D. C. 20314**

**1. Reference is made to the following:**

a. **DARAND letter 942.2, subject "Funding by DARA for Nuclear Weapons Effects Research at the Armed Forces Radiobiology Research Institute", dated 29 November 1961.**

b. **Your letter HRT-1200-pf, 4200, Ser 304, dated 18 July 1963, subject, "Authorization to Expend Funds as Directed in DARAND 942.2 dated 29 November 1961".**

**2. Approval is hereby granted for the expenditure of approximately \$21,825.00 for the purchase of the following items of Capital Equipment which is required in support of the NWER project 03.004.**

|   |                    |
|---|--------------------|
| <b>High Vacuum Evaporator System, Model VI-4B</b>                                 | <b>\$15,000.00</b> |
| <b>Component Parts to Assemble High Vacuum Test Stand, Model VI-4B (Modified)</b> | <b>12,000.00</b>   |
| <b>Vac Ion Leak Detector, Model 975-0000</b>                                      | <b>1,250.00</b>    |
| <b>Bell Jar, 18" x 30", Model 934-0015</b>  | <b>175.00</b>      |
| <b>Graphic Recorder, Model 974-0028</b>   | <b>200.00</b>      |
| <b>Pressure Sensitive Relay, Model 924-0003</b>                                   | <b>200.00</b>      |
| <b>2KVA Filament Supply, Model 922-0003</b>                                       | <b>250.00</b>      |
| <b>Thermocouple Feedthrough, Model 964-5015</b>                                   | <b>150.00</b>      |

DASACT COPY

DASAND 942.2

SUBJECT: Authorization to Expend Funds

|  |        |           |
|--|--------|-----------|
| 1-1/2" Vacuum Valves                     | 325.00 | \$ 680.00 |
| Bell Jar Seals, 18" I.D., Model 834-8008 |        | 190.00    |

3. It is understood that a review of the DASA Catalog of Research, Development, Test and Evaluation Equipment has been made and such specialized equipment is not presently available. It is further understood that sufficient uncommitted funds are available under Nuclear Weapons Effects Research No. 03.064 for this purchase.

M/R: This is authorization to expend funds for the purchase of Capital Equipment required for research and training at AFERI. Money is available at AFERI under NWER 03.064 authorized funds; total approximate cost \$31,825.00.

S. DASACH

|        |        |        |        |        |        |       |
|--------|--------|--------|--------|--------|--------|-------|
| DASAND | DASANT | DASACT | DASALG | DASASB | DASACS | DASAA |
|        | CDR    | GADE   |        | mls    | 1B095  | 77615 |

2

6 AUG 63

*File 904-5*

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Biomedical Division  
WASHINGTON 25, D. C.

DASAMD 921.2

4 June 1963

MEMORANDUM FOR: COMPTROLLER

SUBJECT: AFRRI Program Change Proposal

1. In addition to the funds for the Positive Ion Accelerator (PIA) there are three additional unrelated items requiring FY 64 funding. They are as follows:

a. LINAC Training Program. There are no available personnel in the military or on the Civil Service Register trained to operate a linear accelerator. This situation has been anticipated, as it was with the DASA-TRIGA nuclear reactor and plans have been made to provide a proper training program for an increment of 12 officers to be added to the AFRRI staff in July or August 1963. The training will be given by General Atomic Division, General Dynamics, La Jolla, California. It will be a nine month program and will cost \$125,000. This does not include travel and per diem, estimated at \$25,000. The high cost of the training is explained by the on-the-job use of the GA Linear accelerator which is \$1170.00 per day. This is a standard government approved cost. The value of the Reactor Training Program has been firmly established. It is quite clear that the AFRRI must "breed" and train its own staff for the handling of all its radiation sources. The LINAC is an approved and appropriated item. Bidding is now proceeding. The housing for the LINAC is already complete. It is essential that this training program begin not later than September 1963 in order to have capable trained personnel to operate the LINAC upon its establishment in July 1964. Requirement: \$150,000.

b. Operational Research Support. Planning for the AFRRI staff has envisaged increments of military and civilian personnel in specific phases to handle the DASA-TRIGA Reactor, the LINAC, and the Positive Ion Accelerator as they become operational. Thus far the plan has unfolded quite well; however, it is apparent that a gap in obtaining and training both military and civilian personnel will exist in FY 64 and possibly FY 65. This gap can be filled only by contracting on a task force basis (CPFF) for the personnel needed in the most critical areas of the research program. Negotiations are presently under way with several corporations for this type of assistance. At the same time strong effort will continue to obtain and train a permanent civilian and military staff capable of accomplishing these requirements. This scheme is purely an interim measure designed to speed up the output in certain urgent areas of research. Requirement: \$200,000.

904 r 2

DAS-AM 921.2

SUBJECT: AFRRI Program Change Proposal

c. Master Planning. There have been certain **changes** in the overall design of the AFRRI since the original concept and over the next five years an appreciable expansion is planned. It is now necessary to provide a master plan of all the facilities as they must fit into the total plan of the National Naval Medical Center. This involves proper phasing of the construction with sanitation, water, electrical requirements, etc., plus consideration of general appearance and landscaping. This problem has been reviewed with the Navy Area of Public Works Office which will be responsible for the construction and is considered to be essential and urgent. Requirement: \$50,000.

d. Total Requirement: \$400,000.

  
ROBERT H. HOLMES  
Colonel MC USA  
Chief, Biomedical Division

22 May

AFM 0000

AFM 0000: Research and Development, at the Naval Research Laboratory,  
Hammond Building, 4410th Naval Medical Center, Bethesda,  
Maryland.

To: Chief, Bureau of Yards and Docks  
Naval Hospital

1. In FY 1964, the AFM, on behalf of the Defense Atomic Support Agency, transferred \$1,800,000 to the AFM, on behalf of the Navy for the construction of a laboratory and the installation of a linear accelerator at the Naval Research Laboratory, Bethesda, Maryland. Approximately \$1,000,000 of this amount remains available with the Area Public Works Office, Massachusetts, for the purchase and installation of a linear accelerator. The AFM has received by the AFM, on behalf of this amount. The Defense Atomic Support Agency has recommended in the FY 1964 Military Construction, Arm Program a deficiency appropriation of \$800,000. It is requested that the AFM employ an engineering firm, experienced in linear accelerators, to review the Defense Atomic Support Agency's preliminary specifications, and such additions or amendments as may be required, and submit the specifications of the bids when received. The expenditure of \$10,000 from project funds already transferred to your office is authorized for this purpose. In selecting an appropriate firm, consideration should be given to the fact that the AFM may later require assistance in the training of operators, and in maintenance and operation of the machine over a period of perhaps one year.

2. By Military Interdepartmental Memorandum Request No. 72-60, dated 26 March 1960, the Defense Atomic Support Agency transferred \$12,000 to the Navy Department, AFM, for preliminary design of space to house a positive ion accelerator and of space for supporting laboratory work. The Defense Atomic Support Agency has requested \$1,000,000 in the FY 1964 Military Construction, Arm Program for final design and a full construction of this space. It is requested that the AFM employ an engineering firm experienced in Positive Ion Accelerators, to perform the necessary preliminary design. Should Congress appropriate additional funds, AFM, with the concurrence of the AFM, should consider retention of this firm to perform final design and supervision of work.

104-A3

DASALG 600.1

SUBJECT: Construction and Master Planning at the Armed Forces Radiobiology Research Institute, National Naval Medical Center, Bethesda, Maryland

3. If AFWO, C is agreeable to awarding and supervising the contract for preliminary design of the structure and laboratory space concurrently with a contract for preliminary design of the PIA, the DASA will, on request, make available ~~Research and Development~~ Research and Development funds for preliminary design of the positive ion accelerator. Upon recommendation of the AFWO, C, DASA will consider requesting retention of this same firm to perform final design and supervise installation. The positive ion accelerator is estimated to cost in the neighborhood of \$3,000,000 and will be funded from Research and Development funds. In selecting an appropriate firm to perform preliminary ~~design~~ of the PIA, consideration should be given to the fact that DASA may later require assistance in the training of operators and in maintenance and operation of the equipment for a period of perhaps one year.

4. The Defense Atomic Support Agency requires assistance in formulating a suitable master plan to govern the growth of the AFRI physical plant. At present the following construction is contemplated for future years:

- a. Physics and Radiobiology Training Center Building - roughly estimated at \$800,000.
- b. Radiation Physics Laboratory - roughly estimated at \$700,000.
- c. Radiation Fallout Simulator - perhaps to be constructed at a remote location and with a cost believed to be in excess of \$4,000,000.

It is requested that you enter into negotiations with a view to employing an architect-engineer capable of formulating this plan. The firm should be capable of reducing statements of requirements of scientific personnel to specific structure and equipment design incorporated in a master plan to guide the growth of the AFRI physical plant through the five-year budget cycle - FY 1965-1969. The master plan should be completely integrated with the master plans of the National Naval Medical Center and of other Government and Municipal Agencies affected by the existence of the AFRI. DASA is prepared to provide the architect-engineer with information as to future strengths and technical requirements and will make funds available to AFWO, C for his employment as soon as the amount of the contract is known.

M/R: This action requests the Department of Navy, AFVOC to employ architect engineer firms to review specifications for the AFVRI LIDAC and assist in evaluation of bids, perform advance planning for space to house FIA, perform advance planning on FIA, perform master planning for AFVRI. These matters were agreed at a 18 May meeting at AFVOC attended by Col. Helms, Col. Tyler, Mr. Taton, Mr. Watson. General Booth has been briefed.

**BASALB**

**BASAAG**

**BASACS**

**BASAAP**

Colonel

Tyler

vrl

100000

1000

13 March 1963

MEMORANDUM FOR: DCA/WEAPONS EFFECTS & TESTS

SUBJECT: Construction Program for AFERI

1. The Director of Logistics has forwarded to this office a proposed change to the AFERI Construction Program. It provides for \$6,000,000 in Fiscal Year 1963 and eliminates projects previously planned for other years, but the amount requested far exceeds the amount approved by NERF. It is contemplated that the facility will be ready in early FY 1966.

2. The expanded facility will result in a substantial increase in the scope of medical effects research and will require additional NERF funds for this purpose. This will result in either a reduction in the scope of effects research in other areas or in a need to request an increase in the NERF Program. Previous decisions of NERF have resulted in a ceiling of \$35 to \$38 million during the period FY 1964 and beyond.

3. We have three alternatives:

a. Request an increase in NERF for FY 1963 and beyond.

b. Assume that the increased medical research requirement can be absorbed within the NERF ceiling. It will, however, be necessary to provide an estimate of the increased requirement in our Program Change Proposal.

c. Delay forwarding a Program Change Proposal at this time. Since the construction program is scheduled for FY 1966, we have until 1 April 1964 to forward the PCP. If this is done, the \$600,000 presently approved for FY 1963 would be reprogrammed into other DASA Program Elements.

4. It is requested this office be informed which alternative you desire. If it is determined that we should forward a PCP at this time, we must act immediately since OSD has placed a deadline of 1 April on FY 1963 changes. Personnel of my office are available for consultation on this matter if you desire.

JOHN H. GOME  
Captain, SC, USAF  
Comptroller

**ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE**  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA 14, MARYLAND

227-2101-mlm  
3910  
Ser 105-62  
28 December 1962

From: Director, AFRRI  
To: Surgeon, DASA  
Subj: NBS LINAC Proposal

Encl: (1) Revision of NBS LINAC Proposal  
(2) NBS Reports

1. Attached as enclosure (1) is a revision of the NBS LINAC proposal for a joint AFRRI NBS effort.

2. From the AFRRI point of view the main facts bearing on the matter are as follows:

a. As a result of the last round of bidding we cannot begin installation of the AFRRI LINAC until 8 July 1964 at the earliest. This is a year later than planned.

b. The AFRRI LINAC plans will go ahead whether or not there is any AFRRI-NBS joint project. The same specifications will be put out for bids next year, the only difference being that this time we know how much money is needed and we will have enough.

c. This leaves us with a one year gap in our LINAC radiobiology research program that could very well be filled by a joint effort as proposed. Actually, under the NBS proposal, AFRRI can start doing LINAC radiobiology six months sooner than we could have, had the original AFRRI LINAC bids gone ahead as planned.

d. Attached as enclosure (2) is a voluminous set of reports generated in the last four years by the NBS LINAC planning group. Even without detailed study of enclosure (2) it is obvious that that group has done an impressive amount of high quality work. By accepting the NBS proposal AFRRI can gain the advantage of working closely with the individuals who produced these reports.

3. We have gone over the latest NBS draft and find the proposal satisfactory from the AFRRI point of view except on two points as follows:

a. We need a more positive statement to the effect that, after the machine is set up and running, it will be available for radiation biology work approximately 50% of the time.

*File - 904-113*

b. We can see our way clear for all but \$35,000.00 of the \$432,100.00 total. This is possible because, as a review of the records will show, for several years past we have planned to spend more than \$100.00 on LINAC operations and maintenance during the fiscal years 64, 65,

4. I would like to propose the following sequence:

a. Review of the proposal by your office.

b. Review by Mr. Taton and Dr. Otting.

c. Review by DASA Comptroller. Even though the Board of Governors has approved the project as a whole, it will still be necessary for the DASA Comptroller to okay each individual expenditure of more than \$1,000.00.

d. Conference between the DASA Comptroller and the NBS contract writing section to discuss the manner in which funding can be accomplished. The purpose of this conference would be to reach an agreed upon set of justifications as to why DASA resources are to be expended for some items and NBS resources for others. I believe that the contract itself should be between NBS and AFRI in accordance with the AFRI Charter.

5. It is desirable that the AFRI furnish its answer to the NBS proposal as soon as possible. Delay will eat into the total time that the machine is available for service.

6. This proposed project would enable both NBS and AFRI to get moving about 1½ years earlier than they would otherwise but of even greater importance is the fact that the project will result in a considerable overall saving for the taxpayer. If this project is not conducted at AFRI then NBS will have to do it later on the NBS LINAC at Gaithersburg. This machine will cost \$3,000,000.00 for the equipment alone. Consequently it will cost twice as many dollars as it would to get the same answers here at AFRI.

*James T. Brennan*  
JAMES T. BRENNAN

Draft

**REPORT FOR A SHORT-TERM CONTRACT**

**SPONSOR - ATOMIC ENERGY RESEARCH ESTABLISHMENT**

**December 17, 1952**

**Introduction**

The rapid increase in the use of high current linear electron accelerators has not been accompanied by a complete understanding of the heavily-beam-loaded linear accelerator. This has resulted in experimental difficulties in the design of beam output which can be produced by these accelerators without beam destruction. While a reasonable amount of empirical data now exists concerning beam destruction phenomena, these effects are not well understood and lead to considerable conservatism in linear accelerator design, especially for accelerators where the beam currents or pulse lengths exceed those previous dimensions.

For linear accelerators being considered for the future the beam currents contemplated are often well in excess of present designs. It is expected that new limitations on linear accelerator performance will be experienced in these situations unless there is improved theoretical and experimental understanding of the heavily-beam-loaded linear.

With respect to beam scattering and beam loading for linear electron accelerators, the problems are especially acute. Sections of accurate measurement of electron and gamma fluxes, radiation damage of components, heat damage of components, etc. are especially acute for the high current linear accelerators and well developed techniques do not exist. Due in addition to the long government time of these accelerators and associated facilities there is generally a considerable delay in effective utilization of these facilities.

At present there are no linear accelerators operating with as great average electron beam currents as will be available from the ARES or LL accelerators. Accelerators operating with beam fluxes up to ten times smaller average beam currents are presently operating; however, little attention is being given in their programs to the above mentioned problems. It is very clear that the research programs on these accelerators are suffering because of this.

The program described in this proposal is designed to provide a partial solution to these problems; namely:

- (a) Develop increased understanding of the heavily-beam loaded linear electron accelerator.
- (b) Develop competence in the measurement and handling of large electron beam currents.

- (a) Request more closely ASEE and ILL any further...  
 accelerator groups and get as immediate as possible...  
 their linear accelerator research program...  
 experimental program could be largely developed...  
 accelerators at the time they become available

**Facilities**

A superconducting prototype linear accelerator has been constructed by High Voltage Engineering Department (HVED) at their White Lake, Michigan, plant in order to test and prove out various components which will be used in the large linear accelerators they are developing for ILL. This accelerator has been in use for several weeks at HVED and has demonstrated excellent performance. The essential properties of this accelerator are listed in Table 1. With improvements and modifications now underway on this prototype accelerator, the performance can be expected to be superior to that listed in Table 1.

**Table 1. Properties of one section ILL prototype accelerator (shown in ) have not yet demonstrated, but are predicted for other ILL accelerators)**

|   |             |
|---|-------------|
| Selected electron energy  | 20 MeV      |
| Selected electron beam current (5 $\mu$ sec pulse)              | 650 mA      |
| Short pulse electron beam current ( 0.1 $\mu$ sec)              | 1           |
| Average electron beam current                                   | 1 mA        |
| Pulse repetition rate   | 4 to 750 Hz |
| Duty cycle  | 20%         |
| Function of current within 25 energy bin (including transients) | 20 S        |
| Electron beam posit   | 12 MV       |

It is proposed that a joint ILL-ASEE research program be undertaken to attack some of the accelerator and measurement problems outlined above. This program would involve the use of a small linear accelerator for which the ILL prototype accelerator could be admirably suited.

The ASEE test program on the ILL prototype accelerator is scheduled for completion within the next two months. This accelerator could be shipped during February and March, 1961, and the accelerator would be operational before the end of May 1961.

The engineering development costs of the prototype accelerator have already been paid in the cost of the IRE accelerator. Other engineering costs of the prototype accelerator can be considered as spare parts for the IRE accelerator. Among these spare parts are the following items: two L-2 tubes, one set klystron beam coils, one complete klystron modulator, one power water lead, one injector gun, one output window, one modulated IRE coupler with rf couplers and focus coils. The remaining necessary components of this prototype accelerator would have to be purchased for this project. They would be purchased from AECR less engineering development costs which are already included in the IRE accelerator costs. These additional costs constitute approximately one-half of the total cost of the accelerator. These components which are spare parts for the IRE accelerator will normally be used as IRE spare parts when the IRE accelerator is installed, and this material can still be returned. This cost for IRE as spare parts will not exist until essentially the completion of this project. Funds for the replacement of these spare parts which are to be considered as having short life have been included in the maintenance costs of this proposal.

Some of the components which are IRE accelerator spare parts would not normally have short life and have not been budgeted in the maintenance costs of this program. These components include one set klystron focus coils, one accelerator tube complete with rf couplers and focus coils, and portions of one klystron modulator. The estimated replacement cost of these items is about \$40,000. In the unlikely event that these items become damaged during this research program and must be replaced to maintain the integrity of the IRE accelerator spare parts, this cost will be borne by IRE from its research funds.

An estimated breakdown of the cost of the accelerator in terms of IRE spare parts, parts which must be purchased, and IRE charged engineering costs is:

|  |                |
|--|----------------|
| 1. IRE spare parts, purchased by IRE   | \$ 67,000      |
| 2. Parts which must yet be purchased from AECR   | 102,000        |
| 3. Engineering development costs already paid by IRE and estimated as 47% of component costs | <u>168,000</u> |
| Total accelerator cost   | \$377,000      |

The test accelerator would be installed in an already existing shielded accelerator vault in the AECR laboratory. The space required for the installation in this laboratory would be the linear cave, the linear control room, and a small portion of the klystron modulator room. The installation of the test accelerator at this site would not be purchased from AECR but would be done by personnel assigned to this project.

The test accelerator would remain at the ANSII site until July 1, 1964, at which time ENE would relocate the test accelerator to a new ENE site if so requested by ANSII. The responsibility and funding for relocation would be borne by ENE. The original installation would be made in such a way as to allow rapid relocation of the test accelerator and, therefore, very little lost time and expense due to relocation. At the termination of this research program those items which are ENE spare parts would revert to their original purpose.

### Summary

Below is outlined a three year research program. Only a portion of the program would be financed and staffed by this project directly. The remainder would be provided by ENE and ANSII programs. The emphasis at different times in the program would always be directed toward the maximum benefit to the long range ENE and ANSII research efforts. *7,50 - 50 tm omitted from last page*

The initial phases of the experimental program would concentrate on the beam-monitoring and beam-handling studies since these are essential to all applications which either ENE or ANSII will have in their linear programs.

The program can be divided into four logical subdivisions. These are discussed in general below.

1. Linear Accelerator Studies. This portion of the program would be directed toward achieving a better fundamental understanding of the heavily-beam-loaded linear accelerator. Attached to this proposal is an extensive study of transient and beam-loading phenomena in the linear accelerator. In this report are specific predictions concerning beam blow-up phenomena, vacuum current instabilities on linear operations, and electron beam energy spread. The initial work on this portion of the project would be to achieve experimental confirmation of these predictions. Later work would be directed toward answering the linear time on linear operation which these calculations indicate. Additional work in this portion of the project would be directed toward the development of unusual beam conditions such as unaccelerated beam pulses and subnanosecond linear injections.

2. Beam-Monitoring and Beam-Handling Studies. One portion of this program would be directed toward development of reliable and accurate beam monitors of several types. These would include such monitors as non-intercepting magnetic induction pickups for total beam current and beam position, secondary emission monitors, and Faraday cages.

Other portions of this program would be directed toward the vacuum damage and heat removal problems. Tests already made jointly by ENE and the University indicate that serious fatigue effects can result in some materials due to the pulsed nature of the linear beams. The implications of these vacuum heating effects are little understood at present.

Radiation damage studies would concentrate mainly in studying the radiation effects on substances of engineering interest to linear programs. An effort here would be to obtain practical design information and operational tests on specific devices.

3. Development and Initial Use of Experimental Apparatus for NBS Research Program. The effort of this portion of the program would be to develop, test, and initiate portions of the experimental program which will later be carried out on the NBS linac. Examples of the type of equipment involved might be neutron time-of-flight detection equipment, ~~SSM~~ state detectors for charged particle detection, development of positron sources, etc.

4. Development and Initial Use of Experimental Apparatus for AFRL Research Program. The effort of this portion of the program would be to develop, test and initiate portions of the experimental program which will later be carried out on the AFRL linac. Examples of the type of program involved might be the development of calorimeters for dose measurement, development of apparatus for producing broad field radiation sources, preliminary biological experiments, etc.

#### NBS Contributions to Research Program

The concept of this proposal is to establish a research program to attack some of the accelerator and measurement problems which AFRL and NBS will encounter in their linear accelerator research efforts, and to study some of the fundamental problems of the heavily-beam-loaded linear accelerator.

The NBS linear accelerator program became active in 1958 when a design study program was initiated to educate the NBS staff in the linear accelerator art and to develop the specifications of the NBS linac, building, and research program. This study program resulted in approximately 26 reports on various aspects of the study program. Contracts with vendors were established for the linear accelerator, beam-handling system, electron scattering spectrometer, and laboratory building, and these items are presently under construction.

The present NBS activities are concentrated in developing the research program which will use this linear accelerator facility. Because of the importance of monitoring and beam-handling problems to any linac program, the initial efforts are concentrating on these areas. NBS presently has equipment funds committed or requested totalling \$130,000 for this phase of the program. These efforts will result in the development of such devices as nanosecond linac pulsing equipment, Faraday cage detectors, secondary emission monitors, non-intercepting magnetic induction monitors for total electron beam current and beam position, beam dumpers, etc. Personnel for these efforts will be provided from the NBS research staff.

The nuclear and radiation physics program using the NBS linac is now receiving active attention. Experimental programs are presently being developed in the following areas:

- (a) Elastic and inelastic electron scattering.
- (b) Electroproduction and photoproduction of heavy particles, e.g., protons, deuterons, alpha particles, etc.
- (c) Electroproduction and photoproduction of neutrons using time-of-flight detection techniques.
- (d) Shielding studies for high intensity accelerators.
- (e) Production and use of monochromatic photon beams.
- (f) Production and use of conventional bremsstrahlung beams.
- (g) Radioactivity studies.

As these programs are developed and defined, the necessary funds for these programs will be requested from the NBS administration.

NBS would make active use of the temporary linear test facility described in this proposal in the development, testing, and proving-out of various aspects of this research effort. For some of the experimental programs it will be feasible to conduct preliminary experiments using the test accelerator. Of the ten members of the NBS staff listed under personnel, it is estimated that an average of about 50% of each person's time would be directly involved in either preparing for or using the linear test facility. Salaries of these personnel would come directly from the NBS operating funds.

### Personnel

It is contemplated that three people would be supported by the funds of this program. These would be a linear operator, a linear engineer, and a microwave engineer. The major responsibility of these personnel would be the operation and maintenance of the accelerator and portions of the research program on linear accelerator studies. These personnel would be supplemented by NBS and AFRL personnel who would concentrate their efforts on measurement problems and the initiation of specific experimental programs, and whose salaries would be paid by their respective organizations.

NBS personnel who would spend a portion of their time on this program are Drs. W. Dodge, E. Fuller, E. Hayward, D. Eckhelle, J. Lisco, S. Fawcett, J. Pruitt, R. Schwartz, and Messrs. S. Deane, G. Ward, and J. Wychoff. These are all members of the High Energy Radiation Laboratory of NBS and all have considerable experimental experience using particle accelerators.

It is expected that AFRL would also assign a number of their personnel to this project to develop measurement techniques and initiate their research programs.

It is also expected that both NBS and AFRL would desire [redacted] members of their line operating staff to this accelerator as a [redacted] technician.

**Financial Detail**

The budget proposed below is for a three-year period. The first year costs are to cover those portions of the [redacted] accelerator which are not NBS spare parts, the initial installation costs of the accelerator, salaries of those operating personnel, and miscellaneous maintenance costs of the accelerator. The costs for the next two years would be for the salaries of three operating personnel, estimated maintenance costs of the accelerator, and a small amount for the research program. The other costs of the research program and equipment for those using this facility would be carried by the NBS and AFRL research budgets as described above.

The breakdown of the costs for the remainder of the line installation is listed below.

|   |                  |
|---|------------------|
| Remainder of line                                 | \$122,000        |
| 400 cps NS set and outgear                        | 14,000           |
| Shipping costs                                    | 6,000            |
| Installation supervision and consultation by ANCO | 3,000            |
| Miscellaneous installation costs                  | <u>10,000</u>    |
| <b>Total facility cost</b>                        | <b>\$155,000</b> |

Maintenance costs and basic experimental equipment procurement costs during the first year are estimated as \$25,000.

During the remaining two years the costs are for the three operating personnel, expected electron replacement costs, and a portion of the equipment costs for the line development program. The labor costs include the pay rate change due in January 1964 and expected periodic salary increases of the personnel.

The proposed budget is summarized below. The salaries have been estimated for one GS-9, one GS-12, and one GS-13. The salaries for the first year have been estimated for a six-month period.

**Proposed Budget, Fiscal Year 1963**

|                             |                   |
|-----------------------------|-------------------|
| Project salaries            | [redacted]        |
| Equipment and other objects | [redacted]        |
| Bureau overhead             | [redacted]        |
| <b>Total for FY 1963</b>    | <b>\$ 262,700</b> |

✓  
DASACT 904-AS

25 May 1953

MEMORANDUM FOR: SAC/USPOIS EFFECTS & TESTS

SUBJECT: Funding of the Research Program at the AFVRI

1. We have followed a policy so far of ordering research on the AFVRI in the same manner as we are accustomed to ordering on other government laboratories. This is on the basis of "applied" work having specific research descriptions and objects in mind.

2. It appears that applied research orders are certainly appropriate when dealing with organizations that are set up to do a program that is considerably broader than the work accepted for NSA. However, there may be some injustice in this to the AFVRI, whose program for some time may be limited to the requirements of NSA. A recent study made by the Bureau of the Budget at the direction of the President subject: "Government Contracting for Research and Development," April 30, 1953, points out that several improvements are needed in managerial arrangements for many government operated research and development facilities. It is recommended on page 47 of the study that government research laboratories be provided an allotment of funds to be available to the Laboratory Director for projects of his own choosing, for results for which he is to be responsible. It would be reasonable to do this for some part, say 10%, of the total program that we intend to obtain through the AFVRI. In this case NSA would be entering for the first time into basic research.

3. If you cannot I suggest that you draft your future NSA program this way. My office can take the necessary steps to show it in the program and budget.

E. R. CAMPBELL  
Captain, SC, USN  
Comptroller

**DASACT 904-43**

**1 OCT 1961**

**SUBJECT: Transfer of Funds for Armed Forces Radiobiological Research Institute, National Naval Medical Center, Bethesda, Maryland**

**TO: Chief  
Bureau of Medicine and Surgery  
Code 7  
Navy Department**

It is requested that the amount of \$200,000 be transferred to the Area Public Works Officer, Chesapeake, Building 5V, U.S. Naval Weapons Plant. These funds are for pending obligations for procurement of Health Physics equipment and other research equipment required at the Armed Forces Radiobiological Research Institute. By copy herewith, Area Public Works Officer, Chesapeake is advised that these funds are requested in partial satisfaction of needs summarized in his letter of 28 September 1961 to the Chief, DASA.

**JOHN W. GANNON  
Rear Admiral, USN  
Deputy Chief**

**M/R: The Area Public Works Officer advised us that we are \$200,000 behind on pending obligations and change orders which have been approved in the planning of the AFRI. A number of months ago we made an agreement with Da Med that they would supply \$200,000 to help fund the changes and the additions. The present letter is the specific information on how the money is to be applied. A meeting was held with Admiral Galloway and Admiral Kreuz in the DASA on 11 October 1961 where this action was decided. A Memorandum for the Record is on file in the Comptroller's office.**

**CT BCS/WET LG AS**

**CAPTAIN CAMPBELL**

**nj**

**18720  
12 Oct 61**

**52250**

CI COMEBACK CY

**SECRET 504-42**

MAR 1962

**MEMORANDUM FOR: ASSISTANT SECRETARY OF DEFENSE (COMPTROLLER)**

**SUBJECT: Planning of Armed Forces Pathobiology Research Institute**

**1. Reference is made to the following:**

**a. NSD Directive 5151.16 of May 12, 1951.**

**b. NSD memorandum for the Secretary of Defense of 27 August 1955, subject: "FY 1956 Emergency Funds for DASA Educational Studies."**

Reference a. provides that the Assistant Secretary of Defense (Comptroller) "shall be responsible for arranging the financing of the Institute and its activities." The present arrangements are based in part on a provision in reference b. that "fall-in operating costs up to \$500,000, subsequent to FY 51 will be included in the Bureau of Medicine and Surgery portion of the Navy NSDMS budget request."

2. The total cost for research programs in the AFPMI, not including military pay and investment recovery, amount to about \$1.2 billion per year in Fiscal Years 1958 and 1959. The difference between these sums and the approximately \$500,000 budgeted each year by the Navy is made up by DASA orders for research work funded from the DASA NSDMS budget.

3. We feel that a sounder financial basis for the AFPMI would be provided by pricing the research projects ordered on the AFPMI so as to include all of the costs excepting military labor and investment. It is recognized that this would increase the unit amounts paid by the DASA since the \$500,000 annually from the NSD would have to be absorbed in research orders, however this could be not provided that it is considered before the beginning of a budget cycle.

4. The advantages are felt to be in two areas: First, the AFPMI would then be encouraged to accept orders on the zero cost basis from other agencies than the DASA, such as the AEC, and National Institutes of Health. This would broaden the basis of support, with some increase

2/15

DASACT 904-A3

SUBJECT: Financing of Armed Forces Radiobiology Research Institute

of stability over that which might be expected at present. Besides, the \$400,000 annual overhead cost for the AFERI now in the Navy's MTRAC budget might be considered better displayed for higher level budget management if it is associated with the work to be done in the Institute. The amounts paid for local support to the National Naval Medical Center by the AFERI would be determined in the usual host-tenant agreement, and could be expected to reflect the situation accurately since they would be decided and kept up to date locally.

5. It is not believed that any change in reference a. is required. Approval is requested to put the above policy in effect beginning with FY 64.

Copy furnished  
Asst Sec Navy (PR)  
Chief Bu Med  
Director AFERI

ROBERT E. BOUTH  
Major General, USA  
Chief

M/R: The AFERI is currently being funded both from DASA NWER funds and from Dept of the Navy Funds. Above letter to the Asst Sec of Defense states reasons for desiring total funding from DASA, starting with FY 64. Draft of this letter was reviewed by the Board of Governors of the AFERI at their 15 Feb 62 meeting and it was recommended that Chief, DASA submit the letter as written.

CI

ME

AG

C/S

2

CAPTAIN

CAMPBELL

nj

1B729

52350

23 Feb 62

**DABAND 942.2**

**SUBJECT: Authorization to Purchase Van Trailer, Government Code 0012-01; Tractor, Government Code 0004-01; and Accessory Radiation Detection Equipment**

**TO: Director  
Armed Forces Radiobiology Research Institute  
National Naval Medical Center  
Bethesda 14, Maryland**

**1. Reference is made to the following:**

a. Letter, DABAND 942.2, this headquarters, dated 29 November 1961, subject: "Funding by DASA for Nuclear Weapons Effects Research at the Armed Forces Radiobiology Research Institute."

b. Your letter, NS7-0701-ahr, 4235, Ser: 113, dated 2 January 1962, subject: "Authorization to expend funds as directed in reference (a)."

**2. Purchase of a Van Trailer, Government Code 0012-01; Tractor, Government Code 0004-01, and accessory radiation detection equipment, as requested in reference 1b, at an estimated cost of \$25,000 is hereby approved.**

**3. This equipment will be used to establish a portable field laboratory for the Armed Forces Radiobiology Research Institute participation in the NREN project and subsequently will be used for routine environmental monitoring in the Bethesda area to measure air and ground radioactivity produced by the AFMRI stack gases.**

**4. It is understood that a thorough review of the DASA Catalog of Research, Development, Test, and Evaluation Equipment has been made and this equipment is not available; further, sufficient uncommitted funds**

904-113

**AD 942.2**

**SUBJECT: Authorization to Purchase Van Trailer, Government Code  
0812-01; Tractor, Government Code 0804-01; and Accessory  
Radiation Detection Equipment**

are available under Weapons Effects Board No. 03.004 and no additional funds will be required for the procurement and adaptation of this equipment. Your attention is invited to paragraph four of reference is regarding accountability for property furnished by the Defense Atomic Support Agency and purchased with project funds.

**M/R: See attached Memorandum for Chief, DASA, by DASAMD, dtd  
9 January 1963. CW 00302 applies.**

**2**

**DASAMD**

**DASAET**

**DASACT**

**DASALG**

**DASAMM**

**DASAVV**

**DASACH**

**Lt. Col.**

**NOLD**

**bdj**

**1B695**

**77615**

11 October 1961

MEMORANDUM FOR THE RECORD

SUBJECT: Funds for the AFRRI

1. The following people met today in DASA Headquarters to discuss funding for the AFRRI:

Rear Admiral Frank P. Kreuz - NNMC  
Rear Admiral C. B. Galloway - Bu Med  
Commander Bernard H. Hunt - NNMC  
Lt. Commander Lucien E. Barkley - Bu Med  
Lt. Commander C. A. Carr - AFRRI, NNMC  
Mr. Wilbur C. Oates - Bu Med  
Captain R. R. Campbell - Comptroller, DASA  
Dr. W. S. Mullins - MD, DASA

2. Inclosure 1 is the estimate made by NNMC in behalf of the AFRRI for expenses remaining in Fiscal Year 1962. Inclosure 2 is the division of fund responsibility which was proposed by the DASA. Inclosure 3 is a copy of a Memorandum for the Record written by Colonel Holmes, who could not be present at today's meeting.

3. It was agreed that the concepts in Inclosures 1 and 2 provided sufficient flexibility within Bu Med resources that \$200,000 could be made available to the Area Public Works Officer for procurement of AFRRI equipment. The DASA will make up the balance out of project funds to complete the outfitting of the AFRRI, amounting to somewhat less than \$200,000. Accordingly, it was decided that DASA would send a letter to Bu Med giving information for the transfer of the Bu Med \$200,000, which transfer would be done immediately upon receipt of information by Bu Med.

4. It was stated that the AFRRI would be ready for operation in February. Discussion was held on the advisability of sending a Program Letter followed by funding from DASA in order that there would be a backlog of work on which planning for operations could now begin.

3 Incl

1. Estimate made by NNMC
2. Div. of Fund Respon. Proposed by DASA
3. M/R by Col. Holmes, MD

5 Oct 61

R. R. CAMPBELL  
Captain, SC, USN  
Comptroller

11 October 1961

**SUBJECT: Funds for the AFRR, proposed division**

**Bu Med Funds:**

About \$400,000 per year or \$100,000 per quarter budgeted in Navy  
NRY&I appropriation by Bu Med and Surgery.

**Provided for:**

Real Property Maintenance Services - reference DOD Instruction  
4150.9.

**NSMC Command Facilities**

Established exchange, messes, postal service, clubs, information, health and recreational facilities available to AFRR staff under Navy rules applying to military and civilian personnel.

**Security**

**Fiscal and Disbursing**

**NRY&I Project Funds:**

Scientific program budgeted for by DASA, amounting to \$800,000 in  
FY 62.

**Provided for:**

Scientific, technical and clerical labor associated with projects  
performed in the AFRR.

Equipment and material used in projects.

Research program overhead: Travel on project business, training  
for specific AFRR tasks, consumable supplies.

DEPARTMENT OF DEFENSE  
ARMED FORCES RESEARCH AGENCY  
Medical Division  
WASHINGTON 25, D. C.

FORM NO. 648.2

MEMORANDUM FOR THE RECORD:

SUBJECT: Funding of the Armed Forces Radiobiology Research Institute

1. Telephone conversation with Captain Campbell, Suptoller, on 3 October 1961, resulted in the following decision regarding the funding of the Armed Forces Radiobiology Research Institute.

a. Obtain \$200,000 from Bureau of Medicine and Surgery for the purchase of health physics equipment. Previous agreement had been reached with Admiral Galloway that \$200,000 could be made available from a total of \$400,000 budgeted by the Navy in Fiscal Year 1962 for O&M of the Institute.

b. Obtain \$200,000 from the \$400,000 budgeted by NSAS in Fiscal Year 1961 for O&M of the Institute. This money was at one time transferred to the National Naval Medical Center and later brought back to NSAS where it was applied to the AFRI Fiscal Year 1962 research fund. This money would be used for various construction items and equipment necessary to the research program.

c. The above monies totaling \$400,000 would then be sent to Area Public Works Officer, Chesapeake and would satisfy their final requirements. This action is needed immediately.

d. This procedure thus reduces the AFRI research funds from \$600,000 to \$400,000 for Fiscal Year 1962 and curtails that program by one-third. It is possible to live with this but not desirable and it is hoped that consideration will be given to finding this money elsewhere as Fiscal Year 1962 unfolds.

2. General Booth should be made aware of this reduction because the Board of Governors for the AFRI has been told that \$600,000 would be the research fund for Fiscal Year 1962.

3. Apparently Admiral Galloway has gotten the word that the \$200,000 sent to the National Naval Medical Center by Bureau of Medicine and Surgery for funding AFRI O&M for Fiscal Year 1962 is not going to be enough. Colonel Brennan has assured me that it will be, and that any costs above this amount will be charged against his research fund for Fiscal Year 1962.

Copy furnished:  
Chief, NSAS

ROBERT H. HOLMES  
Colonel MC USA  
Chief, Reactor Task Force

Ind 3

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DASAMP 312

5 October 1953

MEMORANDUM FOR RECORD

SUBJECT: Visit to General Atomic Division of General Dynamics Corporation, LaJolla, California

1. The purpose of this visit to General Atomic Division was as follows:

a. To review the progress of the training program and to pin down, as closely as possible, the date for beginning the third phase of the training for the Armed Forces Radiobiology Research Institute cadre.

b. To obtain a commitment at the highest level as to the date the reactor would become operable.

c. To obtain a commitment as to the date the construction of the Institute would be complete excluding and including the Animal Clinical Research Facility.

d. To review with the personnel of General Atomic, Public Information Office and Graphic Arts our plan for the dedication of the Armed Forces Radiobiology Research Institute and to determine the degree of assistance we might expect from General Atomic Division. This would be coordinated with Mr. Hodges.

e. To work out with the Director of the Armed Forces Radiobiology Research Institute and selected members of his staff the requirements for furniture and collateral laboratory equipment. This would be coordinated with Mr. Tator.

DASAD 012

SUBJECT: Visit to General Atomic Division of General Dynamics Corporation,  
LaJolla, California

1. To write up a justification for additional **laboratory** space for the AEFPI and for the Animal Clinical Research Facility. This would be coordinated with the Director and Mr. Taton

2. Reference is above:

a. The training program is proceeding according to schedule. Twelve out of the thirteen who took the AEC examination for license passed. It is believed that Lt. Colonel Holland, USA, will pass on his second trial. He missed about one week of training because of illness in his family. The second phase of training, according to some, has not had the precision in planning that was demonstrated in the first phase. There is some element of truth in this, I believe, and the matter was aired with General Atomic and assurance received that correction, where needed, would be made.

b. Colonel Brennan was informed that General Booth thought it desirable and advantageous in many respects if the Director also obtained an operators license. Colonel Brennan feels that he can do so. The extra tutelage required for this will add little to the total cost of the training program and will be shared in by Lt. Colonel Holland.

c. Discussion with Colonel Brennan and Mr. Smith of General Atomic Division, revealed that with a little extra push it would be possible for all Officers of the initial cadre to obtain their operators license. This goal is beyond original expectation, but well worth the added effort. Because of circumstances beyond DASA's control the third phase of the training program will be stretched out and this will actually provide a good fighting chance for all members of the initial cadre to obtain their operators license. This is far above AEC requirements, but consistent with the usual maximum efforts of the Military.

d. The third phase of training will begin at the Armed Forces Radiobiology Research Institute in Bethesda, Maryland, on 27 November. This will allow for one week of travel for the cadre to return to Washington from LaJolla, California.

DASAND 312

SUBJECT: Visit to General Atomic Division of General Dynamics Corporation,  
LaJolla, California

3. Reference 1b above:

Mr. Rolander, Vice President of General Atomic Division, was interviewed as to the date the reactor would become operable because of rumors that came to my attention of recent difficulties encountered. It seems that one of the sub-contractors is on the verge of bankruptcy and is not delivering certain critical materials on time. It could be that a serious delay of six weeks to two months could occur. General Atomic Division and Area Public Works Office, Chesapeake, were both afraid of this particular contractor at the time the contract was negotiated but he was low bidder and under present government regulations nothing could be done. The situation will be clarified in the near future. It appears now that 1 December 1961 will be the earliest the reactor could become operable and it could be as late as January or February. This is disappointing but can be adjusted to in terms of the training program and the dedication if the delay actually occurs.

4. Reference 1c above:

It appears the main laboratory building and the reactor (if the delay occurs) will be complete about the end of January 1962 or early February. The Animal Clinical Research Facility will not be complete until late March or early April. The latter date for the Animal Facility was expected; the main laboratory is off schedule about one month. This could be caught up if the sub-contractor does not go broke and the materials are delivered on time.

5. Reference 1d above:

Mr. Hodges will make a separate report on his visit. Mr. Rolander has given assurance that General Atomic Division will give all assistance possible in the preparation of a Scientific Symposium preceding the dedication, and also preparation of a brochure and an exhibit regarding the Armed Forces Radiobiology Research Institute. Mr. Hodges seemed pleased with the material made available to him at General Atomic Division.

DAF AMT: -12

SUBJECT: Visit to General Atomic Division of General Dynamics Corporation,  
LaJolla, California

6. Reference to above:

The list of furniture and collateral laboratory equipment was provided and coordinated with Mr. Tator. Final completion of the list will be made in November when the Directorate returns to Washington.

7. Reference to above:

A justification for additional laboratory space for the Armed Forces Radiobiology Research Institute and for the Animal Clinical Research Facility was prepared with the Directorate and with Mr. Tator. It was turned to Mr. Eadie. Attached is a copy of the original.

8. Summary:

a. It appears now that there is a strong possibility that some delay could occur in the projected date of operability for the reactor and hence the date of the dedication. There is nothing that the Defense Atomic Support Agency, the Area Public Works Office, Chesapeake, or General Atomic Division can do about it if the sub-contractor goes broke. General Atomic Division is trying to devise some way of supporting him but apparently it is not easy.

b. Several dates are important now:

(1) The third phase of training for the Armed Forces Radiobiology Research Institute cadre will begin on 27 November. This will allow for one week travel from the West Coast and two weeks for getting settled in Washington. I found that many members of the cadre had arrived at LaJolla on short notice with no chance for leave or delay en-route and had, in fact, deserted their families with the task of working and house hunting. It appeared prudent to give them a short break on their arrival in the Washington area. This will give them an opportunity for leave and also the Thanksgiving Holiday. The fact that the reactor may not be operable also adds logic to this decision, although that is not essential for the first portion of the third phase.

PARAF 517

SUBJECT: Visit to General Atomic Division of General Dynamics Corporation  
LaJolla, California

(2) The Dedication Ceremony will be **delayed until late March or April**, dependent upon a decision by General Booth. If the criterion upon which the decision be made is completion of the main laboratory and operability of the reactor, then a date in February can probably be selected. If the criterion be completion of the entire Armed Forces Radiobiology Research Institute, including the Animal Clinical Research Facility, then late March or early April will be the probable date. Actually, aside from a slight loss of face (mostly mine) because of failure to meet a given target date, there are several good reasons why March or April would be a better date. Many present uncertainties would be removed and definite plans could be made, the weather would be good, President Kennedy might be more easily available, the buildings would be neat and tidy, and all members of the initial cadre would, by then, have obtained their AEC operators license. This would be quite a feat. I had been pushing for an early dedication, but had been plagued with complications surrounding Christmas and New Year Holidays, the prospect of bad weather and a busy January for the President. As a formal recommendation to General Booth, I hereby throw in the towel and propose early April as a new target planning date for the dedication. It is a better date for many reasons. It does not complicate the early operation of the Armed Forces Radiobiology Research Institute by the Director and his staff; it will allow for more precise and dependable planning.

Copy furnished

General Booth  
Captain Sharer  
Captain Campbell  
Mr. Tator  
Mr. Booth  
Colonel Brennan  
Major Vickers

ROBERT H. HILL  
Colonel, USAF  
Chief, Reactor Test Force



AREA PUBLIC WORKS OFFICE  
OFFICE OF SPECIAL INVESTIGATION  
WASHINGTON, D. C.

28 Sept 61

From: Area Public Works Officer, Chesapeake  
To: Chief, Defense Atomic Support Agency, Washington 25, D. C.  
Subj: Contract NHP-27757 - DASA Armed Forces Radiobiological Research  
Institute, National Naval Medical Center, Bethesda, Maryland  
Ref: (a) AFWD 1st NHP-27757(321) 10.1 JIMtop of 23 Mar 1961  
Encls (1) Status of Funds

1. By reference (a), the Area Public Works Officer, Chesapeake forwarded a tabulation of funds received and obligated for the subject project. It was noted in reference (a) that based on pending changes contemplated, additional funds would be required to complete the project.
2. A revised tabulation of the status of funds for the subject project is forwarded herewith as enclosure (1). This tabulation furnishes a list of funds received and an estimate of all change order requests, and other obligations which have been received to date. The estimates furnished are tentative and are not the final negotiated figures, however, they do appear to be reasonably accurate.
3. Accordingly, based on the tabulation of the status of funding forwarded herewith, additional funds in the amount of \$385,310 will be required to complete the subject project.

W. J. MOOREHEAD, JR.  
Deputy

Copy to:  
DASA (COL Holmes)  
ROICC, MATNAVMEDCEN

904-A3

STATUS OF FUNDS  
 DASA BIOMEDICAL RESEARCH REACTOR FACILITY  
 (ARMED FORCES RADIOBIOLOGICAL RESEARCH REACTOR FACILITY)  
 28 September 1961

I. REACTOR ACCELERATOR STRUCTURE

|   |                  |
|---|------------------|
| Funds by direct citation authorized   | \$2,314,000      |
| Less Administrative Overhead (6%)   | <u>138,840</u>   |
| Balance (Sub total)   | 2,175,160        |
| Basic Contract Price, Plus Change A<br>(Reactor Accelerator Portion of NBy-27757) | <u>2,113,660</u> |
| Balance (Sub total)   | 61,500           |

Pending Obligations and Change Orders

|   |                  |                   |
|---|------------------|-------------------|
| Additional Rock Excavation  | 28,500           |                   |
| Change vestibule and door and additional copper water lines                             | 14,500           | -                 |
| Enclosing Reactor control room  | 25,000           |                   |
| Modulator Room and Utilities changed design. Costs include engineering and construction | 45,000           |                   |
| Additional cable trenches, conduits. Engineering and Construction                       | 12,000           |                   |
| Health Physics Equipment  | <u>200,000</u>   |                   |
| Additional Pneumatic tube system  | 30,000           |                   |
| Closed circuit television system  | 50,000           |                   |
| Estimated additional minor construction changes   | <u>20,000</u>    |                   |
|   | <u>\$425,000</u> |                   |
| Sub total   |                  | <u>425,000</u>    |
| Plus administrative overhead (6%)   |                  | <u>-363,500</u>   |
| Additional Funds Required (Reactor Building)  |                  | <u>21,810</u>     |
|   |                  | <u>\$ 385,310</u> |

*Water lines in NC 14 estimated \$500. Less 14.000 for main vestibule alterations to meet for public entrance.*

*Started out at \$50,000 Estimated \$10,000*

*Revised  
of Reactor  
Equipment*

II. LABORATORY AND ANIMAL HOUSE

|  |                    |
|--|--------------------|
| Funds on reimbursable basis authorized                       | 1,891,000          |
| Less administrative Overhead (6%)                            | <u>113,460</u>     |
| Balance (Sub total)  | 1,777,540          |
| Basic contract (Laboratory Building<br>Portion of NBy-27757) | <u>363,043</u>     |
| Balance (Sub total)  | <u>\$1,414,497</u> |

|  |                |                  |
|--|----------------|------------------|
| Balance (Sub total)  |                | \$1,414,497      |
| Pending obligations and Change Orders  |                |                  |
| Additional rock excavation   | \$ 28,500      |                  |
| Additional foundation costs<br>(5 small grade beams)   | 1,000          |                  |
| Additional utilities for<br>animal house addition  | 8,500          |                  |
| Changes in telephone conduit<br>arrangement  | 4,000          |                  |
| Animal House Addition  | 167,000        |                  |
| Collateral Equipment (DASA<br>Estimate) (to be procured by<br>DASA)                                  | 300,000        |                  |
| Linear Accelerator (DASA Esti-<br>mate) (to be purchased and in-<br>stalled under separate contract) | <u>900,000</u> |                  |
|  | \$1,409,003    | <u>1,409,003</u> |
| BALANCE  |                | \$ 5,494         |

Encl (1)

DA.ATP/926.1

10AL

Subject: Transfer of funds for FY 62 nuclear weapons effects research (NWE) program

To: Commanding General  
Medical Research and Development Command  
Department of the Army

1. Reference is made to the following:

a. UNCLASSIFIED letter, DA.ATP/926.1, this headquarters, subject as above, 27 July 1961.

b. Telephone conversations between LtCol Pilchen and Mrs. Lamoure of your office and Major Sterling and Mr. D. Martin of DA's Comptroller.

2. Reference is transmitted funds in the amount of \$1,000,000 to your command for implementation of FY 62 Nuclear weapons effects research assigned to the U.S. Army Medical Research and Development Command for management. This headquarters was subsequently notified by reference 1b that a portion of the research effort identified as "IS Number 03.07k, "Total Body Radiation" was to be performed at the U.S. Army Medical Research Laboratory (AMRL) located at Ft. Knox, Kentucky.

3. In accordance with an agreement reached during conversations listed as reference 1b, DA's Form 2-62 to 64-67 will be issued for \$25,000, and DA's Form 5-62 for \$100,000 will be issued to the U.S. Army Medical Research Laboratory. The tabulation in paragraph 3 of reference 1a should now read:

COPY FOR DASHOFF FILE

DASA 7/920.1

SUBJECT: Transfer of Funds for FY 62 Nuclear Weapons Effects Research  
(NWER) Program

| <u>Number</u> | <u>Agency</u> | <u>Amount</u> |
|---------------|---------------|---------------|
| DA - PG 2-62  | AMRL          | \$ 250,000    |
| DA - PG 3-62  | Landstuhl APC | 30,000        |
| DA - PG 5-62  | AMRL          | 100,000       |
| Alst M-5132   | AMRL          | 650,000       |

Copy furnished  
Chief, N&A ATTN: Atomic Div.  
WRAMC  
AMRL

J. ARROWOOD  
Colonel, USAF  
The Adjutant General

M/R: The letter transferring FY 62 NWER funds to the U.S. Army Medical Research and Development Command was signed out on 27 July 1961. Subsequently, U.S. Army Medical R&D Command informed us that \$100,000 would go to AMRL at Fort Knox. DASA Comptroller agreed about the best arrangement administratively would be to issue a Project Order for \$100,000 to AMRL. This letter implements that agreement. No new fund transfer is involved here.

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May 12, 1961  
NUMBER 5154.16

AdminAsst., S/D

## Department of Defense Directive

**SUBJECT**      **Armed Forces Radiobiology Research Institute**

### I.      INTRODUCTION

- A. Pursuant to the authority vested in the Secretary of Defense and the provisions of the National Security Act of 1947, as amended, there is hereby established within the Department of Defense a Radiobiology Research Institute (hereinafter called "the Institute") with responsibilities, functions, and authority as set forth below. The Institute shall be a joint agency of the three military departments, subject to the authority, direction and control of the Secretary of Defense and under the management control of the Secretary of the Navy.
- B. Subject to the authority, direction and control of the Secretary of Defense, the Chief, Defense Atomic Support Agency, shall sponsor the development and establishment of the Institute and coordinate the research program.
- C. The Institute shall serve primarily as radiobiology research laboratories for the Department of Defense. The National Institutes of Health, Atomic Energy Commission, and other federal and civilian institutions may utilize the laboratories as agreed upon by the Secretary of Defense or his designee.

### II.      MISSION

The mission of the Institute shall be to conduct scientific research in the field of radiobiology and related matters that are essential to the medical support of the United States military services, to national welfare, and to the well-being of mankind.

*Copy in  
DoD Directive  
note book*

*904-A3*

### III. ORGANIZATION

- A. The Institute shall consist of a Board of Governors, a Director, two Deputy Directors, and a supporting staff as authorized.
- B. The Board of Governors shall consist of the Chief of the Defense Atomic Support Agency, who will be the Chairman, and the Surgeons General of the Army, Navy and Air Force, or their designees.
- C. The Director, National Institutes of Health; the Director, Division of Biology and Medicine, Atomic Energy Commission, or their designees, may participate in meetings of the Board of Governors when matters of interest to them are being considered.
- D. The Director of the Institute shall be a medical corps officer of the Army, Navy or Air Force, and normally shall be alternated among the Services in accordance with military requirements and consistent with applicable Department of Defense Directives. The Director shall be appointed by the Secretary of the Navy, subject to approval by the Secretary of Defense, based on nominations received from the Board of Governors. His tour of duty shall be consistent with professional and military requirements and with applicable Department of Defense Directives and Instructions.
- E. The two Deputy Directors shall be military officers from each of the military services not represented by the Director, selected on the basis of individual Service requirements. The Deputy Directors shall be nominated and appointed in the same manner as the Director.
- F. The staff shall be constituted of such military and civilian personnel as may be required in accordance with approved authorizations and applicable Department of Defense Directives.
- G. The Board of Governors may establish a Panel of Consultants to provide advice and assistance to the Director, as required, on scientific research problems or projects in the field of radiobiology and related matters. The members of the Panel will be recommended by the Board of Governors and appointed by the Secretary of the Navy in accordance with applicable Department of Defense Directives and Instructions.
- H. The staff shall be selected and utilized with the specific realization that there is a compelling need for continuous and uninterrupted employment of specially educated, trained, and experienced personnel.

- C. The facilities of the Institute may be made available to qualified scientific personnel for study and research when considered appropriate and practicable by the Director.
- D. Direct communication and coordination between the Director of the Institute and activities of the military departments, the Office of the Secretary of Defense, other Department of Defense agencies, and other federal agencies are authorized on matters of mutual interest. This arrangement, however, shall not be so construed or so utilized as to circumvent the proper command channels for matters relating to the direction and management of the Institute.

IV. EFFECTIVE DATE

This directive is effective upon publication.

*Roswell Gelpatue*

Deputy Secretary of Defense

IV. FUNCTIONS

- A. Under Department of Defense policies, the Institute shall:
1. Provide facilities for research on the biological effects of ionizing radiation.
  2. Conduct advanced training and educational programs.
  3. Provide facilities for radioisotope production.
  4. Perform such other functions as may be assigned.
- B. Under Department of Defense policies governing medical and allied activities, the Board of Governors shall be responsible for the policy direction of the Institute on professional and related matters. Such matters which cannot be readily resolved by the Board of Governors shall be referred promptly to the Secretary of Defense, or his designee, by the Chairman of the Board.
- C. Under the policy direction of the Board of Governors for professional and related matters, and the management control of the Secretary of the Navy, the Director of the Institute shall be responsible for its organization and effective operation and the administration and supervision of assigned personnel.

V. ADMINISTRATION

- A. The Secretary of the Navy, as management agent, shall be responsible for the determination and provision, within the limits and resources available to the Department of the Navy for such purposes, of adequate administrative support for the operation of the Institute. The term "administrative support" as used in this directive is defined to include budgeting, funding, fiscal control, manpower control and utilization, personnel administration, security administration, space, facilities, supplies, and other administrative provisions and services. The Secretary of the Navy, as management agent, may redelegate his authority in connection with these responsibilities within the command structure of the Department of the Navy.
- B. The Assistant Secretary of Defense (Comptroller) shall be responsible for arranging the financing of the Institute and its activities.

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DASAMD 942.2

10 May 1961

MEMORANDUM THRU: DEPUTY CHIEF OF STAFF, WEAPONS EFFECTS AND TESTS

FOR: CHIEF, HEADQUARTERS, DASA

SUBJECT: Review of Armed Forces Radiobiology Research Institute  
Funding Status

Attached are five memoranda and one subject letter which summarize and bring up to date the funding status of the Armed Forces Radiobiology Research Institute. Specific recommendations for required action will be made at a later date.

1 Incl  
M/R by CDR Chapman  
dtd 5 May 1961  
w/5 Incls

ROBERT H. HOLMES  
Colonel MC USA  
Chief, Reactor Task Force

Copies Furnished  
DASAIG  
DASACT

942.23

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DASAMD 942.2

8 May 1961

MEMORANDUM FOR THE RECORD

SUBJECT: Estimated Costs of Collateral Equipment and Change Orders  
for the Armed Forces Radiobiology Research Institute

1. Reference is made to the following:

a. Memorandum for the Record by Commander Chapman, dated 20 April 1961, subject: "Conference at the AFWO,C to Review All AFRI Change Orders Thus Far Submitted."

b. Memorandum for the Record by Captain Campbell, dated 25 April 1961, subject: "Financing of Armed Forces Radiobiology Research Institute Installations."

c. Memorandum for the Record by CDR Chapman, dated 25 April 1961, subject: "Funding of AFRI Installations."

d. Memorandum by Colonel Holmes THRU DCS/WE&T For DASA Comptroller, dated 26 April 1961, subject: "Information Concerning the Estimated Costs of Change Orders and Collateral Equipment for the AFRI."

e. Letter to the AFWO,C, dated 27 April 1961, subject: "AFRI," AG Control Number 101629.

2. The estimates provided below are based on the best available information from General Atomic and the Area Public Works Officer, Chesapeake. Captain Campbell requested these estimates for a review of the funding requirements for the AFRI.

A. ESTIMATED COSTS OF COLLATERAL EQUIPMENT FOR THE AFRI

| <u>Item</u>                           | <u>Estimated Cost</u> |
|---------------------------------------|-----------------------|
| a. Reactor Control Room . . . . .     | \$ 12,000.00          |
| b. Closed Circuit TV System . . . . . | 80,000.00             |

DASAND 942.2

**SUBJECT: Estimated Costs of Collateral Equipment and Change Orders  
for the Armed Forces Radiobiology Research Institute**

|   |                   |
|---|-------------------|
| c. Health Physics Equipment<br>(To be provided by DASA) . . . . .   | \$ 20,000.00      |
| d. Health Physics Equipment<br>(To be provided by General Atomic . . . .  | 100,000.00        |
| e. Mechanical Maintenance Shop Equipment . .  | 60,000.00         |
| f. D <sub>2</sub> O (Annual Rental)<br>4% per annum interest on \$336,000.00<br>(12000 pounds D <sub>2</sub> O @ \$28 per pound = \$13,440.00<br><br>Twenty-Four stainless steel drums<br>@ \$100.00 each . . . . . = 2,400.00<br><br>Transportation and insurance = no estimate<br>available<br><br>Total for Item f . . . . . | 20,000.00         |
| g. Animal House . . . . .   | <u>150,000.00</u> |
| SUBTOTAL . . . . .  | \$412,000.00      |

**B. ESTIMATED COSTS OF CHANGE ORDERS FOR THE AFRI**

|  |                 |
|--|-----------------|
| h. Vestibule (Access Door on Reactor<br>Control Floor) . . . . .   | \$ 4,000.00     |
| i. Telephone Equipment . . . . .   | 4,000.00        |
| j. LINAC Change Orders . . . . .   | 13,000.00       |
| k. Pneumatic Tube System For Isotopes . . .  | 30,000.00       |
| (No estimate is available for the<br>additional terminal for this system<br>requested in paragraph 3 of reference e) |                 |
| l. Two 4" Copper Pipes for LINAC . . . . .   | 500.00          |
| m. Modulator Room . . . . .  | <u>5,000.00</u> |
| SUBTOTAL . . . . .   | \$ 56,500.00    |

**DARAMD 942.2**

**SUBJECT: Estimated Costs of Collateral Equipment and Change Orders  
for the Armed Forces Radiobiology Research Institute**

|  |                  |
|--|------------------|
| A. Estimated Costs of Collateral Equipment | \$418,000.00     |
| B. Estimated Costs of Change Orders        | <u>55,500.00</u> |
| TOTAL . . . . .                            | \$473,500.00     |

3. The total for the list of requirements in Captain Campbell's memorandum was \$395,500.00. The total for paragraph 2 above differs from that in Captain Campbell's memorandum (reference b) by an increase of \$73,000.00. This difference is due to the following factors:

|   |                  |
|---|------------------|
| a. Estimates for items k, l, and j of paragraph 2 above were not previously available. The total for these items is . . . . . | \$21,000.00      |
| b. Item a has been increased by . . . . .   | 2,000.00         |
| c. Item d has been increased by . . . . .   | <u>50,000.00</u> |
|   | \$73,000.00      |

4. In the early planning stages of the AFRI estimates were made for funds required to furnish all laboratories. Estimates for completely equipping each room and laboratory were made according to the recommendations and advice of specialists in the various scientific disciplines. This action was necessary in order to properly define the funding requirements for the total AFRI project. Even though these equipment lists are rather complete and have been in existence for some time, it is not possible to predict in advance the exact equipment a research investigator may desire or require. Consequently, the general philosophy employed throughout the AFRI planning has been to allow the research projects eventually developed to dictate the research equipment requirements. In addition, the amount of funds available in the total AFRI projects for laboratory equipment will not be known until bids or prices have been accepted for change orders or collateral equipment thus far submitted.

**WILLIAM H. CHAFFIN**  
CDR MSC USN  
Medical Division

20 April 1961

**MEMORANDUM FOR THE RECORD**

**SUBJECT: Conference at the APWO,C to Review All AFERI Change Orders Thus Far Submitted**

1. A meeting was held this date at 0830 at the Area Public Works Office, Chesapeake, Building 57, U. S. Naval Weapons Plant.

2. Those in attendance were:

General Atomic

Mr. Owen Smith

Holmes and Narver

Mr. E. E. Dunn

APWO,C

Mr. Joe White

BOINC, NUSC

Lt. Ed Cottingham

Headquarters, DASA

Colonel Robert H. Holmes, MC, USA

CDR William H. Chapman, NMC, USN

Mr. E. L. Taton

3. Mr. Owen Smith of General Atomic listed the problems to be discussed. These were:

- a. Television specifications
- b. Pneumatic systems for conveying radioisotopes from the linear accelerator cave to the Hot Cell.
- c. Reactor Control Room
- d. Water lines into LINAC Cave
- e. Modulator Room Changes
- f. Back filling → Animal House area

*Handwritten notes:*  
24 Apr 1961

DASAND 942.2

SUBJECT: Conference at the AFWO,C to Review All AFERI Change Orders Thus Far Submitted

4. Comments and decisions on the above problems were as follows:

a. Television specifications:

The specifications for the AFERI closed circuit television system were forwarded to the AFWO,C on 13 April 1961 (DASA Control No. 101074). This system was designed to incorporate the very basic elements of a closed circuit system which would insure that all necessary TV cables and conduits were properly positioned during the construction of the AFERI, at the same time providing for the addition of such large screen projectors, demonstration or recording equipment as may be considered to be necessary at a later date.

Throughout the planning of the AFERI the capability of superimposing the pulse of the linear accelerator on the reactor pulse has been considered as a unique and prime requirement. The configuration and arrangement of the AFERI radiation source instrumentation and the inherent shielding factors of the building provide for this capability, yet there is no provision for this (capability) in the present AFERI construction plans (i.e., there is no central control mechanism which will allow for the reactor and the linear accelerator to be simultaneously pulsed in a manner to allow their combined radiations to be utilized in a common exposure area). The reason that a central control console is not being provided is due to the fact that the ABC would in all probability not sanction this capability during the initial operating phases of the AFERI.

The AFERI TV system specifications submitted to the AFWO,C on 13 April 1961 (AG No. 101074) were based on the assumption that there would be some sort of central control to allow for simultaneous pulsing of the LINAC and reactor. This TV system provided for 5 cameras to be located in various parts of the Institute with 5 monitors to be mounted in a control unit adjacent to this central control. Since the LINAC and reactor are to be controlled

DASAND 942.2

**SUBJECT: Conference at the AFWO,C to Review All AFERI Change Orders Thus Far Submitted**

individually (from separate areas), it will be necessary to add an additional set of TV monitors to the present system. It was agreed that the present proposed TV system should be modified accordingly.

**b. Pneumatic System For Isotopes:**

Mr. Owen Smith of General Atomic stated the recent requirement submitted by LCDR Duckworth and LCDR Sharp, i.e., that of adding a terminal to the pneumatic system for isotopes in the LINAC Exposure Room. Action: Need BASA request to AFWO,C.

**c. Reactor Control Room:**

This requirement was submitted to Chief BASA in a letter from LCDR Sharp, dated 3 April 1961 (Tab 483, Book XI). Mr. Taton suggested we write or contact Mr. Charles Edwards of the AEC and determine whether or not a reactor control room would be absolutely necessary in obtaining an AEC operators license. Colonel Holmes made the comment: "If it offers an additional safety factor, perhaps we should do it". Mr. Owen Smith of General Atomic stated that according to preliminary design work he had done with LCDR Sharp, the cost of such a room would be approximately \$10,000.00. Mr. Smith pointed out that modifications to the air conditioning system would be the most difficult part of this installation and that, if possible, he would like to have a decision regarding this room by 26 April 1961.

**d. Water Lines Into LINAC Cave:**

Mr. Taton stated that LCDR Duckworth was unaware that two 3" lines had been omitted from the present plans. He further stated that LCDR Duckworth's requirement for two 6" copper lines was based largely on the fact that this diameter pipe came from the cooling tower, but, as yet no prospective LINAC supplier had stated this pipe size as a requirement. Action: Mr. Taton will write the AFWO,C this date requesting two 4" copper pipes (not tubing) to extend from the LINAC cave to the outside utility pad.

DASAND 942.2

SUBJECT: Conference at the APWO,C to Review All AFERI Change Orders Thus Far Submitted

e. Modulator Room Changes:

Mr. Taton expressed rather grave concern regarding the Modulator Room, in that specific requirements had been submitted to Holmes and Narver (thru the APWO,C) and yet this firm has made considerable changes in the design and lay-out of this room without consulting representatives of the APWO,C or DASA. Adherence to the plans for this room, as submitted, is vitally important, since the specifications for the linear accelerator to be procured are dependent upon the specified arrangement of supporting equipment in this room.

Mr. Taton stated that he would be in the offices of Holmes and Narver on 27 April 1961. He suggested that orders be requested for LCDR Duckworth to proceed from San Francisco and attend this meeting with him. Mr. Taton further stated that he would make every effort to determine why changes had been made in the Modulator Room requirements and to rectify these changes if possible. Mr. Taton was particularly interested as to why plans had been made to locate the required fans within the Modulator Room rather than in a penthouse on the roof as originally specified.

Mr. Owen Smith requested a letter from the APWO,C to reaffirm the desired location of conduits and the arrangement of equipment in the Modulator Room.

4. Back-Filling in Animal House Area:

Agreement was reached that General Atomic would not back-fill in the proposed Animal House area, since this would necessitate re-excavating this fill for construction of the Animal House.

5. The next problem discussed was that of re-locating the "vestibule" (access door to the Reactor Control Room area). This door was originally a fire door and caused the AEC considerable concern when the issuance of a construction permit was under consideration. In fact, the AEC construction permit was issued with certain provisions, the satisfactory sealing and control of this access door being one of the contingencies.

**DASAND 942.2**

**SUBJECT: Conference at the AFWO,C to Review All AFERI Change Orders Thus Far Submitted**

Lt. Cottingham has a memorandum for the record, reporting the results of a conference with the AEC during which a satisfactory location and design for this door were reached. A copy of this memorandum will be provided CDR Chapman who will submit a letter through the AFWO,C to General Atomic to fulfill the change order requirement for subject door.

6. Mr. Owen Smith called attention to the fact that an agreement had been reached during a previous conference for General Atomic to procure and install permanently positioned items of the AEC-required health physics equipment. LCDR Sharp had called attention to three items that had been omitted from this list (Tab 482, Book XI). These items were:

- a. A multichannel area monitor
- b. A stack gas monitor
- c. External air and area monitors

A letter to General Atomic (through the AFWO,C) is necessary to include these items in the list of General Atomic installed equipment.

7. It was agreed that the AFERI contractor should not provide cable trays in the LINAC maze, nor should bolts be positioned for the installation of a hoist in the LINAC Cave. Mr. E. E. Dunn of Holmes and Narver stated that "block-outs" would be provided above doors in the LINAC maze and save for the future installation of cable trays. (See Tab 417, Book X).

8. The next question discussed was that of how costs were determined for the AFERI change orders. Mr. Joe White stated that he felt it rather unfortunate that DASA had quoted Mr. Owen Smith's statement to the effect that General Atomic would provide the required AFERI health physics equipment for cost plus 6% and a nominal fee. Mr. Taton had included this remark as a statement of fact and expressed some trepidation that General Atomic's 149% overhead could still increase the cost of these items beyond reason. Mr. Joe White stated that all costs for change orders would be reviewed and

**DASAND 942.2**

**SUBJECT: Conference at the APWO,C to Review All AFERI Change Orders Thus Far Submitted**

evaluated by the Negotiation Change Order Board at the National Naval Medical Center and that DASA representatives would then be given an opportunity to make decisions regarding these items.

9. CDR Chapman summarized the list of letters required to effect the required AFERI change orders. These were:

- a. Letter regarding two 4" copper pipes
- b. Decision regarding the Reactor Control Room
- c. Arrangement of Modulator Room Equipment
- d. Revised TV specifications
- e. Terminal for pneumatic tube system in the LINAC Exposure Room
- f. Letter to omit installation of bolts for LINAC hoist and cable trays
- g. Include area multichannel monitor and stack gas monitor to General Atomic list

**WILLIAM H. CHAPMAN  
CDR   MPC    USN  
Medical Division**

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DSAAWD 942.2

28 April 1961

MEMORANDUM THRU: DEPUTY CHIEF OF STAFF, WEAPONS EFFECTS AND TESTS

FOR: CONTROLLER

SUBJECT: Information Concerning the Estimated Costs of Change Orders and Collateral Equipment for the Armed Forces Radiobiology Research Institute\*

|                                    |                    |
|------------------------------------|--------------------|
| 1. Vestibule . . . . .             | \$4,000.00         |
| 2. Telephone Equipment . . . . .   | 4,000.00           |
| 3. LINAC Change Orders . . . . .   | 13,000.00          |
| 4. Reactor Control Room . . . . .  | 12,000.00 (AFWC,C) |
|                                    | 15,000.00 (G. A.)  |
| 5. TV and Health Physics . . . . . | <u>150,000.00</u>  |
| TOTAL                              | \$183,000.00       |

\* (Obtained from Mr. Joe White by telephone, Tuesday Evening, 25 April 1961) Mr. White requested that these estimates be considered as coming from the Area Public Works Officer, Chesapeake, rather than General Atomic. Telephone call to be confirmed by letter.

ROBERT H. HOLMES  
Colonel MC USA  
Chief, Reactor Task Force

*reference ch*



102629

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
WASHINGTON 25, D.C.

ADDRESS REPLY TO:  
THE CHIEF, DEFENSE ATOMIC  
SUPPORT AGENCY

DASALG 600.1

27 APR 1961

SUBJECT: Armed Forces Radiobiology Research Institute

TO: Area Public Works Officer, Chesapeake  
Building 57  
U. S. Naval Weapons Plant  
Washington 25, D. C.

1. Reference is made to the following:

a. Letter DASALG 600.1, Headquarters, DASA, 23 February 1961, subject as above.

b. Letter DASALG 600.1, Headquarters, DASA, 23 February 1961, subject as above.

c. Letter NBY-27757(212) 10.1 JIW:rmf, APWO, Chesapeake, 27 February 1961, subject: "Contract NBY-27757, DASA Biomedical Research Reactor Facility, National Naval Medical Center, Bethesda, Maryland," to the General Atomic Corporation.

d. Letter DASALG 600.1, Headquarters, DASA, 11 April 1961, subject as above.

e. Letter DASAPD 942.2, Headquarters, DASA, 13 April 1961, subject: "Contract NBY-27757, Armed Forces Radiobiology Research Institute."

f. Conference among representatives of General Atomic, Holmes and Narver, this headquarters and your office on 20 April 1961.

2. By reference 1a you were requested to obtain proposals from the contractor for certain additional health physics equipment for the subject project. By the same letter you were advised that Chief, DASA would purchase and install certain items of this equipment. During referenced conference it developed that there were certain other items which should be added to the list to be procured and installed by the Area Public Works Officer, Chesapeake. These items are:

*reference 1a*

DASALB 600.1

SUBJECT: Armed Forces Radiobiology Research Institute

a. A multi-channel area monitoring system (included as item 1d in paragraph 4 of reference 1a).

b. A laboratory stack gas monitor.

c. External air and area monitors.

It is requested that a proposal be obtained for the installation of these items.

3. In paragraph 7a of reference 1b the requirement was submitted for a pneumatic tube system between the LINAC CA E and the Hot Cell to permit rapid handling of accelerator-produced radioisotope targets. A requirement now exists for an additional terminal in this system to be provided in the LINAC Exposure Room; this terminal to be located on the inside west wall of the LINAC Exposure Room at a point 40 inches above the floor and vertically beneath the point where this tube system enters the west wall of the LINAC Exposure Room. It is requested that this additional terminal be added to the previous request.

4. It is requested that items discussed in paragraphs a, f and g of reference 1c be cancelled as per agreement reached during conference, reference 1f.

5. By reference 1c it was requested that your office include in the linear accelerator specifications a provision that if coolant water was required by the manufacturer of the linear accelerator, it would be his responsibility to install the coolant water lines through one of the spare wave guide tubes. During the referenced conference it was determined that the wave guide tube may be more urgently required for other use. Therefore, in lieu of providing coolant water to the linear accelerator equipment in the manner outlined in reference 1c, it is requested that two 1-inch copper pipes (not tubing) be installed 18 inches apart horizontally and three feet down from the ceiling with the first pipe two feet from the east end wall; these pipes to be capped inside the LINAC CA E wall and be connected to the coolant water supply and return lines at a convenient location immediately adjacent to the cooling tower pad. Valves between these lines and the main supply lines will be required.

6. During the above-referenced conference representatives of the General Atomic Corporation furnished certain information clarifying the method by which the AFB requires control of the reactor itself. This will require certain minor revisions in the specifications for the

DASALO 600.1

SUBJECT: Armed Forces Radiobiology Research Institute

closed-circuit television system furnished by reference 1a. Appropriate revisions will be furnished your office not later than 28 April 1961.

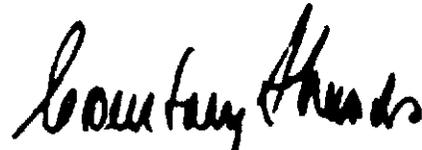
7. Attached herewith are copies of a schematic drawing previously furnished your office showing the required arrangement of utilities in the Modulator Room. It is requested that the detailed plans be carefully reviewed and, if variations are found, corrections be made to conform to plans as submitted.

8. The requirement for a Reactor Control Room was discussed during referenced conference. The decision has been made to add this item to the list of AFRRRI change orders. This decision was based on the fact that the AEC considers this to be an important safety factor in controlling the AFRRRI reactor. It is requested that the appropriate General Atomic representative work with the DASA representative at General Atomic (LCDR Sharp) to develop plans and specifications for subject room.

9. It is requested that at the earliest practicable date an estimate of cost for budgeting purposes be furnished for all requested additional items. It is understood that prior to making an award for these items, this headquarters will be advised of the amounts involved.

FOR THE CHIEF

- 2 Incl (quad)  
1. Sketch No. 1  
2. Sketch No. 2

  
COURTNEY SHANDS  
Rear Admiral, USN  
Deputy Chief

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DAAGU 942.2

28 April 1961

MEMORANDUM TO: DEPUTY CHIEF OF STAFF, WEAPONS EFFECTS AND TESTS

FOR: COMPTROLLER

SUBJECT: Information Concerning the Estimated Costs of Change Orders and Collateral Equipment for the Armed Forces Radiobiology Research Institute\*

|                                    |   |
|------------------------------------|---|
| 1. Vestibule . . . . .             | \$4,000.00                              |
| 2. Telephone Equipment . . . . .   | 4,000.00                                |
| 3. LINAC Change Orders . . . . .   | 13,000.00                               |
| 4. Reactor Control Room . . . . .  | 12,000.00 (ATFO,C)<br>15,000.00 (G. A.) |
| 5. TV and Health Physics . . . . . | <u>130,000.00</u>                       |
| TOTAL                              | \$1 3,000.00                            |

\* (Obtained from Mr. Joe White by telephone, Tuesday Evening, 25 April 1961) Mr. White requested that these estimates be considered as coming from the Area Public Works Officer, Chesapeake, rather than General Atomic. Telephone call to be confirmed by letter.

ROBERT H. BOLLES  
Colonel MC USA  
Chief, Reactor Task Force

*reference 24*

101629



DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
WASHINGTON 25, D.C.

ADDRESS REPLY TO:  
THE CHIEF, DEFENSE ATOMIC  
SUPPORT AGENCY

DASALG 600.1

27 APR 1961

SUBJECT: Armed Forces Radiobiology Research Institute

TO: Area Public Works Officer, Chesapeake  
Building 57  
U. S. Naval Weapons Plant  
Washington 25, D. C.

1. Reference is made to the following:

a. Letter DASALG 600.1, Headquarters, DASA, 23 February 1961, subject as above.

b. Letter DASALG 600.1, Headquarters, DASA, 23 February 1961, subject as above.

c. Letter NBy-27757(212) 10.1 JIW:rmj, APWO, Chesapeake, 27 February 1961, subject: "Contract NBy-27757, DASA Biomedical Research Reactor Facility, National Naval Medical Center, Bethesda, Maryland," to the General Atomic Corporation.

d. Letter DASALG 600.1, Headquarters, DASA, 11 April 1961, subject as above.

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f. Conference among representatives of General Atomic, Holmes and Narver, this headquarters and your office on 20 April 1961.

2. By reference 1a you were requested to obtain proposals from the contractor for certain additional health physics equipment for the subject project. By the same letter you were advised that Chief, DASA would purchase and install certain items of this equipment. During referenced conference it developed that there were certain other items which should be added to the list to be procured and installed by the Area Public Works Officer, Chesapeake. These items are:

*reference 1a*

DASALG 600.1

SUBJECT: Armed Forces Radiobiology Research Institute

a. A multichannel area monitoring system (included as item 1d in paragraph 4 of reference 1a).

b. A laboratory stack gas monitor.

c. External air and area monitors.

It is requested that a proposal be obtained for the installation of these items.

3. In paragraph 7a of reference 1b the requirement was submitted for a pneumatic tube system between the LINAC CAE and the Hot Cell to permit rapid handling of accelerator-produced radioisotope targets. A requirement now exists for an additional terminal in this system to be provided in the LINAC Exposure Room; this terminal to be located on the inside west wall of the LINAC Exposure Room at a point 60 inches above the floor and vertically beneath the point where this tube system enters the west wall of the LINAC Exposure Room. It is requested that this additional terminal be added to the previous request.

4. It is requested that items discussed in paragraphs a, f and g of reference 1c be cancelled as per agreement reached during conference, reference 1f.

5. By reference 1c it was requested that your office include in the linear accelerator specifications a provision that if coolant water was required by the manufacturer of the linear accelerator, it would be his responsibility to install the coolant water lines through one of the spare wave guide tubes. During the referenced conference it was determined that the wave guide tube may be more urgently required for other use. Therefore, in lieu of providing coolant water to the linear accelerator equipment in the manner outlined in reference 1c, it is requested that two 1-inch copper pipes (not tubing) be installed 18 inches apart horizontally and three feet down from the ceiling with the first pipe two feet from the east end wall; these pipes to be capped inside the LINAC CAE wall and be connected to the coolant water supply and return lines at a convenient location immediately adjacent to the cooling tower pad. Valves between these lines and the main supply lines will be required.

6. During the above-referenced conference representatives of the General Atomic Corporation furnished certain information clarifying the method by which the AEF requires control of the reactor itself. This will require certain minor revisions in the specifications for the

DASALO 600.1

SUBJECT: Armed Forces Radiobiology Research Institute

closed-circuit television system furnished by reference 1a. Appropriate revisions will be furnished your office not later than 28 April 1961.

7. Attached herewith are copies of a schematic drawing previously furnished your office showing the required arrangement of utilities in the Moderator Room. It is requested that the detailed plans be carefully reviewed and, if variations are found, corrections be made to conform to plans as submitted.

8. The requirement for a Reactor Control Room was discussed during referenced conference. The decision has been made to add this item to the list of AFRRRI change orders. This decision was based on the fact that the AEC considers this to be an important safety factor in controlling the AFRRRI reactor. It is requested that the appropriate General Atomic representative work with the DASA representative at General Atomic (LCDR Sharp) to develop plans and specifications for subject room.

9. It is requested that at the earliest practicable date an estimate of cost for budgeting purposes be furnished for all requested additional items. It is understood that prior to making an award for these items, this headquarters will be advised of the amounts involved.

FOR THE CHIEF

2 Incl (quad)

1. Sketch No. 1
2. Sketch No. 2

*Courtesy Shands*  
COURTESY SHANDS  
Rear Admiral, USN  
Deputy Chief

25 April 1961

**MEMORANDUM FOR THE RECORD**

**SUBJECT: Financing of Armed Forces Radiation Research Institute Installations**

1. Discussion was held on financial problems of the Bethesda Project on 25 April with the following in attendance:

Colonel Galentine, DCS/WET  
Colonel Holmes, Medical Division  
Commander Chapman, Medical Division  
Mr. Taton, Logistics  
Lt. Colonel Clinton, TP&P  
Captain Campbell, Comptroller

2. Our original resources for the Bethesda Project amounted to \$4,786,000 - \$2,800,000 from FY 60 RDT&E and \$1,986,000 from FY 61 Military Construction funds. The RDT&E funds included \$400,000 for FY 61 operations until the Navy could pick it up in FY 62.

3. As of the present time construction funds for the laboratory appear to be sufficient, with a contingency amount of \$82,000 remaining. This is after taking care of a \$59,000 over-run on foundation excavation. In the reactor area there remains \$88,000 for collateral equipment and \$32,000 for contingencies. The total of these assets is therefore \$200,000, in round figures.

4. At the present time there are design changes as a result of improvements and restudies as the planning has gone forward, which add up in round figures to \$400,000. This list of requirements is attached. We should also plan for at least \$60,000 for contingencies in both the reactor and laboratory construction. The requirement therefore is \$460,000, against which we have the amount of \$200,000. This is exclusive of any consideration of the \$400,000 initially planned for FY 61 operation of the project (referred to in the following paragraph).

5. The FY 62 'A' budget provided for \$600,000 for "Nuclear Reactor Biological Studies." This was reduced to \$44,000 in the budget review. However, the approximate original amount remains a valid requirement in the VEB approved program. The \$400,000 that was provided for the first year's operation of the reactor project (FY 61) was therefore placed in the Medical Aspects of Ionizing Radiation account to be carried forward to FY 62 along with certain other reprogrammed funds amounting to \$160,000.

*reference to*

**BARACT 300.9 X 904**

**SUBJECT: Financing of Armed Forces Radiation Research Institute  
Installations**

FY 62 funds remaining plus the carryover will amount approximately to the \$600,000 that the WER program requires.

6. It is known that Navy has budgeted for \$400,000 for FY 62 operation of the reactor project, however details are lacking. We presume that fitting out, such as laboratory instruments, furnishings and consumable is covered. Navy should be amenable to discussion of support from these funds of the deficiency described in paragraph 4 above. To the extent that a deficiency remains after this, the only source is the money originally budgeted for FY 61 operation of the reactor, at the expense of the FY 62 WER program.

7. Action decided is therefore:

(1) Define the needs and pricing accurately for the items as listed attached. This presently is too shaky to rely upon.

(2) Satisfy as much of these needs as possible from within funds now available for the project (around \$200,000).

(3) Take up the deficiency (about \$250,000) for support out of the Navy FY 62 plan, and finally,

(4) To the extent that any deficiency still remains, consider the possibility of reducing research in Medical Aspects of Ionizing Radiation project.

1 Incl  
Unfunded Design  
Changes AFRR

R. R. CAMPBELL  
Captain, SC USN  
Comptroller

Copy furnished  
DCS/WET  
Director of Logistics

UNFUNDED DESIGN CHANGES, AFARI  
as of April 1961

| <u>Item</u>                        | <u>Amount</u>    |
|------------------------------------|------------------|
| TV, closed circuit control system  | \$ 50,000        |
| Pneumatic tube system for isotopes | 30,000           |
| Health Physics, Gen Atomics        | 50,000           |
| DATA                               | 20,000           |
| 2 copper pipes                     | 500              |
| Reactor control room               | 10,000           |
| Mod. room                          | 5,000            |
| Machine shops                      | 60,000           |
| D <sub>2</sub> O (Rental)          | 20,000           |
| Animal house                       | <u>150,000</u>   |
|                                    | <b>\$395,500</b> |

DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
Medical Division  
WASHINGTON 25, D. C.

DASAMD 942.2

26 April 1961

MEMORANDUM THRU: DEPUTY CHIEF OF STAFF, WEAPONS EFFECTS AND TESTS

FOR: COMPTROLLER

SUBJECT: Information Concerning the Estimated Costs of Change Orders and Collateral Equipment for the Armed Forces Radiobiology Research Institute\*

|                                    |   |
|------------------------------------|---|
| 1. Vestibule . . . . .             | \$4,000.00                                |
| 2. Telephone Equipment . . . . .   | 4,000.00                                  |
| 3. LINAC Change Orders . . . . .   | 13,000.00                                 |
| 4. Reactor Control Room. . . . .   | 12,000.00 (APWO,C)<br>15,000.00 (G. A.)** |
| 5. TV and Health Physics . . . . . | <u>.150,000.00</u>                        |
| TOTAL                              | \$183,000.00                              |

\* (Obtained from Mr. Joe White by telephone, Tuesday Evening, 25 April 1961) Mr. White requested that these estimates be considered as coming from the Area Public Works Officer, Chesapeake, rather than General Atomic. Telephone call to be confirmed by letter.

*Robert H. Holmes*  
ROBERT H. HOLMES  
Colonel MC USA  
Chief, Reactor Task Force

\*\* Would be maximum figure as estimated by General Atomic. The figure \$12,000.00 is used in this total.

904-A3



DEPARTMENT OF DEFENSE  
DEFENSE ATOMIC SUPPORT AGENCY  
WASHINGTON 25, D.C.

CT

3736

ADDRESS REPLY TO:  
THE CHIEF, DEFENSE ATOMIC  
SUPPORT AGENCY

DASAND 980

19 JAN 1961

SUBJECT: Transmittal of DD Form 613s, Entitled "Biological Effects  
of Blast"

TO: SEE DISTRIBUTION

Forwarded herewith for your consideration and retention are  
copies of the DD Form 613s on the proposed projects for the Bio-  
logical Effects of Blast.

*Thirpby*

1 Incl  
DD Form 613,  
Biological  
Effects of Blast  
dtd 25 Nov 60

DISTRIBUTION

Director, DDR&E, (15 cys)  
CNO, Navy Dept., (20 cys)  
Hq., USAF, (8 cys)  
Comptroller, DASA, (1 cy)  
Chief, TP&P Division, DASA, (1 cy)  
Hq., US Army Med R&D Command  
ATTN: Nuclear Energy Div., (13 cys)  
CG, CONARC, ATTN: CD Section, (3 cys)  
Chief Chemical Officer, D/A,  
ATTN: Director of Military Operations, (1 cy)  
CG, USA Chemical Corps, R&D Command,  
ATTN: Nuclear Activities Office, (1 cy)  
CO, USA Nuc. Def. Lab, ACC, (1 cy)  
OCE, D/A, ATTN: ENGRD-SE, (2 cys)  
Director, WES, USA Corps of Engineers  
ATTN: Mr. Guy Arbothnot, (1 cy)  
(Cont'd on Page 2)

**DASAMD 980**

**SUBJECT: Transmittal of DD Form 613s Entitled, "Biological Effects  
of Blast"**

**DISTRIBUTION**

Director USA Corps of Engineers R&D  
Laboratories ATTN: Special Projects  
Branch Ft Belvoir Va., (1cy)  
Chief, R&D, D/A ATTN: Lt. Col. Conarty, (2 cys)  
Chief of Ordnance, D/A, ATTN: ORDIN, (1 cy)  
USA Med R&D Cmd., OTSG, D/A,  
ATTN: Lt. Col. Moncrief (1 cy)  
Maj. J. Beyer (1 cy)  
HQ USAF (AFCSG 11.4) (1 cy)  
CO & Director, USNRDL, ATTN: Mr. Strope,  
San Francisco, California (1 cy)  
Dr. C. S. White, Lovelace Foundation  
Albuquerque, New Mexico, (1 cy)  
ACC, ATTN: Dr. C. Herget, Aberdeen, Md. (1 cy)  
CO, NIMC, NERI, ATTN: Capt. Richard Lee  
Bethesda 14, Md., (1 cy)

|   |  |  |   |   |                                    |
|---|--|--|---|---|------------------------------------|
| <b>RDT &amp; E PROJECT CARD</b>   |  | <b>1. TYPE OF REPORT</b><br><input type="checkbox"/> NLW <input type="checkbox"/> FINAL<br><input type="checkbox"/> REPLACES (No. & Date) DASA Report dtd 1 Sep 59 |   | <b>REPORT CONTROL SYMBOL</b><br>DD R&D (A) 119  |                                    |
| <b>2. PROJECT TITLE</b><br><br>BIOLOGICAL EFFECTS OF BLAST  |  |  | <b>3. SECURITY OF PROJECT</b><br>Unclassified |   | <b>4. PROJECT NO.</b><br>RD 40-60  |
|   |  |  |   |   | <b>5. REPORT DATE</b><br>25 Nov 60 |
| <b>7. BASIC FIELD OR SUBJECT</b><br><br>Nuclear Weapons Effects   |  | <b>8. SUB FIELD OR SUBJECT SUB GROUP</b><br><br>Blast Biology  |   | <b>9. CATEGORY</b><br><br>BR  |                                    |
| <b>10a. COGNIZANT AGENCY</b><br>Defense Atomic Support Agency   |  | <b>11a. CONTRACTOR AND/OR GOVERNMENT LABORATORY</b><br><br>See Continuation Sheets   |   | <b>10. CONTRACT NUMBER</b><br><br>See Continuation Sheets   |                                    |
| <b>b. DIRECTING AGENCY</b><br>Defense Atomic Support Agency   |  |  |   |   |                                    |
| <b>c. REQUESTING AGENCY</b><br>Army, Navy, Air Force, DASA  |  |  |   |   |                                    |
| <b>12. PARTICIPATION BY OTHER MILITARY DEPTS. AND OTHER SOVT. AGENCIES</b><br><br>See Continuation Sheets   |  | <b>14. SUPPORTING PROJECTS</b><br><br>See Continuation Sheets  |   | <b>16. EST. COMPLETION DATES</b>  |                                    |
|   |  |  |   | DEV. N/A  |                                    |
|   |  |  |   | ENGR TEST. N/A  |                                    |
|   |  |  |   | USER TEST N/A   |                                    |
|   |  |  |   | OPERATIONAL N/A   |                                    |
| <b>13. COORDINATION ACTIONS W/OTHER MILITARY DEPTS. &amp; OTHER SOVT. AGENCIES</b><br><br>See Continuation Sheets   |  | <b>15. DATE APPROVED</b><br>See Continuation Sheets  |   | <b>19. EST. SUPPORT LEVEL</b><br><input type="checkbox"/> UNDER \$50,000<br><input type="checkbox"/> \$50,000 - \$100,000<br><input type="checkbox"/> \$100,000 - \$250,000<br><input checked="" type="checkbox"/> \$250,000 - \$500,000<br><input type="checkbox"/> \$500,000 - \$1,000,000<br><input type="checkbox"/> OVER \$1,000,000 |                                    |
|   |  | <b>16. PRIORITY</b><br>NA  |   | <b>17. BUDGET CODE</b><br>1   |                                    |
| <b>20.</b><br><br>A-9   |  | <b>21. SPECIAL CODES</b><br><br>NONE   |   |   |                                    |
| <b>22. REQUIREMENT AND/OR JUSTIFICATION</b><br><br>With extensive progress in the field of protective construction, evaluation of the personnel hazard in such areas must continue. In addition, evaluation of the hazard from missiles, and from body translation has not been completed. Such information is required in evaluation of military tactics and protective measures. The hazard to personnel aboard ships from underwater explosions continues to be problematical, with few protective developments to date. |  |  |   |   |                                    |
| <b>DD FORM 613</b><br>FEB 60  |  | PREVIOUS EDITIONS ARE OBSOLETE.  |   | PAGE 1 OF 4 PAGES   |                                    |

23.a. Task No. 1: Biological Effects of Blast from Bombs.1. Directing Agency: The Defense Atomic Support Agency.2. Project No: RD 40-603. Contractor and/or Government Laboratory and Technical Supervisor:Lovelace Foundation for Medical Education and Research, Albuquerque,  
New Mexico, Dr. C. S. White - Principal Investigator.4. Requirement and/or Justification: See Item 22.5. Brief of Project and Objective: The hazard to biological specimens exposed, in various configurations, to blast of varying pressures is to be evaluated. Missile hazard evaluation is to continue, and translational hazard evaluation to be completed.6. Background and/or Progress: This project has been previously carried out by the USAEC, but is being terminated as being beyond the scope of their mission. It is an extensive investigation and the prime project in blast biology of interest to DASA. Due to funding difficulties the blast biology programs of the Army and Air Force have been dropped and they look to this research to satisfy this requirements.7. Future Plans: Will involve the use of larger animals in an effort to fill the gaps in extrapolation and the effects on man.8. Date Initiated: Project transferred from AEC auspices in October, 1960, following one year of joint sponsorship by AEC and DASA.9. Fiscal Estimates:

| <u>FY 1961-1962</u> | <u>FY 1963</u> | <u>FY 1964</u> | <u>FY 1965</u> |
|---------------------|----------------|----------------|----------------|
| \$490M              | \$350M         | \$350M         | \$350M         |

10. Related Work: BuMed Project NM 81-01 09.1 USAF School of Aviation Medicine Project No. 7756-25.

23.b. Task No. 2: Personnel Blast and Shock

1. Directing Agency: Bureau of Ships
2. Project No: S-F015 14 04 (Navy, BuMed Task 1815)
3. Contractor and/or Government Laboratory and Technical Supervisor:

David Taylor Model Basin, Washington, D. C.  
Dr. Murray - Principal Investigator, Naval Shipyard, Norfolk, Va.

4. Requirements and/or Justification: It is necessary to have the ability to predict the degree of impairment, due to personnel casualties, of a ship's operational and survival capability after underwater nuclear attack, as a function of the attack parameters.

5. Brief and/or Objective: To determine human response to a given shock-excited motion of the deck to determine the personnel casualties to be associated with such motions.

6. Approach: Human volunteers will be subjected to known tolerable levels of shock and their responses determined. Articulated dummies and animals will be subjected to much higher levels of shock and their responses determined. Analytic techniques will be employed to determine casualties to be expected in humans when subjected to these motions.

7. Background and/or Progress: Tests utilizing human volunteers were conducted by FAMRL with promising results. Dummies and animals were subjected to shock motions from a large high explosive charge, in a test series designed for other purposes, and records of their reaction obtained.

8. Fiscal Estimates:

FY 1961-1962    FY 1963    FY 1964  
\$35M

9. Future Plans: Will be further developed when the group at the David Taylor Model Basin becomes active.

23.c. Task No. 3: Personnel Protection from Blast - Full Scale Studies

1. Directing Agency: Bureau of Ships
2. Project No: S-F015 14 04 (Navy, BuShips, Task 1816)
3. Contractor and/or Government Laboratory and Technical Supervisor:

David Taylor Model Basin, Washington, D. C.

Dr. Murray - Principal Investigator, Naval Shipyard, Norfolk, Va.

4. Requirements and/or Justification: It is necessary to develop the ability to predict the degree of impairment, due to personnel casualties, of a ship's operational and survival capability after underwater nuclear attack, as a function of the attack parameters.

5. Brief and/or Objective: To determine the shock motions of the deck at vital personnel stations for ships attacked by underwater nuclear detonations. To determine parameters of the shock induced missile hazard for inclusion in the personnel casualty prediction procedure.

6. Approach: Ships subjected to simulated full-scale nuclear attack will be instrumented to determine deck motions at vital personnel stations. Dummies and/or human volunteers will be utilized, when possible, to determine response to the motions. This will provide information on the true shock environment for use in task 1815 (Task No. 2 preceding).

7. Background and/or Progress: See Task No. 2 (Task 1815) preceding.

8. Fiscal Estimates:

|                     |                |                |
|---------------------|----------------|----------------|
| <u>FY 1961-1862</u> | <u>FY 1963</u> | <u>FY 1964</u> |
| \$90M               |                |                |

9. Future Plans: Will be further developed when the group at the David Taylor Model Basin becomes active.

10. Major Equipment Requirements: Will participate in full-scale simulated nuclear tests of ships.

P.I. & M.

Emergency  
Fund

|                                      |           |           |
|--------------------------------------|-----------|-----------|
| Site Preparation                     |           | 20,000    |
| → Reactor (TRIGA)                    |           | 850,000   |
| Reactor Structure                    |           | 450,000   |
| Accelerator Structure                |           | 210,000   |
| Site Utilities                       |           | 202,000   |
| Linear Accelerator                   | → 610,000 |           |
| Laboratory Wing 14,900 Sq Ft @ 17.50 | 260,000   |           |
| Air Conditioning                     | 40,000    |           |
| Hot Waste System                     | 14,000    |           |
| Laboratory Utilities                 | 6,000     |           |
| Animal Facilities                    |           |           |
| Structure 2500 Sq Ft @ 11.00         | 27,500    |           |
| Paved runs, Canses, drains etc       | 12,000    |           |
| Collateral Equipment                 | 141,400   | 22,000    |
| Sub Total                            | 1,901,900 | 1,816,000 |
| Contingencies 1%                     | 19,019    | 18,160    |
|                                      | 1,920,919 | 1,834,160 |
| Govt Costs (Ingr & Insp) 1%          | 19,209    | 18,342    |
|                                      | 1,940,128 | 1,852,502 |

*Mea Research Reactor*

The proposed project has three principal parts: the reactor and its special-purpose shielding structure, a linear electron accelerator, and an attached laboratory building with a total estimated cost of \$4.285 million. These constitute a necessary, integrated effort to relieve the existing emergency medical shortage. However, in order to insure the use of emergency funds to the financing of interim efforts prior to the availability of the FY 1961 NSA appropriation, it is recommended that approval be given for the transfer of \$2,422 million from the FY 1960 Emergency Fund to the appropriation Research, Development, Test and Evaluation, Army, for the procurement of the research reactor and the associated special-purpose shielding structure for the reactor and the linear accelerator. The adjoining laboratory building costs in the amount of approximately \$1,986 million, including the special linear accelerator itself, will be included in the R&D portion of the Army FY 1961 Military Construction budget request. The operating costs for the research reactor for FY 1961 will be included in the R&D portion of the Army NSM&E budget request. As mentioned above, follow-on operating costs up to \$400,000 subsequent to FY 1961 will be included in the Bureau of Medicine and Surgery portion of the Navy NSM&E budget request.

2.402

400

Robert F. York

Consent:

Approved:

Assistant Secretary of Defense  
(Inspector)

Secretary of Defense

Date: \_\_\_\_\_

Date: \_\_\_\_\_

cc: ASD(Health & Medical)  
Office of Science

Coordinated with:

R/Sgt E.H. Foster, DASA

Faindy/Hollings/Thayer/Schneider/br  
27 Aug 59 1045, PMS, 3 71287

*Edward J. Taylor*

REMITTANCE FOR THE SECRETARY OF DEFENSE

SUBJECT: FY 1965 Emergency Funds For R&D Biomedical Research Reactor

In order to acquire adequate equipment with which to obtain promptly available and urgently needed information concerning the biological effects of nuclear weapons, the Defense Atomic Support Agency has requested emergency funding of the subject research item to be located at the National Naval Medical Center, Bethesda, Maryland.

This is proposed as a R&D project coordinated with, and available to, all three Military Departments and other interested Government agencies, for basic radiobiological research, including cell permeability, and biological testing and evaluation. Continuous or pulsed neutron irradiation, neutron fluxes in excess of  $10^{14}$  neutrons per square centimeter per second, and exposures of cells of intense gamma radiation will provide means of characterizing the biological effects of radiation from nuclear weapons detonations under controlled laboratory conditions and will eliminate many of the serious limitations of existing instrumentation, most of which is inadequate or obsolete.

Use of emergency funds for this purpose is considered appropriate for a number of reasons. The reactor, developed specifically for biomedical investigations, employs fast elements of enriched uranium homogeneously mixed with solid graphite moderator and utilizes a novel and radical design which makes possible a heretofore unattainable neutron flux over a volume adequate for experimentation with non-cancer specimens without serious operational safety hazards. It will provide a capability for evaluating the anti-personnel effectiveness of small nuclear weapons in which neutron emission becomes more significant relative to blast and thermal energy. In the absence of field tests of nuclear weapons, this will provide the only known suitable means of obtaining the most important data, while if weapons testing should be resumed, the reactor will greatly facilitate such studies and free many of them from their dependence upon the uncertainties of field test programs. This biomedical reactor, which will be the only instrument of its kind in this country, will be available for use on a tri-service basis, and will not duplicate any existing or presently proposed facility. Support in the form of well-established research and clinical laboratories already exists at the National Naval Medical Center. By memorandum dated 13 August 1964, a copy of which is attached, the Navy has assured follow-on funding not to exceed \$400,000 per year commencing after FY 1961.

F.Y. 61 NIA

DD-642  
Bar graph  
Fund:

|                                      |           |         |
|--------------------------------------|-----------|---------|
| Site Preparation -                   |           | 10,000  |
| → reactor (TRIGA)                    |           | 850,000 |
| reactor Structure                    |           | 450,000 |
| Accelerator Structure                |           | 210,000 |
| Site Utilities                       |           | 208,000 |
| Linear accelerator                   | → 940,000 |         |
| Laboratory Wing 14,905 Sq Ft @ 17.80 | 265,000   |         |
| Air Conditioning                     | 49,000    |         |
| Hot Waste System                     | 16,000    |         |
| Laboratory Utilities                 | 41,000    |         |
| Animal Facilities                    |           |         |
| Structure 2500 Sq Ft @ 15.00         | 37,500    |         |
| Paved runs, fences, drains etc       | 12,000    |         |
| Collateral Equipment                 | 141,400   | 88,000  |

|                              |  |                  |                  |
|------------------------------|--|------------------|------------------|
| Sub Total                    |  | 1,901,900        | 1,816,000        |
| Contingencies 15%            |  | 285,285          | 272,400          |
|                              |  | <u>1,927,185</u> | <u>2,088,400</u> |
| Govt Costs (Engr & Insp) 15% |  | 289,077          | 313,260          |
|                              |  | <u>1,986,211</u> | <u>2,401,660</u> |

CONTINUED FOR THE SUBJECT OF RESEARCH

**SUBJECT: FY 1961 Emergency Funds for NRC Biomedical Research Reactor**

In order to acquire adequate equipment with which to obtain presently unavailable and urgently needed information concerning the biological effects of nuclear weapons, the Defense Atomic Support Agency has requested emergency funding of the subject research for to be located at the National Naval Medical Center, Bethesda, Maryland.

This is proposed as a DASA project undertaken with, and available to, all three Military Departments and other interested Government agencies for basic radiobiological research, training of personnel, and biological testing and evaluation. Continuous or pulsed neutron operation, neutron fluxes in excess of  $10^{14}$  neutrons per square centimeter per second, and exposures of tissues from radiation will provide means of characterizing the biological effects of radiations from nuclear weapons distributed under controlled laboratory conditions and will eliminate many of the serious limitations of existing instrumentation, most of which is inadequate or obsolete.

Use of emergency funds for this purpose is considered appropriate for a number of reasons. The reactor, developed specifically for biological investigations, employs fast elements of enriched uranium homogeneously mixed with solid graphite hydride and contains a novel and radical design which makes possible a heretofore unobtainable neutron flux over a volume adequate for experimentation with sub-critical systems without serious operational safety hazards. It will provide a capability for evaluating the anti-personnel effectiveness of small nuclear weapons in which neutron emission accounts more significantly relative to blast and thermal energy. In the absence of field tests of nuclear weapons, this will provide the only known suitable means of obtaining the needed biological data, while if weapons testing should be resumed, the reactor will greatly facilitate such studies and free many of them from their dependence upon the uncertainties of field test programs. This biomedical reactor, which will be the only instrument of its kind in this country, will be available for use on a tri-service basis, and will not duplicate any existing or presently proposed facility. Support in the form of well-established research and clinical laboratories already exists at the National Naval Medical Center. By memorandum dated 13 August 1959, a copy of which is attached, the Navy has secured follow-on funding not to exceed \$400,000 per year commencing after FY 1961.

P.I.-61 NEM

DD-64E  
Emergency  
Fund

Site Preparation  
 → Reactor (TRIGA)  
 Reactor Structure  
 Accelerator Structure  
 Site Utilities  
 Linear Accelerator  
 Laboratory Wing 14,905 Sq Ft @ 17.80  
     Air Conditioning  
     Hot Waste System  
     Laboratory Utilities  
 Animal Facilities  
     Structure 2500 Sq Ft @ 15.00  
     Paved runs, fences, drains etc

→ 940,000  
 265,000  
 49,000  
 16,000  
 41,000  
 37,900  
 12,000

10,000  
 850,000  
 450,000  
 210,000  
 → 208,000

Collateral Equipment

141,400                      38,000

Sub Total  
 Contingencies      15%  
 Govt Costs (Engr & Insp) 15%

1,901,900                      1,816,000  
225,240                      374,400  
 1,727,140                      2,068,400  
279,032                      313,260  
 1,986,211                      2,401,660

*Mea Research Reactor*

2.502

400

The proposed project has three principal parts: the reactor and its special-purpose shielding structure, a linear electron accelerator, and an attached laboratory building with a total estimated cost of \$6,300 million. These constitute a necessary, integrated effort to relieve the existing emergency outlined above. However, in order to limit the use of emergency funds to the financing of interim efforts prior to the availability of the FY 1961 MSA appropriation, it is recommended that approval be given for the transfer of \$3,402 million from the FY 1960 Emergency Fund to the appropriation account, Research, Development, Test and Evaluation, Army, for the procurement of the research reactor and the associated special-purpose shielding structure for the reactor and the linear accelerator. The adjoining laboratory building costs in the amount of approximately \$1,900 million, including the special linear accelerator itself, will be included in the MSA portion of the Army FY 1961 Military Construction budget request. The operating costs for the research reactor for FY 1961 will be included in the MSA portion of the Army MSA budget request. As mentioned above, follow-on operating costs up to \$470,000 subsequent to FY 1961 will be included in the Bureau of Medicine and Surgery portion of the Army MSA budget request.

Harbert F. Tark

Concur:

Approved:

Assistant Secretary of Defense  
(Comptroller)

Secretary of Defense

Date: \_\_\_\_\_

Date: \_\_\_\_\_

cc: ASD(Health & Medical)  
Office of Science

Coordinated with

X/Adm R.E. Farnon, DASA

F. Andy / ... / ... / ... / ...  
27 Aug 59 ... 74867

**CONFIDENTIAL**

| Item  |                           |
|---|---------------------------|
| Utilities such as power, cooling, storage and waste disposal required for the installation and testing of the reactor and accelerator |                           |
| Engineering and Inspection  | 11,000                    |
| Collateral Equipment  | 88,000                    |
| Contingencies   | 272,400                   |
|   | <hr/>                     |
|   | Rounded Total \$2,402,000 |

Informal staff discussions have developed the fact that it is practical to provide the \$2,402,000 by reprogramming and utilizing RDT&E Army fund. presently available to the Defense Atomic Support Agency program. Such reprogramming action is approved.

The Assistant Secretary of the Army (FM) is being advised of this action by copy of this memorandum.

**CONFIDENTIAL**

904-112

DASARA-4 902

28 November 1960

MEMORANDUM FOR THE RECORD

SUBJECT: Meeting with the Bureau of the Budget 23 November 1960

1. On 23 November 1960 a meeting was held with Mr. Gerry C. Pettibone, Office of the Director, Bureau of the Budget, Room 331, Executive Office Building, 17th & Pennsylvania Avenue, Washington, D. C. The following DASA personnel were in attendance:

- Col Robert Holmes - Medical Division
- Col Ralph Swanson - Radiation Division
- LCDR William Chapman - Medical Division
- Maj Ralph LaRock - Radiation Division

2. The purpose of the meeting was to provide background information for Mr. Pettibone concerning the status, operational characteristics and planned employment of pulse type reactors either operational or to become operational within the United States.

3. As the meeting progressed it became apparent that the Bureau of the Budget personnel need factual information for reference above and beyond that which could be provided in an informal discussion. It was also noted that the Bureau of the Budget personnel would use this information to answer questions previously posed by LtCol James Hartgering, Assistant to Dr. Kistiakowski. The tenor of the questions indicated that LtCol Hartgering is uninformed concerning the capabilities and limitations of the DORF and DASA reactor facilities and the technical considerations involved in the use of a TRIGA reactor as a basic research tool in the design of a facility to accomplish a specific research objective.

4. For the above reasons the DASA representatives suggested that a fact sheet which would set forth the research objectives of the Biomedical and Transient Radiation Effects on Electronics programs together with the status and operational characteristics of the pulsed reactors to be used in each program be prepared. Mr. Pettibone agreed to this suggestion and a tentative date of 16 December was set for submission to the BOB.

5. The brochure will be prepared by the Radiation Division in conjunction with the Medical Division.

RALPH W. SWANSON  
Colonel, USAF  
Chief, Radiation Division

DASH 1

DASA  
 omedical Radiation Research Fund  
 NNMC Bethesda

Statement of Financing as of June 1961

Source of Funds (000):

|              |                     |
|--------------|---------------------|
| Fy 60 RDT&E  | 2,800               |
| Fy 61 MilCom | <u>1,986</u>        |
| Total        | <u><u>4,786</u></u> |

Application of Funds (000):

|                                   |              |                     |
|-----------------------------------|--------------|---------------------|
| Bu Books (DASA/IVR)               | 2,314        |                     |
| C/E Allocation                    | <u>1,891</u> | 4,205               |
| Soil Study                        |              | 1                   |
| C/E Design Funds                  |              | 95                  |
| Held by DASA - Collateral Equipmt |              | 85                  |
| - Initial Research                |              | 400                 |
|                                   |              | <u><u>4,786</u></u> |

2314  
 85  
 2399

DASA

Medical Radiation Research Institute  
NIMHC Bethesda

Statement of Accounting as of 2 Jan 1961

Balance of Funds (000)

|              |                     |
|--------------|---------------------|
| 2:60 RDT&E   | 2,800               |
| 7:61 MilCom. | <u>1,986</u>        |
| Total        | <u><u>4,786</u></u> |

Allocation of Funds (000)

|                                 |              |                     |
|---------------------------------|--------------|---------------------|
| Ex. Budget (DASA MilCom)        | 2,314        |                     |
| C/E Allocation                  | <u>1,891</u> |                     |
|                                 |              | 4,205               |
| Soil Study                      |              | 1                   |
| C/E Design Funds                |              | 95                  |
| Held by DASA - Collateral Equip |              | 85                  |
| - Initial Research              |              | <u>400</u>          |
|                                 |              | <u><u>4,786</u></u> |

Kingston Faculty  
 Nov 27 November 1960

FY 1960

|             |                   | Committed | Allocated |
|-------------|-------------------|-----------|-----------|
| MIPR 515-60 | NAVAL Weapons F&T | 1,216     | 1,216     |
| 518-60      | PO/2-3-60         | 173,000   | 173,000   |
| 539-60      | En. Insp.         | 400,000   | 400,000   |
|             |                   | 574,216   | 574,216   |

| FY 1961     |                             |         |        |
|-------------|-----------------------------|---------|--------|
| MIPR 518-60 | En. Insp.                   | 171,000 | 43.47  |
| P.O. 13-61  | <del>W. Insp.</del><br>AFIP | 33,425  | 33,425 |
|             |                             | 174,425 | 37,772 |

This will be brought back and reprogrammed into research

This will be adjusted to credit reactor and change a research project.

— Holmes, Knoll, Clinton 2/1/61

1. AFIP project \$33,425 now charged to 126 Reactor facility.

med dir. give CT a reprogramming action to charge to medical aspects of honey calibration.

2. ~~TP&P~~ \$400,000 order on Du med. Take back from Du med and credit by reprogramming action to appropriate Med Research Project.

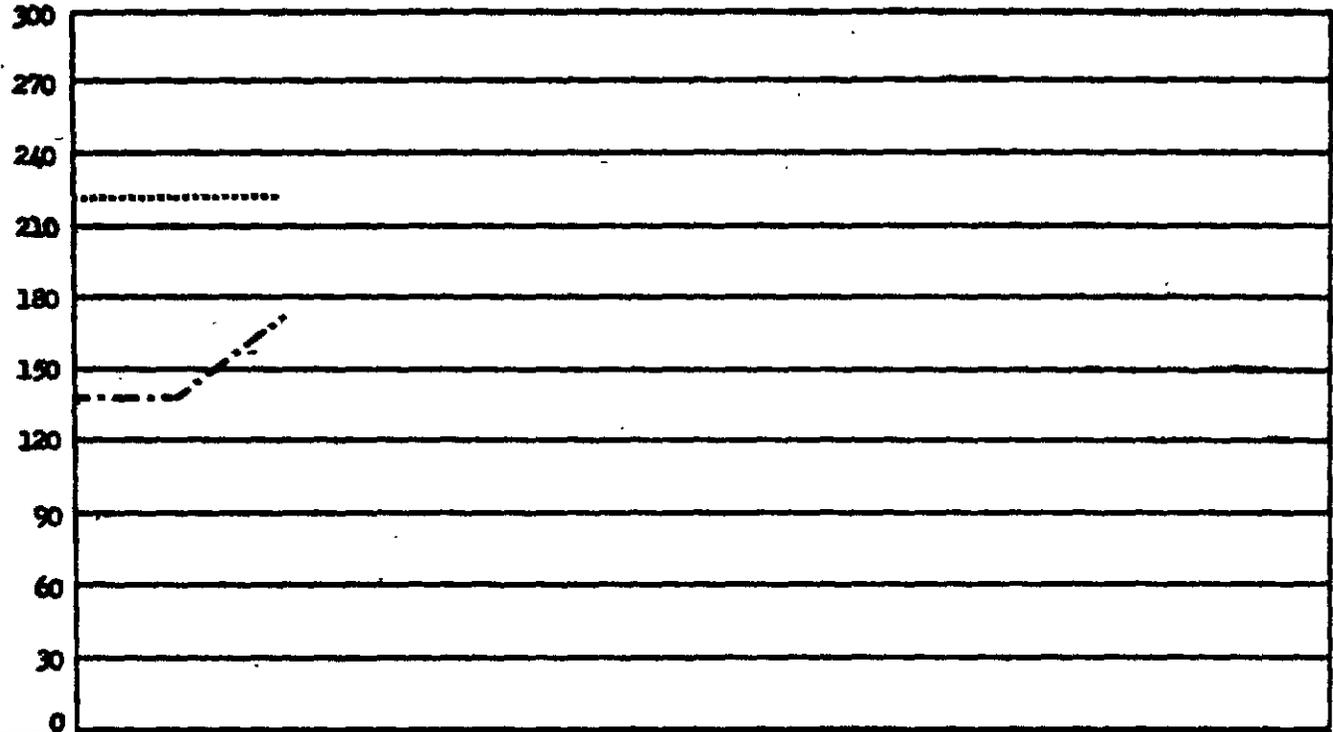
3. ~~TP&P~~ <sup>Estab</sup> for money on deferred item list

to buy heavy water 12000# @ \$28 = 336000  
+24 500# S. S. drums @ \$100 24000  
338,400

**RESEARCH DEVELOPMENT TEST AND EVALUATION  
FY 1961**

**RESEARCH AND DEVELOPMENT  
REACTOR FACILITY**

(IN THOUSANDS OF DOLLARS)

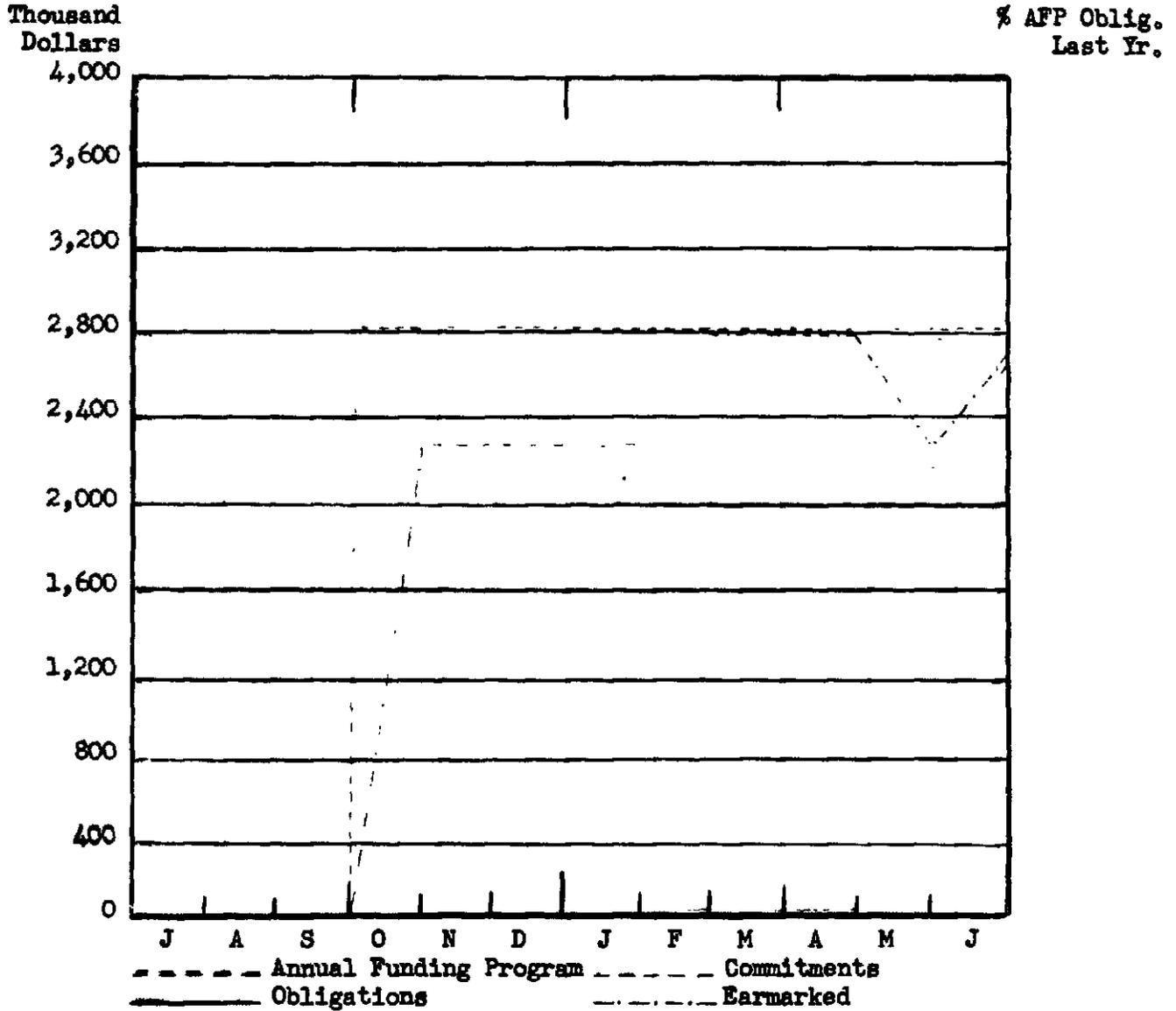


|                        | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>PROGRAM</b>         | 226 | 226 |     |     |     |     |     |     |     |     |     |     |
| <b>RESERVATIONS</b>    | 141 | 174 |     |     |     |     |     |     |     |     |     |     |
| <b>COMMITMENTS</b>     | 141 | 174 |     |     |     |     |     |     |     |     |     |     |
| <b>OBLIGATIONS</b>     | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| <b>EXPENDITURES</b>    | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| <b>WORKING BALANCE</b> | 85  | 52  |     |     |     |     |     |     |     |     |     |     |

PROGRAM    
  CUMULATIVE COMMITMENTS    
  OBLIGATIONS

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 60**

**REACTOR FACILITY**



**Note: Excludes AEC Transfers**

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % | Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % |
|-------|-----------------|-----------------|-----------|-------|-----------------|-----------------|-----------|
| Jul   |                 |                 |           | Jan   | 2,800           | 0               | 0         |
| Aug   |                 |                 |           | Feb   | 2,800           | 1               | .04       |
| Sep   |                 |                 |           | Mar   | 2,800           | 1               | .04       |
| Oct   | 2,800           | 0               | 0         | Apr   | 2,800           | 1               | .04       |
| Nov   | 2,800           | 0               | 0         | May   | 2,800           | 2,174           | 78.0      |
| Dec   | 2,800           | 0               | 0         | Jun   | 2,800           | 2,574           | 92        |

213P

UNCLASSIFIED

FY62  
RDTHZ

PRIORITY  
PRIORITY

X DA

CHIEF DEFENSE ATOMIC SUPPORT AGENCY  
WASHINGTON DC

DIA DDA ABC WASHDC (MAIL)

INFO: FROM SANDIA CORP SANDIA BASE ALBUQUERQUE NMEX

UNCLAS. 718 By DASARA-4 926.145, 2 Sep 1960.

1. DASA has tentatively planned to provide funds in the FY62 budget for the construction of a new pulse radiation facility for tri-service use in research on transient radiation effects on electronics if the projected work load indicates that presently available or planned facilities will not be adequate.

2. An announcement was made by Sandia Corporation personnel at the AFMWC Pulse Radiation Conference, 13-16 Sep, to the effect that Sandia Corporation intends to support all DOD agencies and their contractors in this field with an initial two shift operation of the facility and with an expansion to three shifts if the work-load demands. Such support is deemed to be adequate for absorbing the overflow DOD workload in the foreseeable future. However, before eliminating the presently earmarked new facilities monies from the DASA program, confirmation of the Sandia announcement

1900 SEP 21 21 01

19 1600  
Sep 1960

DASARA-4 926.145

RALPH I. LaROCK, Major, USA

74178

1 2

C. E. LINDENSON  
Brigadier General, USA  
Deputy Chief

UNCLASSIFIED

9 12

U.S. AIR FORCE

UNCLASSIFIED

CHIEF DEFENSE ATOMIC SUPPORT AGENCY  
WASHINGTON DC

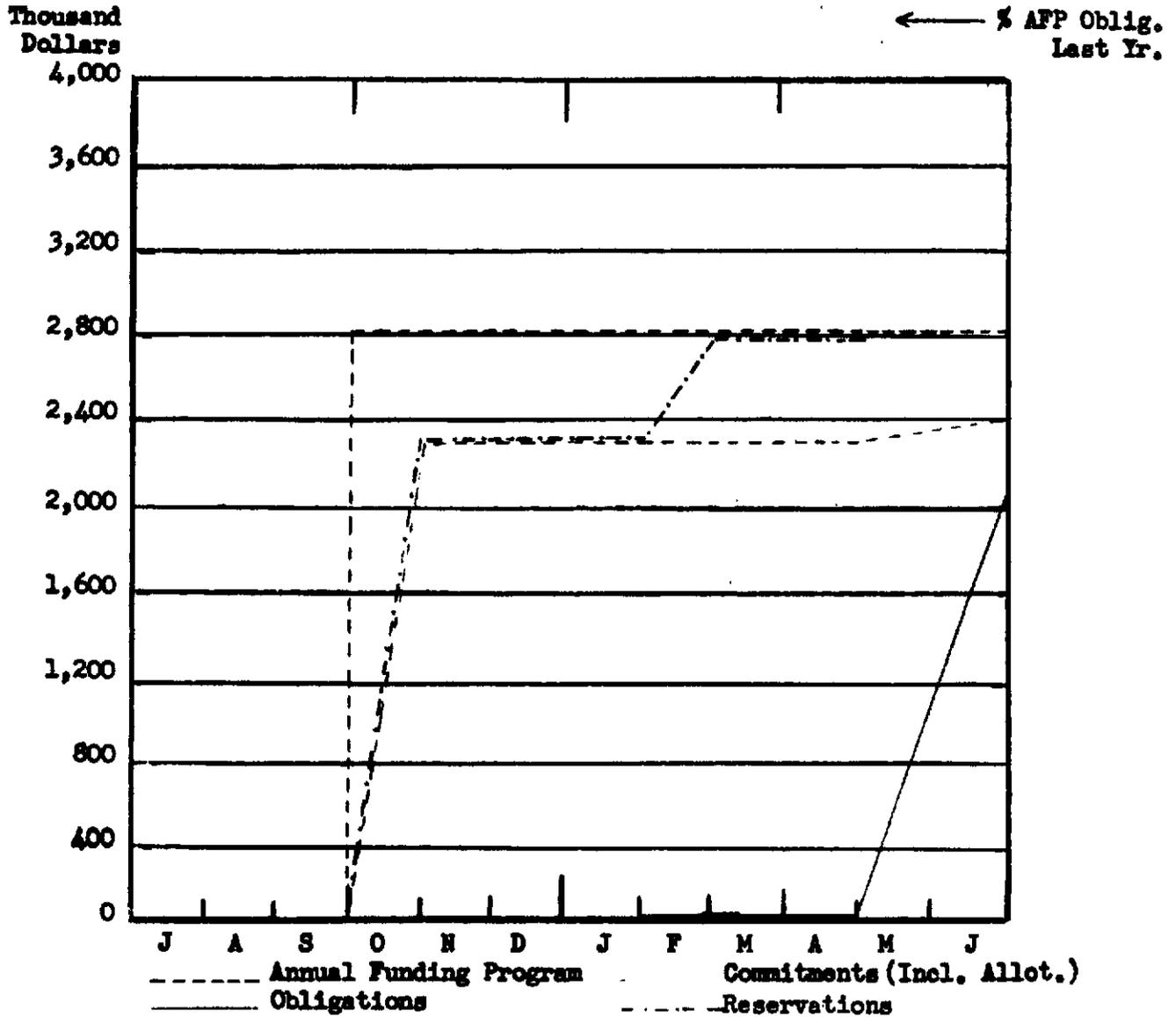
is herewith requested.

3. Since the DASA program must be finalized by 1 October, it is requested that a reply be received by 23 September 1960. From DASARA-4.

M/R Info requested from the ABC will be used by the WKB Steering Group in finalizing the FY62 DASA coordinated R&D Program in Weapons Effects Research. If answer is in the affirmative the monies now earmarked for Pulse Radiation Facilities will be reprogrammed to satisfy other research requirements.

|                  | DASARA  | DASATF       | DASAET | DASACT | DASAIG       | DASAAG |            |
|------------------|---------|--------------|--------|--------|--------------|--------|------------|
| DASARA-4         | 926.145 | MAJOR LABOCK | 2      | 2      | UNCLASSIFIED | MPG    | 699B 74178 |
| Typed: 19 Sep 60 |         |              |        |        |              |        |            |

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 60  
REACTOR FACILITY**



Note: Excludes AEC Transfers

| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   |                    |                    |              | Jan   | 2,800              | 0                  | 0            |
| Aug   |                    |                    |              | Feb   | 2,800              | 1                  | .04          |
| Sep   |                    |                    |              | Mar   | 2,800              | 1                  | .04          |
| Oct   | 2,800              | 0                  | 0            | Apr   | 2,800              | 1                  | .04          |
| Nov   | 2,800              | 0                  | 0            | May   |                    |                    |              |
| Dec   | 2,800              | 0                  | 0            | Jun   | 2,800              | 2,051              | 73           |

OUTSTANDING COMMITMENTS - 3/31/60

A-11 Medical Aspects of Ionizing Radiation \$136,400

a. Total body radiation - \$134,000

(1) Application of cell-free spleen extract - \$51,000

(a) National Naval Medical Center

(b) Researchers are attempting to isolate and identify chemically the active principle of spleen extract found to be protective against radiation death. They are studying the antigenicity of such extracts to determine whether they could be used in the crude form. This is a continuing program and an additional \$50,000 is set aside in FY61.

(2) Installation of whole body counting facilities - \$49,600

(a) Walter-Reed Army Medical Center

(b) This project covers the installation of a whole body counting facility, construction of housing for care of irradiated dogs, and the determination of fission products in biological specimens. Follow up studies of Operation PLUMBBOB swine will be funded from this money.

(3) Support of medical research - \$3,300

(a) Walter-Reed Army Medical Center

(b) This program is a small effort in evaluation of the pathologic changes in tissue following radiation injury. It has been slow in completion because of transfer of the military principle investigator. The replacement is expected to complete the project in FY61.

(4) Study of effect of massive, acute radiation doses - \$30,100

(a) Walter-Reed Army Medical Center

(b) This project is the result of a requirement generated by the armed services to gain additional information about the incapacitating dose of radiation for man. The object is to obtain discriminating performance data from massively irradiated Rhesus monkeys. Additional funds in the amount of \$50,000 for this project are allotted in FY61.

b. Tissue Dosimetry - none

c. Radiation sickness, prevention and treatment - \$2,400

(1) Irradiation of animals

(a) E. H. Smith and Co.

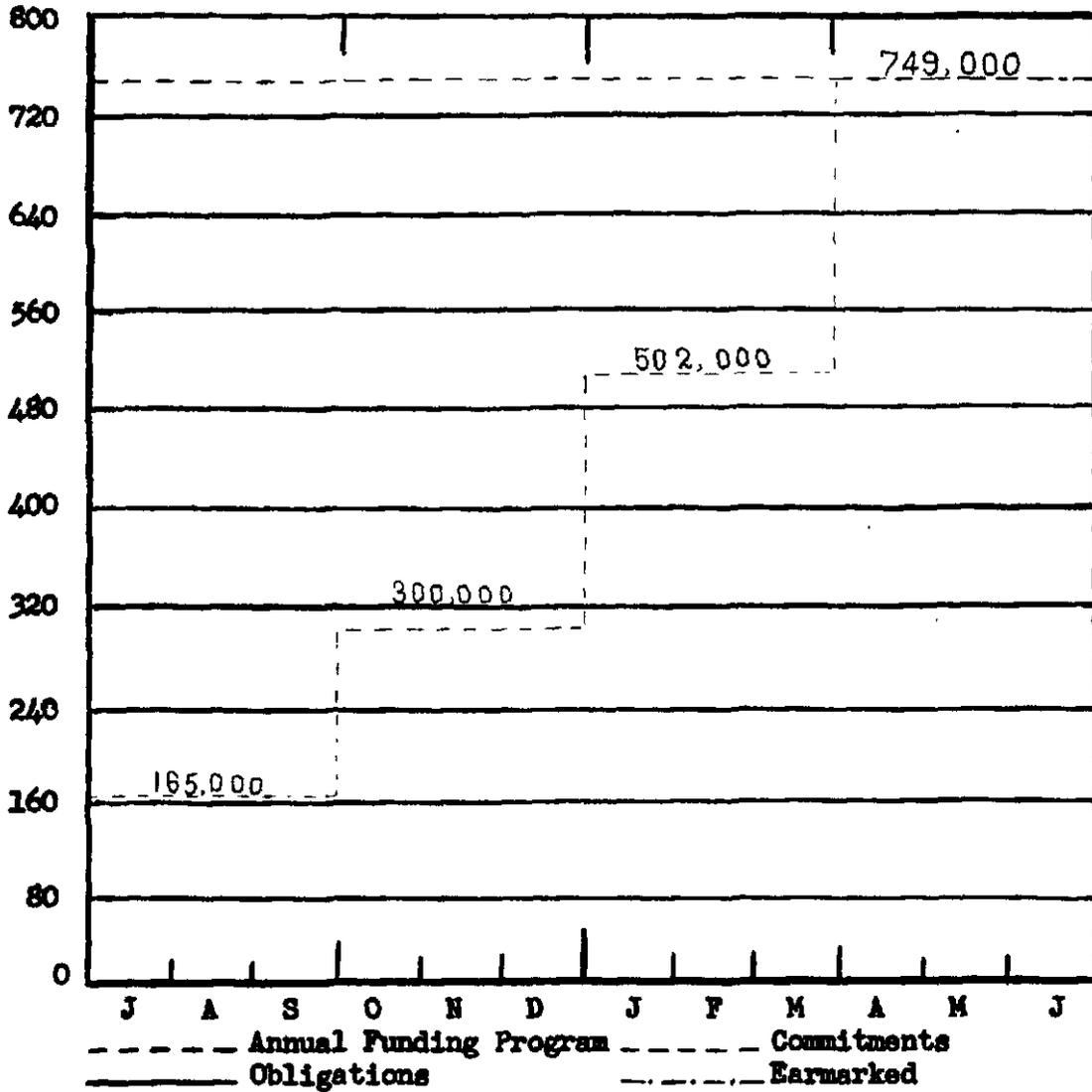
(b) These funds remain from a contract let with the E. H. Smith and Co. to study irradiation effects in animals. This work has been completed and the project is being closed out. Funds are being held to cover close-out costs.

RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 61

REACTOR FACILITY

Thousand  
Dollars

% AFP Oblig.  
Last Yr.



Note: Excludes AEC Transfers

| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   |                    |                    |              | Jan   |                    |                    |              |
| Aug   |                    |                    |              | Feb   |                    |                    |              |
| Sep   |                    |                    |              | Mar   |                    |                    |              |
| Oct   |                    |                    |              | Apr   |                    |                    |              |
| Nov   |                    |                    |              | May   |                    |                    |              |
| Dec   |                    |                    |              | Jun   |                    |                    |              |

**PLANNED COMMITMENTS - 4TH QUARTER**

A-12 Medical Research Reactor Facility \$484,784

a. Establishment of facility - \$484,784

(1) Agency: BuMed

This fund is to cover purchase of ancillary equipment for the facility and to cover expenses incident to its establishment through FY 61.

b. Biological Studies - None

**OUTSTANDING COMMITMENTS - 3/31/60**

A-12 Medical Research Reactor Facility \$2,315,000

a. Establishment of Facility - \$2,315,000

(1) Construction of DASA Biomedical Facility

(a) National Naval Medical Center

(b) These funds are a major part of the \$2,800,000 set up to purchase the reactor and supporting equipment for the medical reactor being established at Bethesda, Maryland.

b. Biological Studies - None

28 DEC 1959

DASACT 900.9

MEMORANDUM FOR: BUREAU OF THE BUDGET  
ATTENTION: Mr. Don Cadle

SUBJECT: Information on Medical Research Reactor

In accordance with your request of 14 December 1959, the attached information is furnished.

- 2 Incl
- 1. DORE ltr, 13 Aug 59
- 2. M/R, 21 Dec 59

CORDES F. TIEMANN  
Colonel, USAF  
Chief of Staff

- M/R: The two inclosures requested by Mr. Cadle are:
- 1. FY 1960 Emergency Funds for DASA Biomedical Research Reactor, Memo for the Secretary of Defense, 13 August 59, s/Dr. York.
  - 2. Memo for Record, 21 Dec 59, Proposed Training Aspects of the DASA Biomedical Research Reactor at Bethesda, Maryland, s/Lcdr Chapman, Medical Div, DASA.

DASACT

DASAAG

Cdr

Campbell

ab/22 Dec 59 1B729

52350

13 August 1959

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: FY 1960 Emergency Funds for DASA Biomedical Research Reactor

In order to acquire adequate equipment with which to obtain presently unavailable and urgently needed information concerning the biological effects of nuclear weapons, the Defense Atomic Support Agency has requested emergency funding of the subject research item to be located at the National Naval Medical Center, Bethesda, Maryland.

This is proposed as a DASA project coordinated with, and available to, all three Military Departments and other interested Government agencies, for basic radiobiological research, training of personnel, and biomedical testing and evaluation. Continuous or pulsed reactor operation, neutron fluxes in excess of  $10^{14}$  neutrons per square centimeter per second, and superposed fields of intense gamma radiation will provide means of simulating the biomedical effects of radiation from nuclear weapons detonations under controlled laboratory conditions and will eliminate many of the serious limitations of existing instrumentation, most of which is inadequate or obsolescent.

Use of emergency funds for this purpose is considered appropriate for a number of reasons. The reactor, developed specifically for biomedical investigations, employs fuel elements of enriched uranium homogeneously mixed with solid zirconium hydride and embodies a novel and medical design which makes possible a heretofore unattainable neutron flux over a volume adequate for experimentation with man-sized specimens without serious operational safety hazards. It will provide a capability for evaluating the anti-personnel effectiveness of small nuclear weapons in which neutron emission assumes more significance relative to blast and thermal energy. In the absence of field tests of nuclear weapons, this will provide the only known suitable means of obtaining the needed biomedical data, while if weapons testing should be resumed, the reactor will greatly facilitate such studies and free many of them from their dependence upon the uncertainties of field test programs. This biomedical reactor, which will be the only instrument of its kind in this country will be available for use on a tri-service basis, and will not duplicate any existing or presently proposed facility. Support in the form of well-established research and clinical laboratories already exists at the National Naval Medical Center. By memorandum dated 13 August 1959, a copy of which is attached, the Navy has assured follow-on funding not to exceed \$400,000 per year commencing after FY 1961.

encl 1

The proposed project has three principal parts: the reactor and its special-purpose containing structure, a linear electron accelerator, and an attached laboratory building with a total estimated cost of \$4,338 million. These constitute a necessary, integrated effort to relieve the existing emergency outlined above. However, in order to limit the use of emergency funds to the financing of interim efforts prior to the availability of the FY 1961 MCA appropriation, it is recommended that approval be given for the transfer of \$3,402 million from the FY 1960 Emergency Fund to the appropriation Research, Development, Test and Evaluation, Army, for the procurement of the research reactor and the associated special-purpose shielding structure for the reactor and the linear accelerator. The adjoining laboratory building costs in the amount of approximately \$1,936 million, including the actual linear accelerator itself, will be included in the DASA portion of the Army FY 1961 Military Construction budget request. The operating costs for the research reactor for FY 1961 will be included in the DASA portion of the Army RDT&E budget request. As mentioned above, follow-on operating costs up to \$1,000,000 subsequent to FY 1961 will be included in the Bureau of Medicine and Surgery portion of the Navy RDT&E budget requests.

1,986  
1,971  
- 35  
=

Herbert F. York

Concur:

Approved

Assistant Secretary of Defense  
(Comptroller)

Secretary of Defense

Date: \_\_\_\_\_

Date \_\_\_\_\_

cc: ASD(Health & Medical)  
Office of Science

MEMO FOR THE RECORD:

21 December 1959

SUBJECT: Proposed Training Aspects of the DASA Biomedical Research Reactor at Bethesda, Maryland.

1. In the original proposal, as submitted on 26 July, 1958, the training aspects of the proposed facility were stated as follows:

"To establish, at a single location, a facility to provide: Specialized training for medical department personnel in radiobiology, radiation physics and the medical aspects of radiological safety; this training, in accordance with existing academic and professional standards, to include the application of research reactors to medical research and the technology thereof."

2. Neither the curriculum nor the scope of the above - stated concept has been finalized at the present time. From several conferences with representatives of the Armed Services, sponsoring government agencies, and the local graduate schools, it is anticipated that the Armed Services and other government agencies will sponsor individuals with Masters Degrees in either Radiation Physics or Radiation Physiology for an additional 3 years training for a doctorate degree in the desired or specified area of endeavor.

WILLIAM E. CHAPMAN  
Lebr, MSC, USN  
Medical Division, DASA

Incl 2

4 September 1959

MEMORANDUM FOR: CHIEF DABA  
THRU: CHIEF OF STAFF

SUBJECT: Conference with Mr. Elliott on O&M and RDT&E Matters,  
4 September 1959

I talked with Mr. Elliott this morning about the two subjects.  
Comment for your information is as follows:

Withholding of O&M FY 61 Funds by DA in Target Figures

You will recall from the attached memorandum, Inclosure (1), that we held out \$4,735,000 of our FY 61 O&M requirements when they distributed the O&M. A target figure in the Budget Advisory Committee (BAC). The net result of my discussion of this with Mr. Elliott was that we should submit our FY 61 budget in the amounts we require, and that the R&E, ICS action on it will be binding on Army.

RDT&E Programs FY 60 and FY 61

Mr. Elliott agrees with our FY 60 plan which will use the \$4 million of funds now on the Deferred Items List, and will reprogram within our resources for the Medical Research Center. He will see Mr. McNeil and suggest that Mr. McNeil ask Mr. Gates to release the \$4 million, or alternatively authorize Mr. Elliott to see Mr. Gates directly for this purpose.

I left the attached tabulation of our RDT&E Programs, Inclosure (2), with Mr. Elliott, who will give Mr. Livermore a copy of it when he comes back next week. I explained the various items in this plan, which Mr. Elliott understands, subject to more details being furnished at a later date. Since this plan now involves spending in a different way than we have explained before to the Bureau of the Budget, I suggested that we should advise Mr. Schuldt. Mr. Elliott agreed and he said that he would be glad to go along, if I would set it up with Mr. Schuldt. I think it will be best to do this after our \$4 million is off the Deferred Items List and we have the Medical Research Center funding settled.

cc: Captain Lambert

R. R. CAMPBELL  
COMMANDER, SC, USN  
Chief, Budget & Fiscal Division

904 A<sup>3</sup> HZ

~~132-110~~

**MEMORANDUM FOR THE SECRETARY OF DEFENSE**

**SUBJECT: FY 1960 Emergency Funds for DASA Biomedical Research Reactor**

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Use of emergency funds for this purpose is considered appropriate for a number of reasons. The reactor, developed specifically for biomedical investigations, employs fuel elements of enriched uranium homogeneously mixed with solid zirconium hydride and embodies a novel and medical design which makes possible a heretofore unattainable neutron flux over a volume adequate for experimentation with man-sized specimens without serious operational safety hazards. It will provide a capability for evaluating the anti-personnel effectiveness of small nuclear weapons in which neutron emission assumes more significance relative to blast and thermal energy. In the absence of field tests of nuclear weapons, this will provide the only known suitable means of obtaining the needed biomedical data, while if weapons testing should be resumed, the reactor will greatly facilitate such studies and free many of them from their dependence upon the uncertainties of field test programs. This Biomedical reactor, which will be the only instrument of its kind in this country will be available for use on a tri-service basis, and will not duplicate any existing or presently proposed facility. Support in the form of well-established research and clinical laboratories already exists at the National Naval Medical Center. By memorandum dated 13 August 1959, a copy of which is attached, the Navy has assured follow-on funding not to exceed \$400,000 per year commencing after FY 1961.

27 Aug 59

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Herbert F. York

Concur:

Approved

Assistant Secretary of Defense  
(Comptroller)

Secretary of Defense

Date: \_\_\_\_\_

Date \_\_\_\_\_

cc: ASD(Health & Medical)  
Office of Science

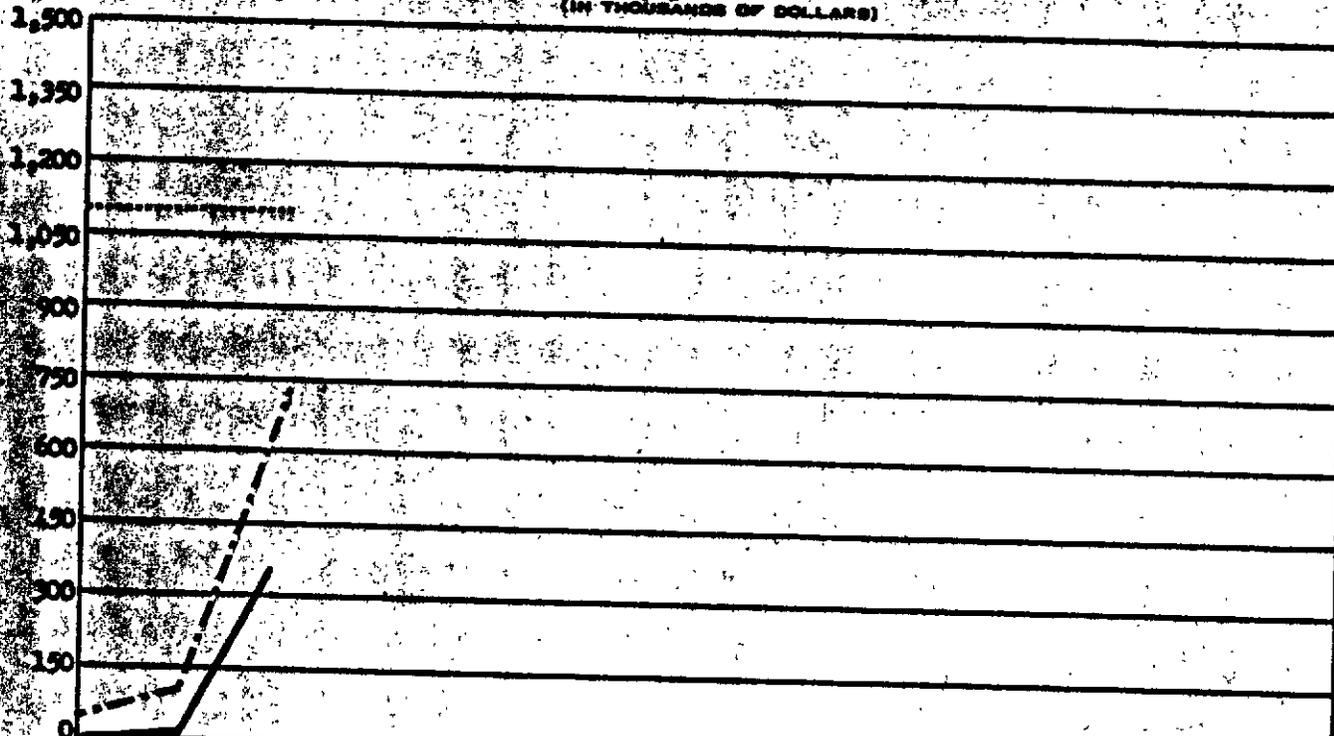
27 Aug 1959

**RESEARCH DEVELOPMENT TEST AND EVALUATION  
FY 1961**

**RESEARCH AND DEVELOPMENT**

**MEDICAL ASPECTS OF IONIZING RADIATION**

(IN THOUSANDS OF DOLLARS)



|                        | JUL   | AUG   | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
|------------------------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>PROGRAM</b>         | 1,001 | 1,001 |     |     |     |     |     |     |     |     |     |     |
| <b>RESERVATIONS</b>    | 551   | 916   |     |     |     |     |     |     |     |     |     |     |
| <b>COMMITMENTS</b>     | 93    | 730   |     |     |     |     |     |     |     |     |     |     |
| <b>OBLIGATIONS</b>     | 20    | 343   |     |     |     |     |     |     |     |     |     |     |
| <b>EXPENDITURES</b>    | -0-   | 9     |     |     |     |     |     |     |     |     |     |     |
| <b>WORKING BALANCE</b> | 450   | 85    |     |     |     |     |     |     |     |     |     |     |

PROGRAM

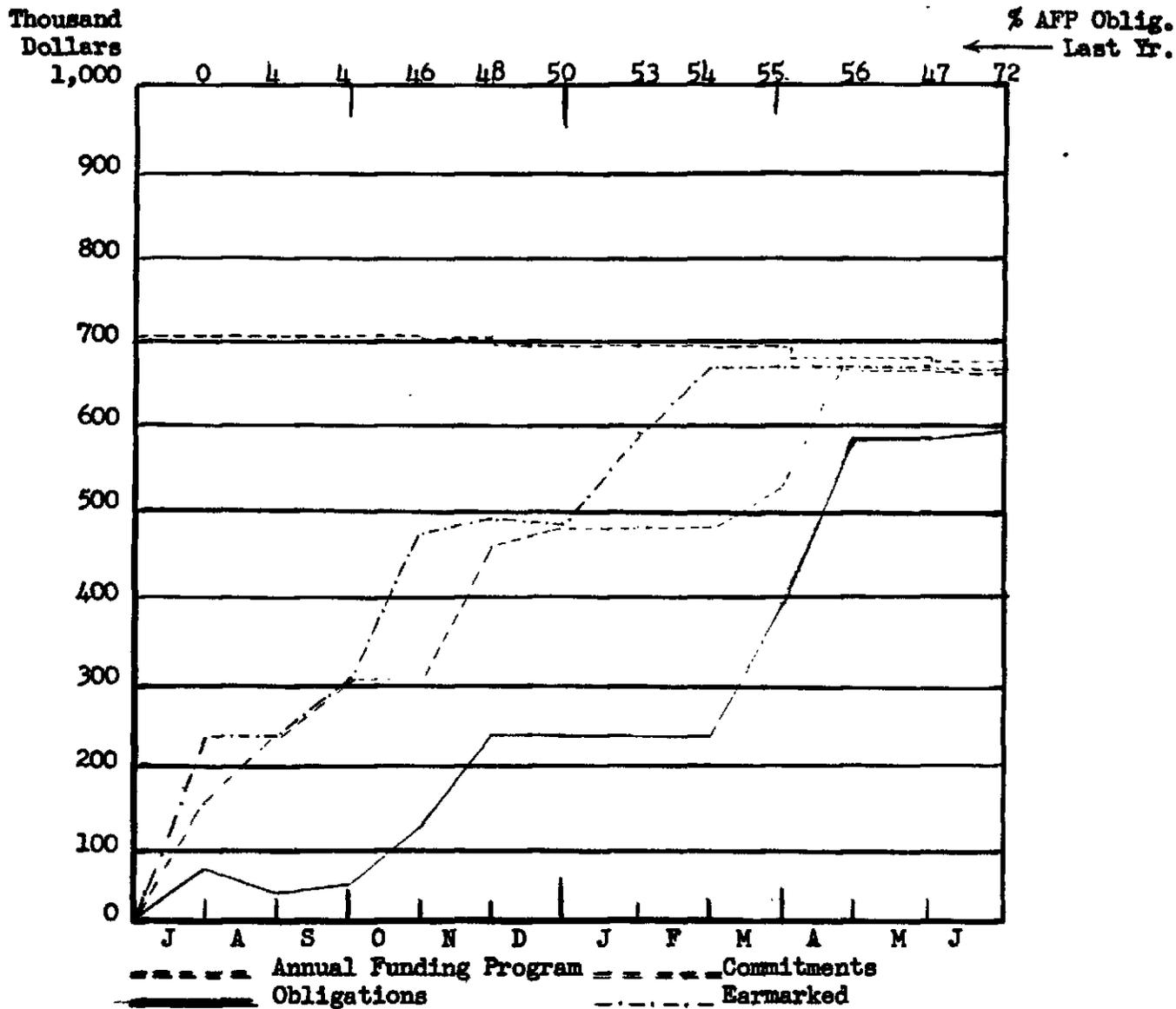
CUMULATIVE COMMITMENTS

OBLIGATIONS

OBLIGATIONS

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 60**

**IONIZING RADIATION**



Notes: Excludes AEC Transfers

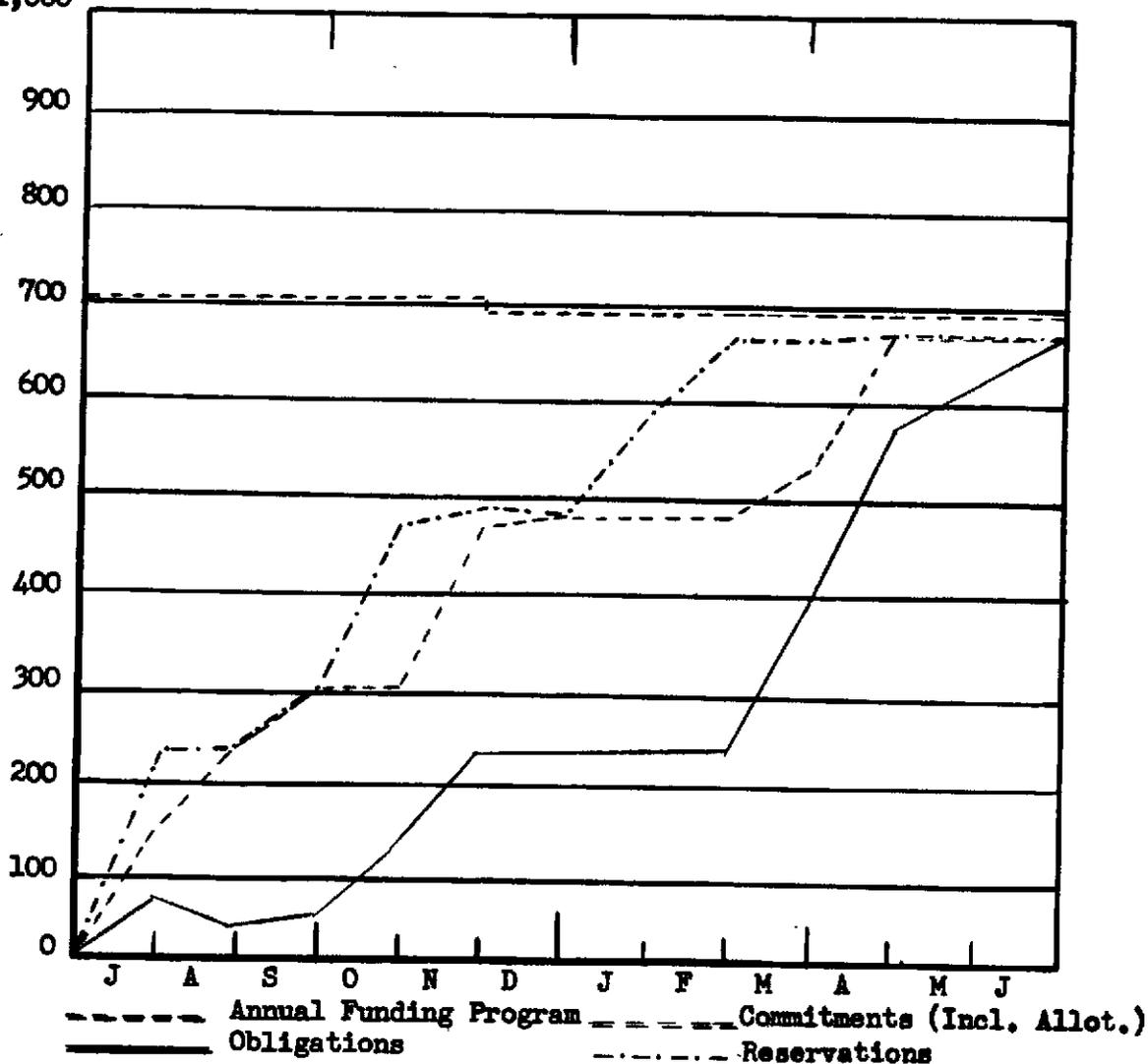
| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   | 711                | 71                 | 10           | Jan   | 697                | 239                | 34           |
| Aug   | 711                | 41                 | 6            | Feb   | 697                | 247                | 35           |
| Sep   | 714                | 50                 | 7            | Mar   | 697                | 396                | 57           |
| Oct   | 714                | 140                | 20           | Apr   | 669                | 585                | 87           |
| Nov   | 712                | 230                | 32           | May   | 669                | 585                | 87           |
| Dec   | 697                | 238                | 34           | Jun   | 659                | 593                | 90           |

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY60**

**IONIZING RADIATION**

Thousand  
Dollars  
1,000

% AFP Oblig.  
Last Yr.



Note: Excludes AEC Transfers

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % |
|-------|-----------------|-----------------|-----------|
| Jul   | 714             | 71              | 10        |
| Aug   | 714             | 41              | 6         |
| Sep   | 714             | 50              | 7         |
| Oct   | 714             | 140             | 20        |
| Nov   | 712             | 230             | 32        |
| Dec   | 697             | 238             | 34        |

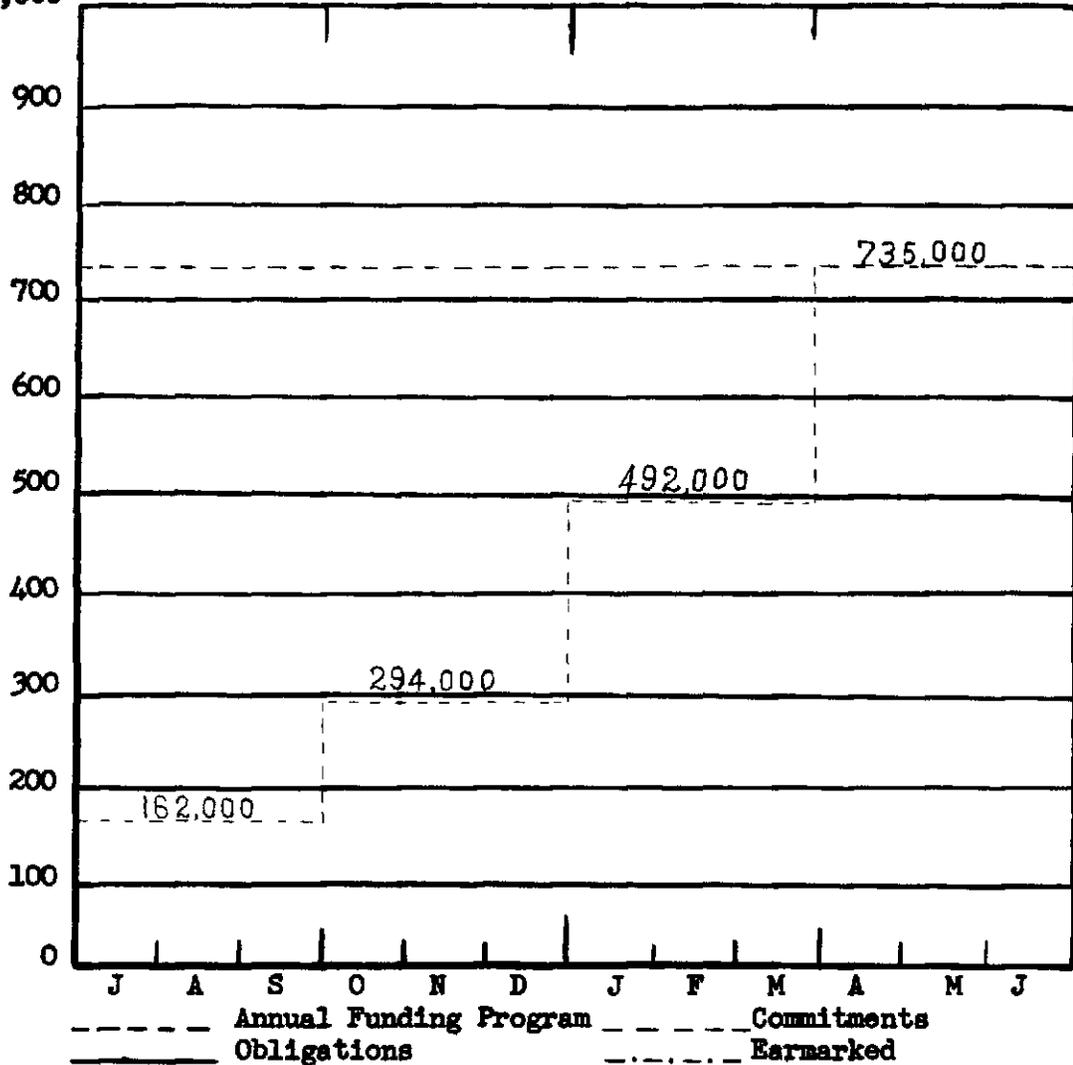
| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % |
|-------|-----------------|-----------------|-----------|
| Jan   | 697             | 239             | 34        |
| Feb   | 697             | 247             | 35        |
| Mar   | 697             | 396             | 57        |
| Apr   | 669             | 585             | 87        |
| May   | 669             | 659             | 99        |
| Jun   | 669             | 659             | 99        |

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY-61**

**IONIZING RADIATION**

Thousand  
Dollars  
1,000

% AFP Oblig.  
Last Yr.



**Note:** Excludes AEC Transfers

| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   |                    |                    |              | Jan   |                    |                    |              |
| Aug   |                    |                    |              | Feb   |                    |                    |              |
| Sep   |                    |                    |              | Mar   |                    |                    |              |
| Oct   |                    |                    |              | Apr   |                    |                    |              |
| Nov   |                    |                    |              | May   |                    |                    |              |
| Dec   |                    |                    |              | Jun   |                    |                    |              |

PLANNED COMMITMENTS 4TH QUARTER

A-11 Medical Aspects of Ionizing Radiation \$137,595

a. Total body radiation - \$60,700

1. Agency -NNMC

The examination of the effects of protraction and fractionation of radiation exposure, as in fallout, utilizing changes in gastro-intestinal mitotic figures as criteria. Part of the biologic evaluation of the fallout hazard.

b. Tissue Dosimetry - \$66,650

1. Agency - NNMC

Minaturization and improvement of existing dosimeters and development of techniques for their application in the determination of the depth dose and relative biological effectiveness of various types of radiation in large biological specimens and human phantoms.

c. Radiation sickness prevention and treatment -0-

d. Biological hazard of fallout -0-

NOTE: Funds in the amount of \$10,245 will be transferred to A-10C for use by Lockheed Aircraft Corporation in the retinal burn study.

| <u>ACTIVITY</u>                            | <u>LABORATORY</u>                 | <u>AMOUNT</u> |
|--|-----------------------------------|---------------|
| A-11 MEDICAL ASPECTS OF IONIZING RADIATION |                                   |               |
| a. Total body radiation                    |                                   |               |
| 03.08 Radiation effect & response          | Walter Reed Army Ins. of Research | \$40,000      |

This project is the result of a requirement generated by the Armed Services to join additional information about the incapacitating dose of radiation for man. Object is to obtain discriminating performance data from massively irradiated Rhesus monkeys.

|                            |                     |          |
|----------------------------|---------------------|----------|
| 03.09 Whole body radiation | University of Cinn. | \$25,000 |
|----------------------------|---------------------|----------|

The primary objective of this investigation is to measure urinary excretion of amino acids in X irradiated humans in order to elucidate the mechanisms responsible for the amino-aciduria and to determine whether this is a practical test of radiation exposure.

|                            |                           |          |
|----------------------------|---------------------------|----------|
| 03.10 Whole body radiation | Sloan Kettering Institute | \$43,000 |
|----------------------------|---------------------------|----------|

Uses irradiation patients to study post irradiation syndrome in humans. Clinical observations are made; hematologic measurements and biochemical determinations as well. Irradiation studies of dogs are pursued to try to correlate findings with those in humans. Long term project due to scarcity of human subjects.

|                            |        |          |
|----------------------------|--------|----------|
| 03.11 Whole body radiation | Baylor | \$77,000 |
|----------------------------|--------|----------|

In progress for eight years. Studies relation between whole body radiation and systemic or isolated tissue response in humans. Slow progress expected since human subjects not numerous. Most valuable because of its direct application to radiation injury in humans.

|                         |                                 |          |
|-------------------------|---------------------------------|----------|
| 03.35 Hazard evaluation | Naval Radiological Defense Lab. | \$70,000 |
|-------------------------|---------------------------------|----------|

To provide biological data necessary to allow a rational approach to instrument requirements for sound hazard evaluation. Delineates the nature of surface radiation hazard and deep rad. hazard. Beta radiation vs tumor formation is also studied.

b. Tissue dosimetry

|                 |                               |          |
|-----------------|-------------------------------|----------|
| 03.36 Dosimetry | National Naval Medical Center | \$50,000 |
|-----------------|-------------------------------|----------|

Miniaturization and improvement of existing dosimeters and development of techniques for their application is the objective. Studies are made in large animals and human phantoms. A minimal amount of human material made be used eventually to check reliability of data.

c. Radiation sickness, prevention & treatment

|                      |                               |          |
|----------------------|-------------------------------|----------|
| 03.07 Spleen extract | National Naval Medical Center | \$50,000 |
|----------------------|-------------------------------|----------|

Isolate and identify chemically the active principle of spleen extracts found to be protective against radiation death and to study the antigenicity of such extracts to determine whether they could used in the crude form.

MEDICAL ASPECTS OF IONIZING RADIATION (Cont)

d. Biological hazard of fallout

03.37 Counter and dogs                      Walter Reed Army Ins. of Research      \$40,000

Covers the installation of a whole body counting facility, construction of housing and care of irradiated dogs, and the determination of fission products in biological specimen and follow up studies of Operation PLUMBOB swine.

03.43 Biomed program                      Naval Radiological Defense Lab.      \$240,000

This project is part supports project 35, attempting to define the hazard of all types of radiation. The rest of the program supports project 27, the broad radiobiology program.

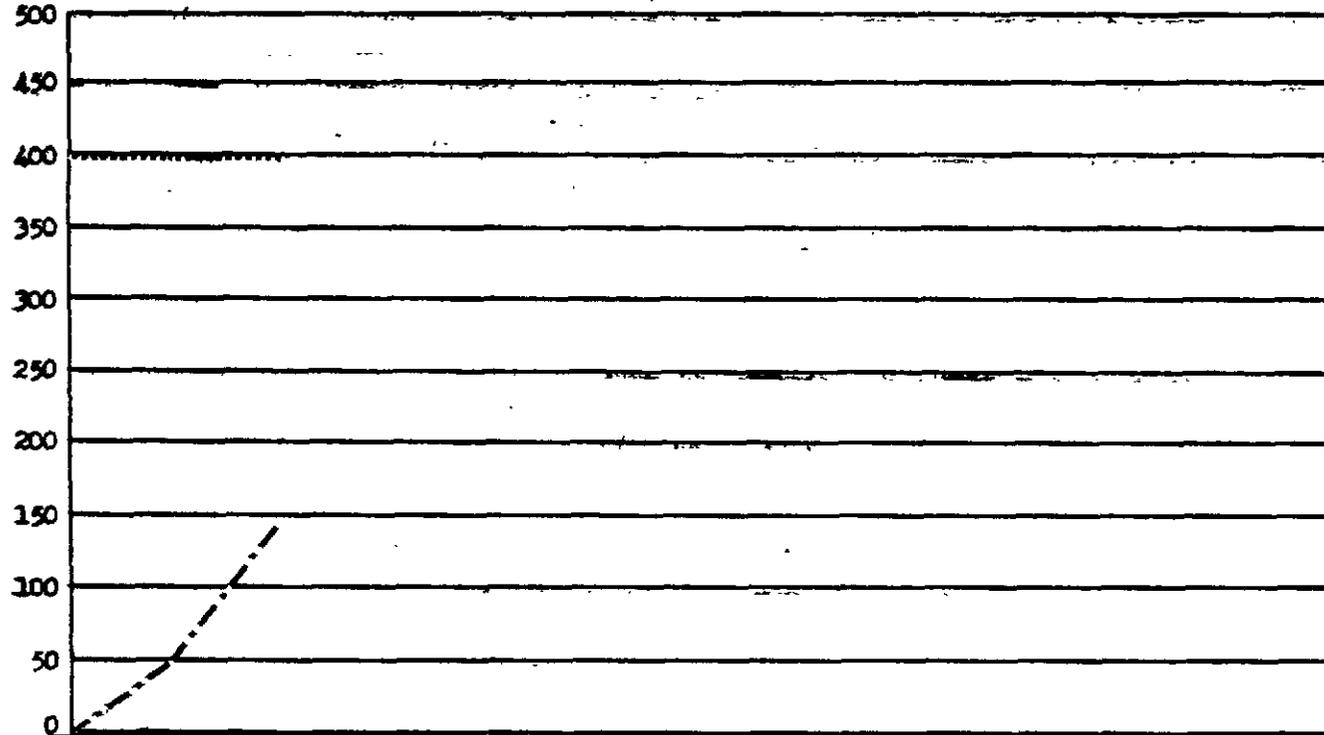
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RESEARCH DEVELOPMENT TEST AND EVALUATION  
FY 1961

RESEARCH AND DEVELOPMENT  
MEDICAL ASPECTS OF THERMAL INJURY

(IN THOUSANDS OF DOLLARS)



|                 | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| PROGRAM         | 399 | 399 |     |     |     |     |     |     |     |     |     |     |
| RESERVATIONS    | 161 | 167 |     |     |     |     |     |     |     |     |     |     |
| COMMITMENTS     | 50  | 149 |     |     |     |     |     |     |     |     |     |     |
| OBLIGATIONS     | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| EXPENDITURES    | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| WORKING BALANCE | 238 | 232 |     |     |     |     |     |     |     |     |     |     |

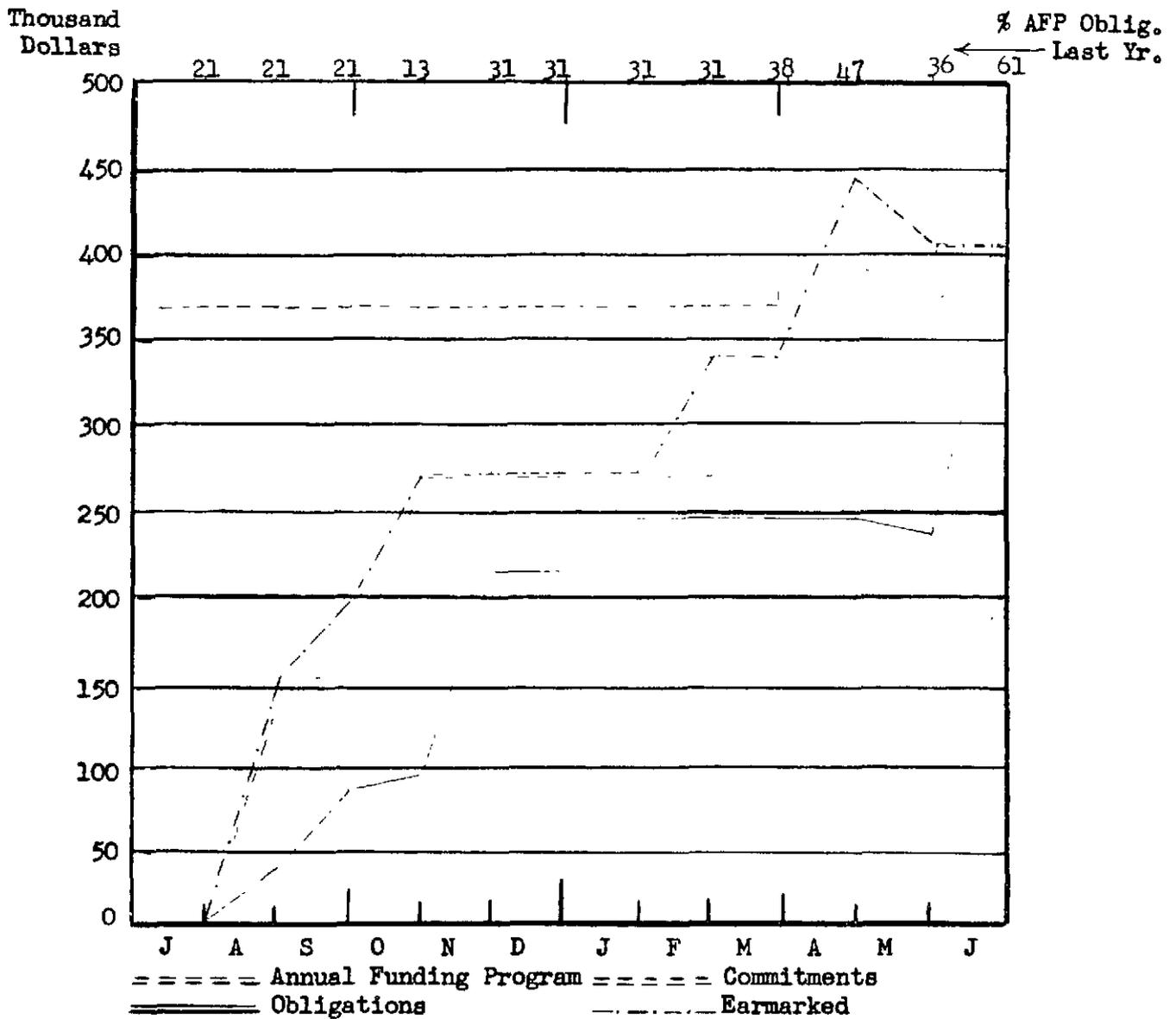
PROGRAM

CUMULATIVE COMMITMENTS

OBLIGATIONS

RESEARCH DEVELOPMENT TEST & EVALUATION  
 TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
 OBLIGATIONS FY 60

MEDICAL THERMAL INJURY

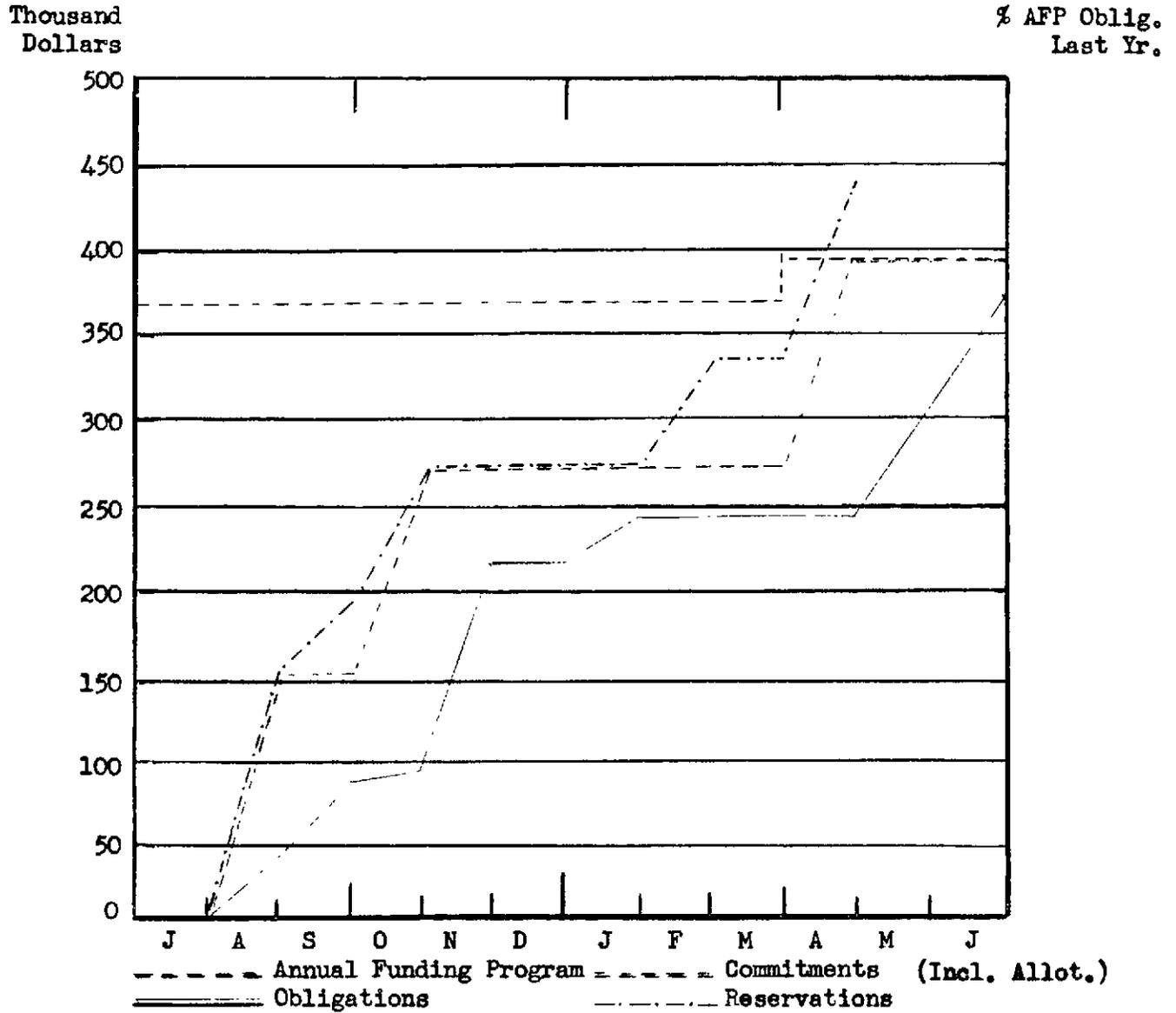


Note: Excludes AEC Transfers

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % | Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % |
|-------|-----------------|-----------------|-----------|-------|-----------------|-----------------|-----------|
| Jul   | 366             | 2               | .6        | Jan   | 369             | 249             | 67        |
| Aug   | 366             | 40              | 11        | Feb   | 369             | 249             | 67        |
| Sep   | 366             | 85              | 23        | Mar   | 369             | 249             | 67        |
| Oct   | 366             | 91              | 25        | Apr   | 396             | 249             | 63        |
| Nov   | 369             | 217             | 59        | May   | 396             | 234             | 59        |
| Dec   | 369             | 217             | 59        | Jun   | 405             | 405             | 100       |

RESEARCH DEVELOPMENT TEST & EVALUATION  
 TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
 OBLIGATIONS FY 60

MEDICAL THERMAL INJURY

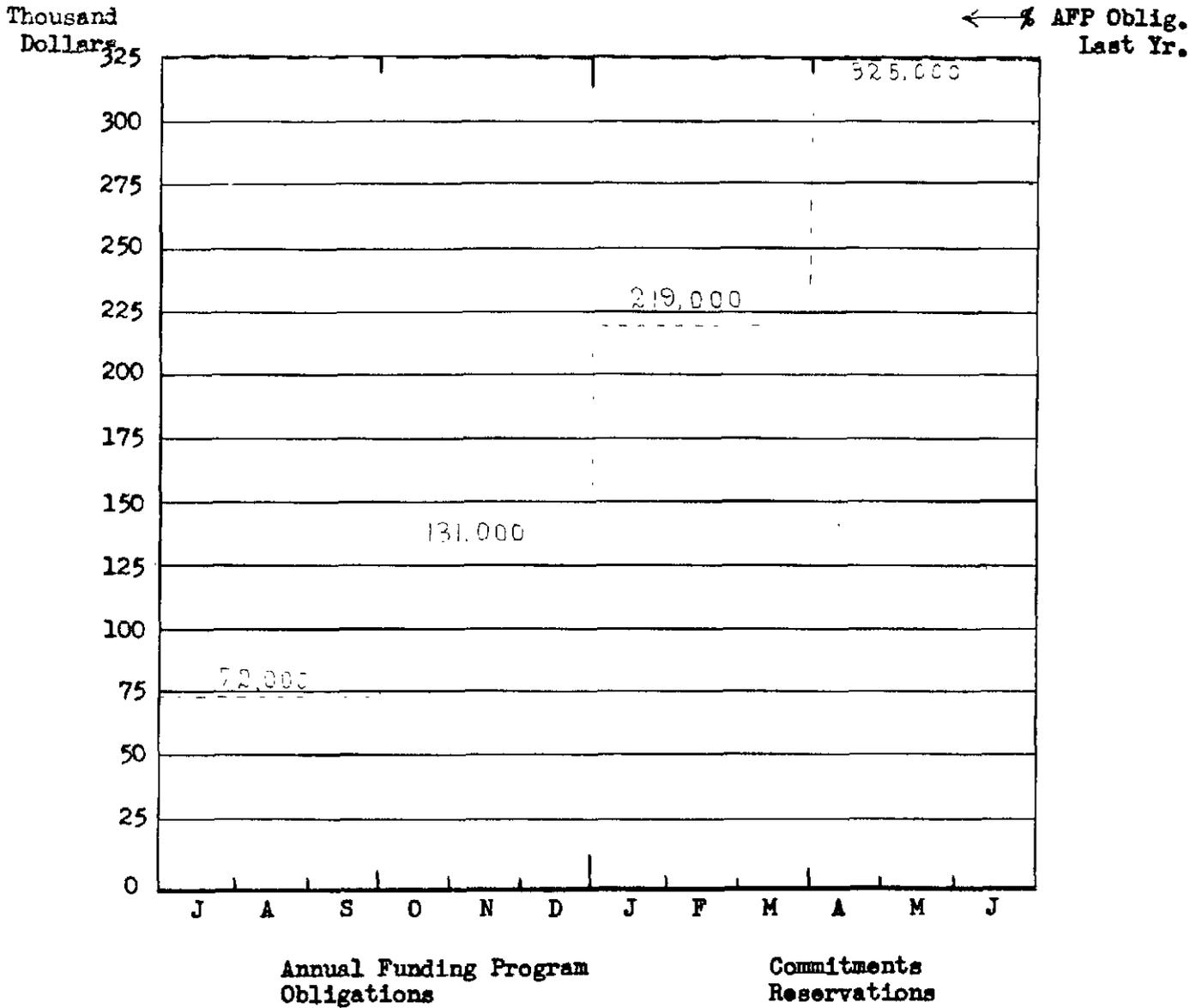


Note: Excludes AEC Transfers

| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   | 366                | 2                  | .6           | Jan   | 369                | 249                | 67           |
| Aug   | 366                | 40                 | 11           | Feb   | 369                | 249                | 67           |
| Sep   | 366                | 85                 | 23           | Mar   | 369                | 249                | 67           |
| Oct   | 366                | 91                 | 25           | Apr   | 396                | 249                | 63           |
| Nov   | 369                | 217                | 59           | May   |                    |                    |              |
| Dec   | 369                | 217                | 59           | Jun   | 396                | 370                | 93           |

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 61**

**MEDICAL THERMAL INJURY**



Note: Excludes AEC Transfers

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl (%) | Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl (%) |
|-------|-----------------|-----------------|-------------|-------|-----------------|-----------------|-------------|
| Jul   |                 |                 |             | Jan   |                 |                 |             |
| Aug   |                 |                 |             | Feb   |                 |                 |             |
| Sep   |                 |                 |             | Mar   |                 |                 |             |
| Oct   |                 |                 |             | Apr   |                 |                 |             |
| Nov   |                 |                 |             | May   |                 |                 |             |
| Dec   |                 |                 |             | Jun   |                 |                 |             |

## PLANNED COMMITMENTS 4TH QUARTER

A-10 Medical Aspects of Thermal Injury \$122,622

a. Systemic Effects of Thermal Radiation - \$79,396

(1) Systemic Effects of Burns - \$79,396  
Agency: Medical College of Virginia

(a) The evaluations of the relation between the shock state following thermal burns and the liberation of toxic substance in the damaged tissues. This is part of the program of mass casualty effects and possible approaches to therapy.

b. Protective Clothing and Skin - None

c. Oculo-visual Effects - \$43,226

(1) Spectral Response Characteristics in Retinal Burns - \$43,090  
Agency: Medical College of Virginia

(a) Determination of spectral response characteristics and time - temperature relationships in retinal burns in rabbits and humans. This is necessary in determination of yield - height of burst relationships in retinal burns.

(2) Operational Aspects of Retinal Burns - \$136  
Agency: Lockheed Aircraft Corp.

(a) This program will determine the relationship among biological, physical, and operational aspects of large numbers of retinal burns resulting from high altitude detonation of nuclear weapons. (The funds to be committed to this program in fourth quarter FY60 amount to \$50,381. \$40,000 will be recovered from the School of Aviation Medicine and \$10,245 will be transferred out of A-11 for this purpose.)

### OUTSTANDING COMMITMENTS - 3/31/60

A-10 Medical Aspects of Thermal Injury \$25,000

a. Systemic Effects of Thermal Radiation - None

b. Protective Clothing and Skin - None

c. Oculo-visual Effects - \$25,000

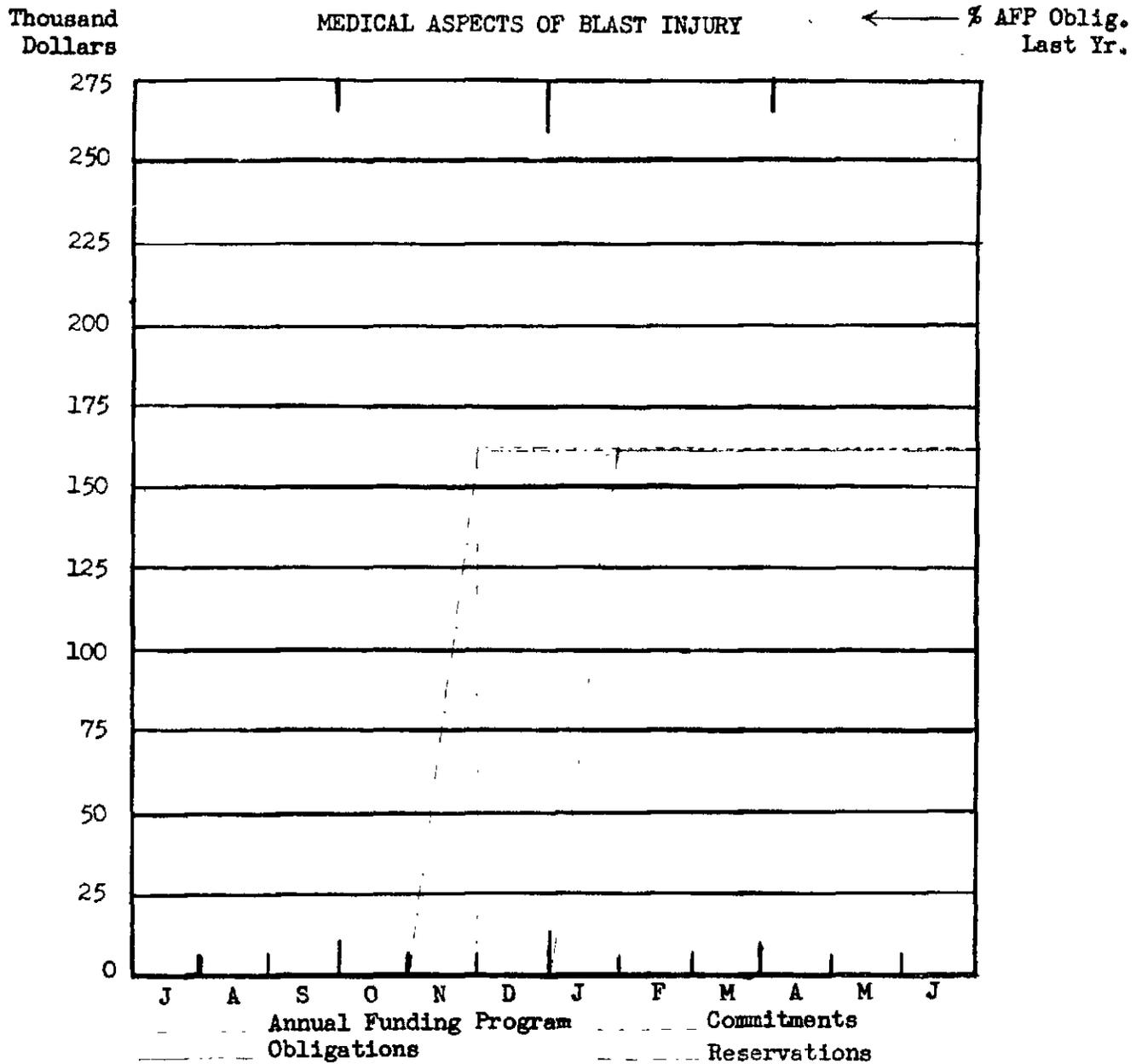
Laboratory investigation of the production of chorioretinal injury, and the protection afforded by photochromic filters.

(1) Agency: SAM

This project is being cancelled and funds will be applied to the study of retinal burns being conducted by Lockheed Aircraft Corporation.

| <u>ACTIVITY</u>  | <u>LABORATORY</u>                 | <u>AMOUNT</u> |
|--|-----------------------------------|---------------|
| A-10 MEDICAL ASPECTS OF THERMAL INJURY   |                                   |               |
| a. Systemic effects thermal radiation  |                                   |               |
| 03.31 Burn physiology  | Naval Medical Field Research Lab. | \$60,000      |
| Initiated in FY 1955. Extensive studies of physiological changes in varying annual following burns. Closely related to projects 32, 33, 34; continuation expected.   |                                   |               |
| 03.32 Burn toxin   | New York Medical Center           | \$50,000      |
| Initiated in FY 57. Producing high thermal intensity flash burns in monkeys with a reproducible mortality to permit study of local and systemic effects and evaluation of fluid therapy. Aim is to develop methods suitable for the mass therapy of extensive thermal burns.                 |                                   |               |
| 03.33 Burn toxin   | Medical College of Virginia       | \$65,000      |
| Started in FY 56. Involves the evaluation of the possible relationship between the shock state following thermal burns and the liberation of a toxic substance in the damaged tissues. Continuation for several years is anticipated in view of probable worthwhile results.                 |                                   |               |
| 03.34 Burn toxin   | National Naval Medical Center     | \$15,000      |
| Initiated in FY 58. Involves evaluation of enzyme system changes in burned animals. Expected to require at least 2 years for completion.   |                                   |               |
| b. Protective clothing and skin  |                                   |               |
| None   |                                   | 0             |
| c. Oculo-visual effects  |                                   |               |
| 03.01 Eye burn   | Naval Material Lab.               | \$50,000      |
| Initiated in FY 56. Primary purpose is source development and instrumentation for short duration high intensity pulses required in determining eye burn parameters. Also concerned with parameters of skin burn. Burns under clothing, cell heat death.                                      |                                   |               |
| 03.02 Eye burn   | Medical College of Virginia       | \$10,000      |
| Initiated in FY 59. Producing retinal burns in rabbits and humans to determine spectral response characteristics and time-temperature relationships. Best source is modified clinical instrument. Effort is partially in source development.   |                                   |               |
| 03.03 Eye burn   | School of Aviation Medicine       | \$50,000      |
| Initiated in FY 59. Producing retinal burns in monkeys and rabbits with heliostat as source, giving different spectra than other sources. Effort in FY 61 will mainly be establishing significant experimental pattern. Also supporting development of exploding wire source for comparator. |                                   |               |

RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 60



Note: Excludes AEC Transfers

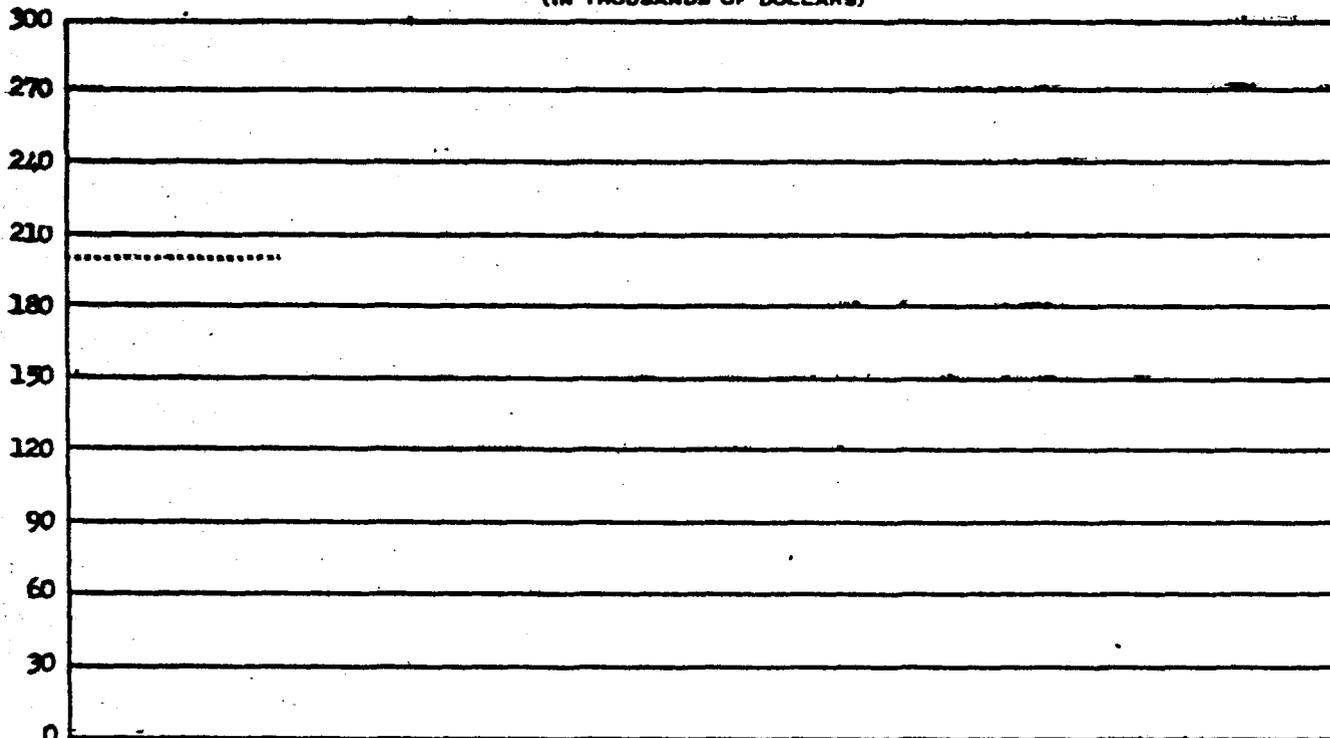
| Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% | Month | Cum AFP<br>(Thous) | Cum Obl<br>(Thous) | Cum Obl<br>% |
|-------|--------------------|--------------------|--------------|-------|--------------------|--------------------|--------------|
| Jul   |                    |                    |              | Jan   | 160                | 160                | 100          |
| Aug   |                    |                    |              | Feb   | 160                | 160                | 100          |
| Sep   |                    |                    |              | Mar   | 160                | 160                | 100          |
| Oct   |                    |                    |              | Apr   | 160                | 160                | 100          |
| Nov   | 0                  | 0                  | 0            | May   | 160                | 160                | 100          |
| Dec   | 160                | 0                  | 0            | Jun   | 160                | 160                | 100          |

**RESEARCH DEVELOPMENT TEST AND EVALUATION  
FY 1961**

**RESEARCH AND DEVELOPMENT**

**MEDICAL ASPECTS OF BLAST INJURY**

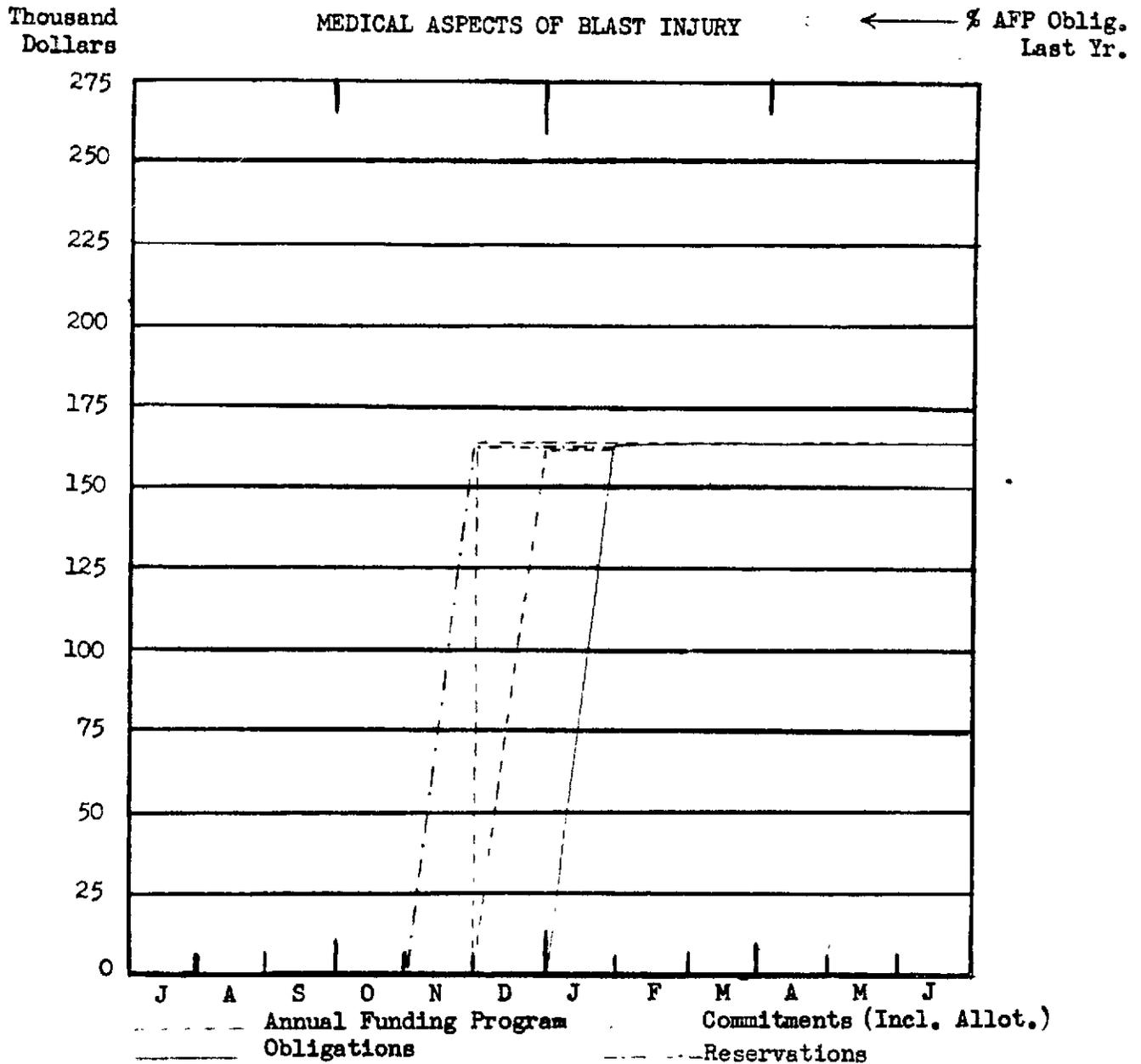
(IN THOUSANDS OF DOLLARS)



|                 | JUL | AUG | SEP | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN |
|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| PROGRAM         | 200 | 200 |     |     |     |     |     |     |     |     |     |     |
| RESERVATIONS    | -0- | 200 |     |     |     |     |     |     |     |     |     |     |
| COMMITMENTS     | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| OBLIGATIONS     | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| EXPENDITURES    | -0- | -0- |     |     |     |     |     |     |     |     |     |     |
| WORKING BALANCE | 200 | -0- |     |     |     |     |     |     |     |     |     |     |

..... PROGRAM      ———— CUMULATIVE COMMITMENTS      ———— OBLIGATIONS

**RESEARCH DEVELOPMENT TEST & EVALUATION  
TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
OBLIGATIONS FY 60**

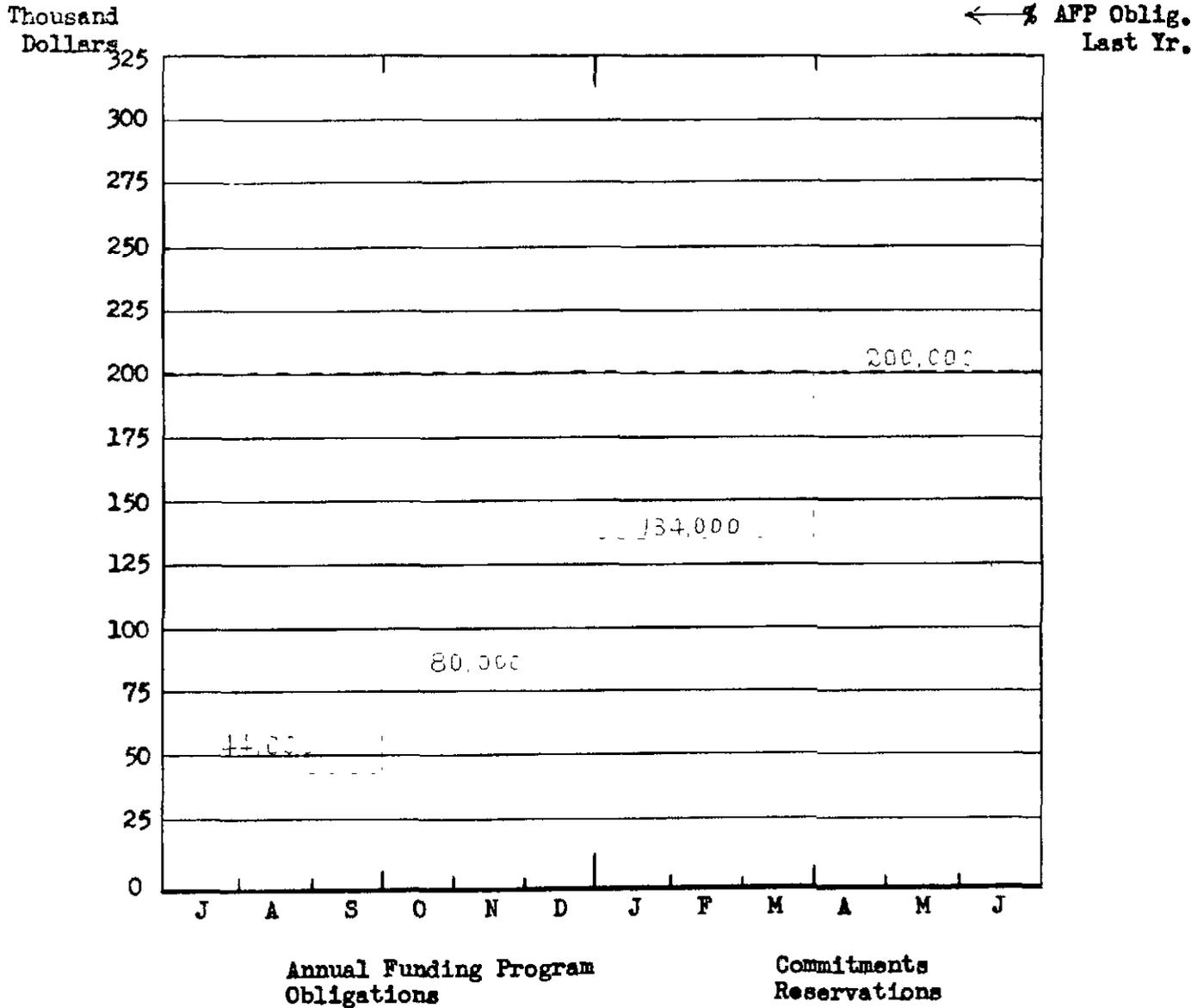


**Note: Excludes AEC Transfers**

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % | Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl % |
|-------|-----------------|-----------------|-----------|-------|-----------------|-----------------|-----------|
| Jul   |                 |                 |           | Jan   | 160             | 160             | 100       |
| Aug   |                 |                 |           | Feb   | 160             | 160             | 100       |
| Sep   |                 |                 |           | Mar   | 160             | 160             | 100       |
| Oct   |                 |                 |           | Apr   | 160             | 160             | 100       |
| Nov   | 0               | 0               | 0         | May   |                 |                 |           |
| Dec   | 160             | 0               | 0         | Jun   | 160             | 160             | 100       |

RESEARCH DEVELOPMENT TEST & EVALUATION  
 TOTAL ANNUAL FUNDING PROGRAM COMPARED TO  
 OBLIGATIONS FY 61

MEDICAL ASPECTS OF BALST INJURY



Note: Excludes AEC Transfers

| Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl (%) | Month | Cum AFP (Thous) | Cum Obl (Thous) | Cum Obl (%) |
|-------|-----------------|-----------------|-------------|-------|-----------------|-----------------|-------------|
| Jul   |                 |                 |             | Jan   |                 |                 |             |
| Aug   |                 |                 |             | Feb   |                 |                 |             |
| Sep   |                 |                 |             | Mar   |                 |                 |             |
| Oct   |                 |                 |             | Apr   |                 |                 |             |
| Nov   |                 |                 |             | May   |                 |                 |             |
| Dec   |                 |                 |             | Jun   |                 |                 |             |

| <u>ACTIVITY</u>                       | <u>LABORATORY</u> | <u>AMOUNT</u> |
|---------------------------------------|-------------------|---------------|
| A-9 MEDICAL ASPECTS OF BLAST INJURY   |                   |               |
| a. Mechanism of blast injury          |                   |               |
| 03.12 Blast biology                   | Lovelace          | \$200,000     |
| b. Prevention of blast injury         |                   |               |
| None                                  |                   | 0             |
| c. Mass casualty methods of treatment |                   |               |
| None                                  |                   | 0             |