

ORIGINAL

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

AFRRI STAFF MEMORANDUM
NUMBER 10-1

26 July 1967

DNA1.941006.076a

ORGANIZATION

AFRRI Organization

1. PURPOSE. To promulgate the organization, mission and functions of the Armed Forces Radiobiology Research Institute (AFRRI).

2. EXTERNAL ORGANIZATION. In accordance with the provisions of reference 7.a., AFRRI is an operational field element of the Defense Atomic Support Agency (DASA). In exercising command and administrative control of AFRRI, the Director, DASA, is assisted in matters of professional policy direction and related matters by a Board of Governors consisting of himself and the Surgeons General of the Army, Navy and Air Force.

3. MISSION. The AFRRI mission is set forth in reference 7.a.

4. INTERNAL ORGANIZATION. The internal organization of the Institute is depicted in Inclosure 1.

5. FUNCTIONS. The functions of the Institute are set forth in references 7.a. and b. and further amplified in Inclosure 2.

6. CHANNELS OF AUTHORITY AND COMMUNICATION. Channels are indicated in Inclosure 1 and are bi-directional in nature. In the absence of a deputy director, all departments and offices normally reporting to that deputy will report to and receive direction from the office of the Director. In the absence of the Director, the Deputy Director, Operations and Administration will assume the duties of acting director. In the absence of both the Director and the Deputy Director, Operations and Administration, the Assistant Deputy Director, Scientific, will assume the duties of acting director.

7. REFERENCES.

a. Department of Defense Directive 5105.33, 20 November 1964, w/Change I, 27 April 1966, subject: Armed Forces Radiobiology Research Institute (AFRRI).

This Memorandum supersedes AFRRI Staff Memorandum Number 10-1, 16 Mar 67, Change I, 12 April 67 and Change 2, 8 May 67.

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HRE-225

f. Assistance in the acquisition and implementation of computer programs, both in-house and at other installations.

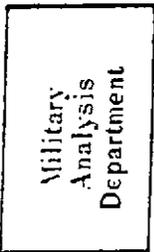
12. Manages and operates the AFRRRI DATA Acquisition System (DAS), providing the necessary engineering and technical services to ensure proper operation of the equipment, and consulting and programming services necessary for the efficient and effective utilization of the DAS by AFRRRI investigators.

13. LABORATORY SUPPORT OFFICE

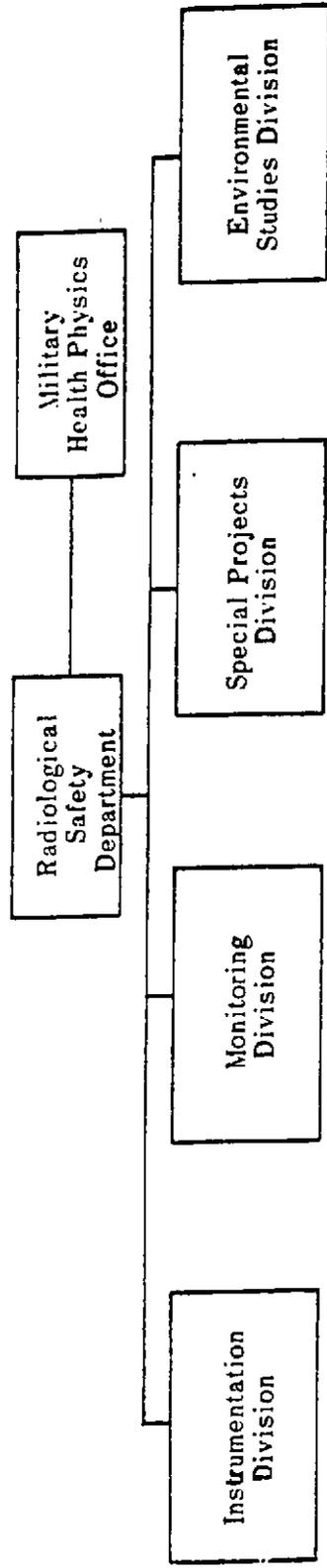
1. Responsible for providing laboratory support services to the Institute in the areas of pathology, electron microscopy, hematology, histopathology and related functions as required.

2. Responsible for the initiation of procurement action, the holding and care, distribution and ultimate disposition of experimental biological specimens required for radiobiology research.

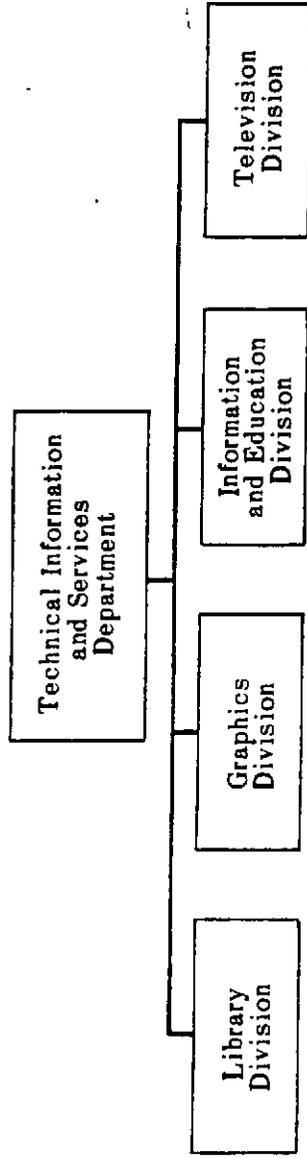
ORGANIZATIONAL CHART - MILITARY ANALYSIS DEPARTMENT



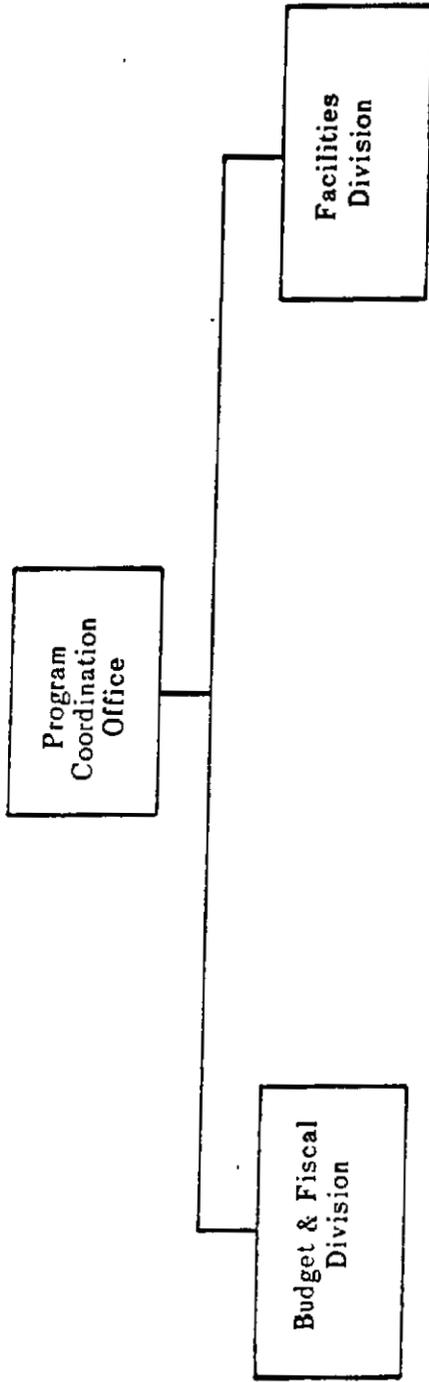
ORGANIZATIONAL CHART - RADIOLOGICAL SAFETY DEPARTMENT



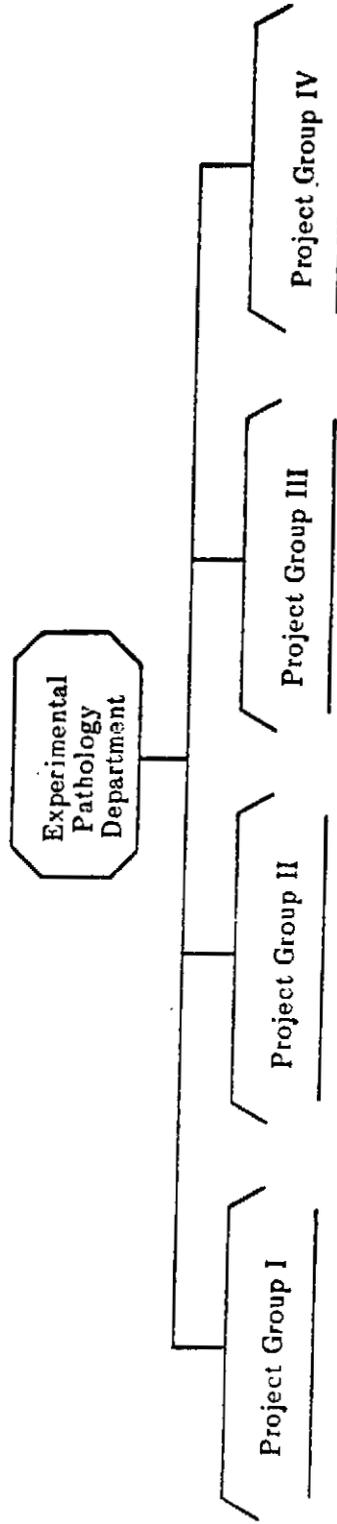
ORGANIZATIONAL CHART - TECHNICAL INFORMATION AND SERVICES DEPARTMENT



ORGANIZATIONAL CHART - PROGRAM COORDINATION OFFICE

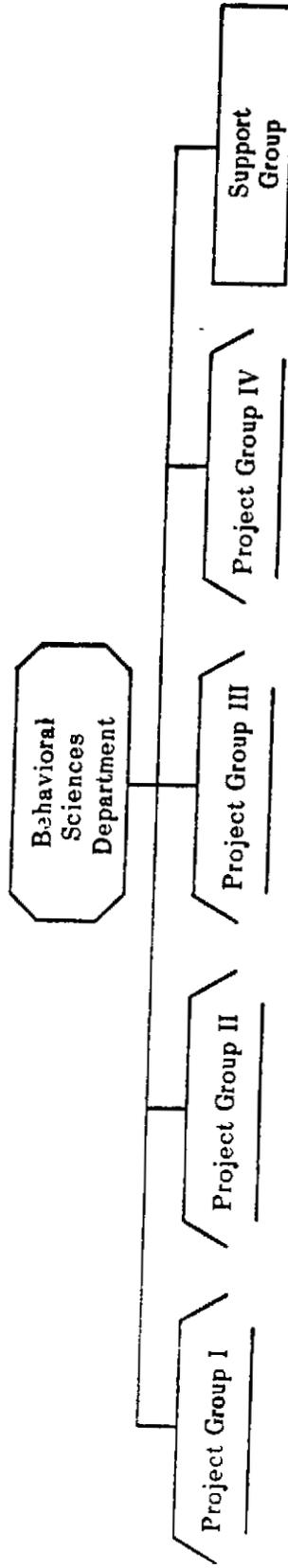


ORGANIZATIONAL CHART - EXPERIMENTAL PATHOLOGY DEPARTMENT



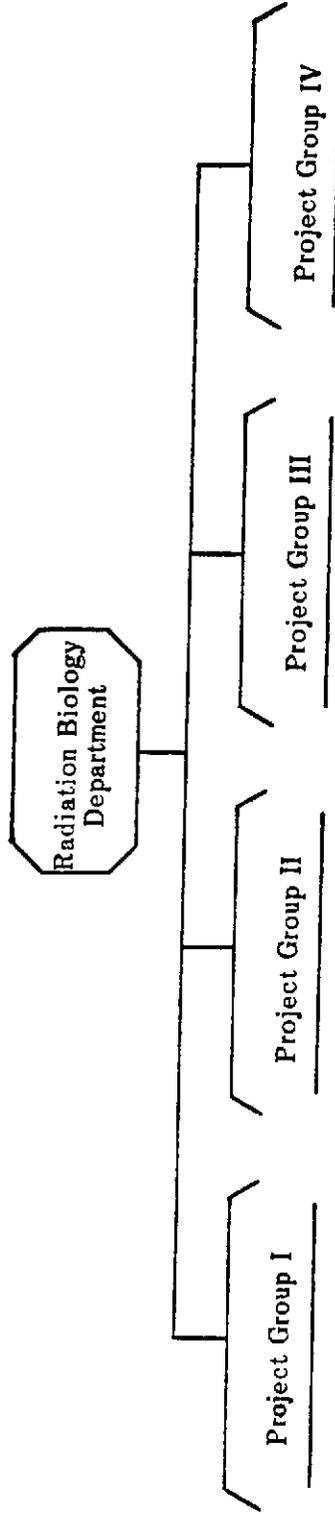
○ = Scientific Department
□ = Research Projects Group

ORGANIZATIONAL CHART - BEHAVIORAL SCIENCES DEPARTMENT



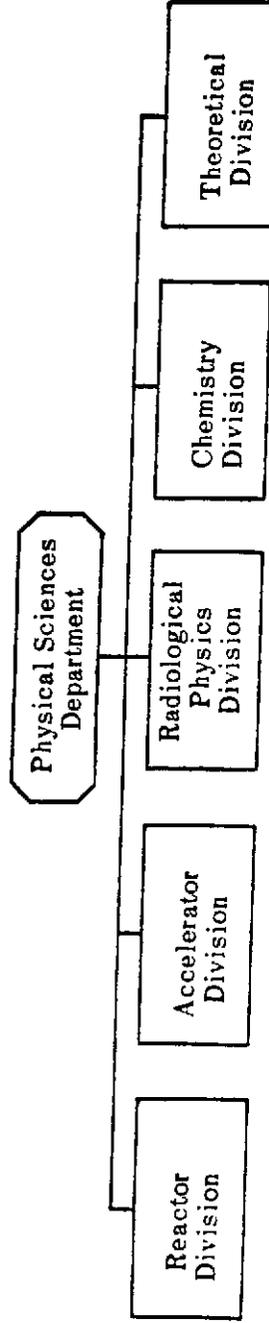
□ = Scientific Department
▤ = Project Groups

ORGANIZATIONAL CHART - RADIATION BIOLOGY DEPARTMENT



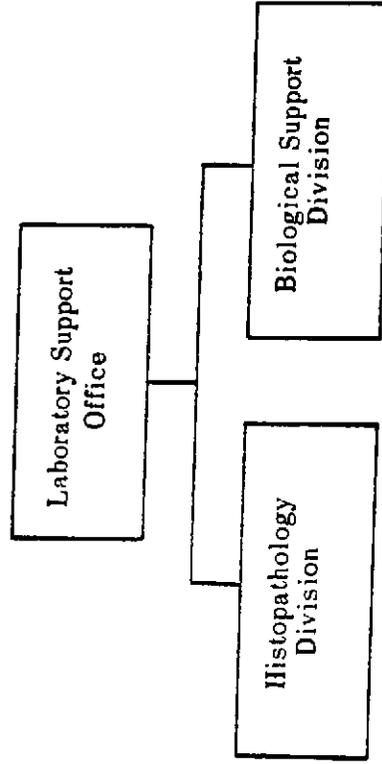
□ = Scientific Department
▭ = Research Projects Group

ORGANIZATIONAL CHART - PHYSICAL SCIENCES DEPARTMENT



○ = Scientific Department
□ = Support Divisions & Branches

ORGANIZATIONAL CHART - LABORATORY SUPPORT OFFICE



FUNCTIONAL STATEMENTS

01. DIRECTOR, ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE

1. Commands, under the military command and administrative control of the Director, DASA, the Armed Forces Radiobiology Research Institute (AFRRI).

2. Provides within AFRRI, over-all surveillance, direction, coordination, advice and assistance on major actions affecting 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, as specified in DOD Directive 5105.33, Paragraph V., Functions.

3. Formulates plans and policies to accomplish all phases of the AFRRI activities.

01A. EXECUTIVE OFFICER

1. Functions as an integral part of the Office of the Director.

2. Exercises no independent authority, but acts for the Director on any matters not requiring the personal attention of the Director, which fall under established Directorate policy.

3. Coordinates matters requiring staff action by two or more organizational elements prior to presentation for the Director's decision.

4. Performs such other duties as are assigned.

02. DEPUTY DIRECTOR, OPERATIONS AND ADMINISTRATION

1. Responsible for the organization, effective operation, administration and supervision of assigned personnel subject to the authority, direction and control of the Director for departments of: Technical Information and Services, Operations and Administration, Radiological Safety, Military Analysis and Program Coordination.

2. Advises the Director, AFRRI, on all support and administrative matters necessary to support the radiobiological research programs of the Institute.

3. Provides assistance and guidance, as necessary, to technical and scientific panels and committees organized within AFRRI in the area of administration and support functions.

4. Provides administrative assistance as directed for the Director AFRRRI, in liaison with Headquarters, DASA, the AEC, National Institutes of Health, Colleges and Universities, other DOD and other Federal organizations and the civilian community.

5. Will, in the area of operations and administration:

a. Evaluate, for the Director, administrative problems and make recommendations for their solution.

b. Recommend to the Director, inter-agency or inter-service agreements with specific regard to the administrative aspects thereof.

c. Recommend to the Director, administrative and support actions, including priorities, necessary or desirable in support of research projects approved or under consideration.

d. Assist Director, AFRRRI in allocation of direct and indirect research support funds.

e. Assist Director, AFRRRI in providing justification of direct, indirect and administrative support funds to higher authorities.

f. Assist Director, AFRRRI in defending the support portion of the AFRRRI budget.

03. PROGRAM COORDINATION OFFICE

Responsible for Comptroller functions, management-engineering, long range planning, facilities management, delineation of resource requirements, program formulating and reporting. Includes the following functions:

a. Budget formulation, presentation and execution

b. Cost accounting, reporting and analysis

c. Monitoring of NNMC accounting performed for AFRRRI

d. Assuring sufficiency of funds.

e. Coordination with other departments of requirements for facilities, alterations and capital equipment and manpower.

f. Space utilization studies

g. Coordination of the AFRRRI Military Construction Program

h. Coordination of minor construction, alteration and improvement and maintenance of real property including utilities.

i. Master facility planning

j. Liaison with LGCI (DASA), Public Work Office (NNMC) and appropriate Naval Facilities Engineering Command elements.

k. Coordination of contractual requirements for scientific and technical research.

l. Coordination with Project Officer, Contract Management Branch, DASA and contractor for development of scope-of-work and resolution of problems.

m. Assuring compliance with contractual requirements (Non-technical)

n. Responsible for industrial safety function.

04. OPERATIONS AND ADMINISTRATION DEPARTMENT

1. Responsible for all administrative matters, including the coordination of the internal administration of the AFRRRI.

2. Responsible for all civilian personnel functions of the AFRRRI, including civilian personnel records, position classification, time keeping, incentives and awards program, recruiting program, technical support and advice to the Technical Information and Services Department in the civilian personnel training and development program and management of the central stenographic and clerical pool.

3. Provides central stenographic and clerical support services.

4. Responsible for all military personnel functions of the AFRRRI including records, reports, allowances and liaison with supporting services organizations.

5. Responsible for travel, transportation and reservation functions

6. Responsible for records, forms and files management functions

7. Responsible for coordination with the AFRRRI Program Coordination Office, on all matters of budgetary and fiscal planning.

8. Responsible for initiating procurement action for materials and services, receipt, custody, inventory, stowage, and issue of equipment and supplies.

9. Responsible for classified document control and personnel and physical security.

10. Responsible for coordination of all matters concerning AFRRI's U.S. Atomic Energy Commission license including developing of applications for licenses, modifications of licenses and other related matters.

11. Conduct periodic unannounced inspections of all uses of radiation sources using as a guide for compliance AEC regulations and pertinent AFRRI Directives.

12. Responsible for processing procurement requests for radioactive material and records on control and accountability of all radioactive material within the AFRRI complex employing computer programming techniques as necessary.

13. Participate as recorder for Radiation Safety Review Committee, Reactor Safeguards Panel, Accelerator Safeguards Panel and Radionuclide Safeguard Panel. Participation includes, in addition to normal membership responsibility, arrange scheduling and agenda for meetings, prepare minutes and disseminate same to interested parties and submit reports of committee recommendations to the Director for approval and implementation.

14. Supports biomedical and physical science research and research support activities with consultation, engineering, design fabrication and maintenance services.

a. Designs and fabricates, within capabilities, special purpose electronic equipment required by the research and research support activities of the Institute.

b. Calibrates and maintains electronic equipment and instrumentation in general use within the Institute.

c. Conceives, designs and fabricates, from woods, plastics, fabrics and/or metals, special mechanical apparatus required by research and research support activities of the Institute.

d. Repairs, alters and modifies existing apparatus in use by research and research support activities.

e. Acts as consultant to using activities in determining need, feasibility, specifications and means of manufacture of new apparatus or modifications to existing apparatus. Tests items of special apparatus to determine their operating effectiveness.

05. RADIOLOGICAL SAFETY DEPARTMENT

1. Responsible for all matters concerning radiological safety.

2. Responsible for the development and maintenance of an adequate radiation protection organization.

3. Responsible for the development and maintenance of complete personnel radiation protection services.

4. Responsible for reviewing and making recommendations prior to the conduct of any new operation or experiment involving ionizing radiation. Represents the Directorate both independently and as a voting member of the Institute Safeguards Committee and of the Institute Isotopes Committee.

5. Responsible for radiological safety aspects of AEC license compliance. Authorized to suspend any operation or take such other action as necessary to avoid or terminate a radiobiologically unsafe condition.

6. Responsible for determining the need for, designing and conducting research and development programs oriented toward solving specific radiological safety problems.

06. TECHNICAL INFORMATION AND SERVICES DEPARTMENT

1. Responsible for the preparation and dissemination of written materials including publications relating to the research and support programs and operation of the Institute, and the conduct and presentation of informational programs, i.e., seminars, symposia, workshops, etc.

2. Responsible for providing services associated with the development and conduct of internal training or training as may be requested by the services. Additionally, provides assistance to individual members of the staff in the development of their career programs and in establishing contacts with local Government and private educational institutions for participation in specialized training.

3. Operating the Technical Library, Document Center and Film Library. These three activities serve as points of scientific reference for the AFRRI in specialized areas of biological and physical sciences relating to ionizing radiation. Responsible for the procurement, custody, arrangement, maintenance and distribution of classified and unclassified written and filmed materials.

4. Responsible for providing the Institute with the illustration, photographic and reproduction services required in the support of the AFRRI research and informational mission.

5. Responsible for providing specialized informational services, such as television not encompassed above.

07. MILITARY ANALYSIS DEPARTMENT

1. Responsible for studying and analyzing, with respect to military radiobiology, the tactics, organization, doctrine, plans, maneuvers, exercises and the published requirements of the three Services in order to interpret these requirements for the research departments of the AFRRI.

2. Responsible for assisting the research departments in relating their output to military requirements by finding ways and means to apply radiobiological information to military situations in a form which makes it useful to military commanders at all levels.

3. Responsible to provide a military consultant service to the other elements of the AFRRI.

4. Maintain cognizance of radiological aspects of standard and developmental equipment of the Military Services.

5. Consult with appropriate elements of the Military Services which participate in or contribute to the development of doctrine, policies, principles and concepts pertaining to military radiological hazards.

6. Maintain liaison with appropriate elements of the Services responsible for teaching or training military personnel in subjects related to military radiobiological hazards.

08. DEPUTY DIRECTOR, SCIENTIFIC

1. Responsible for the organization, effective operation, administration and supervision of assigned personnel subject to the authority, direction and control of the Director for departments of Behavioral Sciences, Radiation Biology, Experimental Pathology and Physical Sciences and the Laboratory Support Office.

2. Responsible for the scientific and technical planning of the AFRRRI research program.

3. Advises the Director, AFRRRI on technical and scientific matters within the broad field of radiobiology and related scientific disciplines necessary to support radiobiological research programs.

4. Supervises all scientific departments of the Institute.

5. Provides assistance and guidance to technical and scientific panels and committees organized within the AFRRRI.

6. Provides technical assistance as directed for the Director, AFRRRI in scientific liaison with Headquarters, DASA, the AEC, National Institutes of Health, Colleges and Universities, other DOD and other Federal laboratories and the civilian scientific community.

7. Will, in the area of military radiobiology,

a. Evaluate, for the Director, military radiobiological problems and make recommendations for the feasibility of their investigation by AFRRRI.

b. Recommend to the Director, programs or projects for approval including priority of individual projects.

c. Assist the Director in allocation of research program funds.

d. Assist the Director in providing technical justification of the AFRRRI research program to higher authorities.

e. Assist the Director in defending the direct research portion of the AFRRRI budget.

08A. ASSISTANT DEPUTY DIRECTOR, SCIENTIFIC

1. Functions as an integral part of the office of the Deputy Director, Scientific.

2. Assists the Deputy Director, Scientific in the performance of his duties.

3. Assists the Deputy Director, Scientific as directed in the coordination of all functions of the Departments of Behavioral Sciences, Experimental Pathology, Physical Sciences, and Radiation Biology and the Laboratory Support Office.

4. Coordinates the evaluation of service requirements and requirements developed by DASA and AFRRRI and assists in the determination of the AFRRRI capability to develop and pursue specific research projects which will contribute to the colutions of these requirements.

5. Assists, as directed, in providing staff supervision in (a) the coordination of the research efforts of the various AFRRRI research departments; (b) preparation of preliminary plans for new research projects; (c) the coordination of any incidental research projects proposed, developed and approved for implementation by support departments of the AFRRRI; and (d) the coordination of AFRRRI research projects conducted at other facilities.

09. RADIATION BIOLOGY DEPARTMENT

1. Responsible for the conduct of radiobiology research in the following broadly descriptive areas:

a. The Relative Biological Effectiveness of Ionizing Radiations of Different Types, Energies, and Dose Rates

b. Investigation of Incapacitating Doses of Radiation

c. Biological Response to Ionizing Radiations.

2. The Department is engaged in studies of the early biological effects of ionizing radiations. Emphasis is placed upon the use of radiations that, in some degree, resemble nuclear weapons radiations. All studies have the objective of contributing to a better military understanding of the mammalian response to acute radiation injury.

3. The six broad classes of research listed below with associated remarks are representative of the investigative pursuits of the Department:

a. Radiation Incapacitation: Emphasis on evaluating the gross neuromuscular responses and the measurable physiological correlates of radiation injury using partial body shielding and biotelemetry methodology with a view towards identifying the prominent sites of radiation injury.

b. Dose Rate/Pulse Width: Studies of the biological effects from varying the average dose rate over several orders of magnitude and of the biological effects from unique pulsing radiation sources.

c. Median Lethality: Studies to compare the lethal effects of different types and energies of radiations, to provide experimental design information for the more sophisticated follow-on studies, and to provide a basis for interlaboratory comparison.

d. Nerve-membrane Response: Studies to evaluate the mechanism of perception of low-level radiation and to relate membrane and transport phenomena to the accompanying perception.

e. Biochemical Studies: Studies to identify quantitative and/or qualitative alterations in biochemical entities that may be functions of dose or type(s) of radiation.

f. Clinical Response Studies: Investigations with emphasis upon improving the clinical assessment, diagnosis, prognosis, and treatment of acute radiation injury. Such studies correlate the gross clinical effects, survival time, pathology, hematology and blood chemistry as functions of diurnal variations, radiation dose, time after dose, and types of radiations.

10. EXPERIMENTAL PATHOLOGY DEPARTMENT

1. Responsible for the design and execution of research projects for the elucidation of the pathophysiological events following the irradiation of several species of mammals at dose levels where recovery is probable. The departmental projects are designed to obtain a better understanding of the acute damaging effects of ionizing radiation to sensitive biological systems, to learn more about the rate and extent of recovery from sustained injury and to assess the size of permanent non-recuperable damage.

2. In order to achieve the departmental objective four major program areas are established, each with its own time-limited projects, yet interdependent with the total departmental effort. The program areas and their functions are:

a. The Injury Program: An integrated group of research projects aimed at evaluating the sequences of related pathologic changes that take place in living tissue as a consequence of exposure to ionizing radiation.

b. The Recovery Program: An integrated group of research projects designed to evaluate the biological processes involved in the recovery of living organisms and repair of tissues and cells following radiation injuries.

c. The Molecular Biology Program: A group of research projects concerned with the biochemical changes in various constituents of radiosensitive mammalian cellular systems.

d. The Immunology and Microbiology Program: A number of research projects concerned with the integrity of the immune system in the post-irradiation mammal. Additional studies attempt to delineate the combined effects of radiation and infection.

11. BEHAVIORAL SCIENCES DEPARTMENT

1. Responsible for originating and carrying out research projects in the field of behavioral science, which are consistent with the mission of AFRRI. In maintaining this responsibility, the department concerns itself with both pure and applied research.

2. The department is divided into four research projects, each under a project director, and a support group under a technical coordinator.

3. The orientation of the department is that of physiological psychology. Its investigations are directed to establishing how radiation affects sensation, perception, learning memory, locomotion, and emotion of various species. It studies effects upon various species and extrapolates from these findings to implications for radiation effects upon man. Special effort is made to establish the biological correlates of all behaviors investigated so that ultimately behavior may be altered by manipulation of the included: exploration into relationships of central nervous system pathways, conduction of neural impulses and simultaneously observed behavior.

4. In all instances the department is concerned with applying its findings to types of radiations of significant interest to the Armed Forces. It attempts to show behavioral responses to mixed fission and various isolated radiations. It examines the effects of these under varying conditions (single and additive, whole and partial doses). It studies radiation effects as related to environmental changes, including variations in temperature, humidity, and atmospheric pressure. Among the unusual environmental effects of concern to the department are those dealing with problems in outer space.

12. PHYSICAL SCIENCES DEPARTMENT

1. Responsible for supporting the biomedical research programs of the AFRRI by providing radiation sources, radiometric and analytic services, and professional and technical assistance in the physical sciences. In addition, the department conducts pure and applied research and development related to the mission of the Institute.

2. Operates, calibrates and maintains the AFRRRI-TRIGA Mark F Reactor and associated systems in compliance with appropriate regulations.

a. Provides radiation exposures in the various exposure facilities in the direct support of the AFRRRI research mission.

b. Supplies instruction and technical assistance to the Institute staff, relating to reactor operations, utilization, instrumentation and modification.

c. Conducts research to analyze reactor performance, develop and advance its capabilities, and evolve new applications.

3. Operates, calibrates and maintains the 150 KEV Texas Nuclear Corporation Neutron Generator. Responsible for planning, evaluation and technical input relative to design, procurement, installation and operation of advanced but related accelerators planned by the Institute.

a. Provide biologically or physically significant fluxes of positive ions, monoenergetic neutrons (of fixed or variable energies) and gamma radiation for radiobiological, dosimetric and calibration programs.

b. Provide radiation sources for activation analysis and isotope production.

c. Perform research, especially relatable to radiobiological research, in the fields of neutron physics, and target and equipment design.

4. Responsible for the operation, calibration and maintenance of the electron linear accelerator and for all planning and training related thereto. Responsible to:

a. Provide gamma radiation pulses having a uniform intensity over the area of large animals.

b. Provide bursts of essentially gamma-free photoneutrons.

c. Provide a source of high energy gamma radiation for activation analysis by the (γ, n) , $(\gamma, 2n)$, etc. reactions.

d. Supplements other sources (e.g., the reactor) in providing radioisotopes.

5. Operates, calibrates and maintains the Institute's X-ray equipment.

6. Responsible for remaining cognizant of the state of the art of large weapon radioactive fallout, with a view towards providing data and analysis on the related military and civilian radiobiology problems.

a. Analyzes both measurement and computation of the radiation field patterns produced by fallout, and the resulting depth dose distributions in human phantoms.

b. Compares the radiation fields produced by fallout with possible fallout simulators for radiobiology experimentation.

c. Aids in proposing and acquiring any fallout simulators judged feasible and required for AFRRI's programs.

7. Operates hot cell, hot laboratory, physical and analytical chemistry laboratory; conducts research, provides services and consultation in the following areas:

a. Radiation detection instrumentation - all methods of data acquisition and processing including coincidence counting systems, use of solid state radiation detectors, gamma ray spectroscopy and spectrum analysis, automated large scale sample handling and counting systems. Use of general purpose digital computers for real-time system operation and analysis is emphasized.

b. Activation analysis - quantitative analysis of submicrogram amounts of trace elements in biological material. Uses neutron, positive ions, and bremsstrahlung gamma rays to produce measurable radionuclides from stable constituents which may be present.

c. Physical chemistry - chemical reaction mechanisms, rates, etc., in an environment which includes ionizing radiation.

d. Radioisotope methodology - including tracer techniques and production of short-lived radioisotopes.

8. Provides physical dosimetry for experiments utilizing ionizing radiation. Conducts research in dosimetry and radiation measurements, with particular attention to depth dose measurements in tissue resulting from radiation sources of significance in military biology.

9. Develops tissue equivalent ionization chambers suitable for dosimetry in vivo and phantoms; correlates results with theoretical and empirical data; coordinates dosimetry techniques and results with other scientific laboratories; utilizes and refines present "standard" radiation dosimetry techniques; develops techniques for determination of neutron flux and spectra, including the use of threshold detectors and establishes standard x-ray, gamma and neutron fields for calibrating detection instruments, supervises various radiation exposures in order to standardize and optimize irradiation studies.

10. Investigates the theory of radiation emission, transport, and absorption, within the framework of the AFRRRI mission. These studies may include:

a. General concepts of radiation measurement, including dosimetry.

b. Radiation transport, especially:

(1) Methods of solving transport and diffusion problems pertinent to radiobiology.

(2) Radiation fields developed by and related to nuclear detonations of primary radiobiological concern.

(3) Radiation fields developed by and related to various laboratory sources of interest.

c. Radiation absorption, especially:

(1) Distribution in tissue of both gross energy deposition and Linear Energy Transfer.

(2) Mechanisms leading from the initial energy deposition, through molecular disruption, toward biological response.

11. Ensures that computer services, necessary for the fulfillment of Institute activities, are made available to the AFRRRI staff. To maintain these services, the following are provided:

a. Assistance in indentifying those research areas that could benefit from a computer application.

b. The capability to perform the mathematical analyses necessary to reduce the equations of the scientist to a form amenable to machine solution.

c. A computer programming capability.

d. An in-house computer capability consistent with the nature and magnitude of Institute computing activities.

e. The maintenance of agreements with other organizations (government, industrial and academic) to provide access to computing equipment necessary to the AFRRRI program but not available within the Institute, and

f. Assistance in the acquisition and implementation of computer programs, both in-house and at other installations.

12. Manages and operates the AFRRI DATA Acquisition System (DAS), providing the necessary engineering and technical services to ensure proper operation of the equipment, and consulting and programming services necessary for the efficient and effective utilization of the DAS by AFRRI investigators.

13. LABORATORY SUPPORT OFFICE

1. Responsible for providing laboratory support services to the Institute in the areas of pathology, electron microscopy, hematology, histopathology and related functions as required.

2. Responsible for the initiation of procurement action, the holding and care, distribution and ultimate disposition of experimental biological specimens required for radiobiology research.

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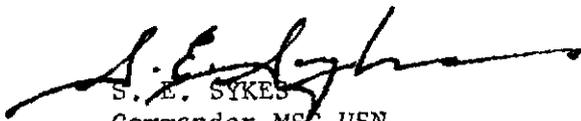
AFRRI Staff Memorandum 10-1, 15 Mar 67 is changed as follows:

The Inclosure 2, Functional Statements, paragraph 11-2. (Superseded).

The Department is divided into four research projects, each under a Project Director, and a support group, under a Technical Coordinator. (ADM)

OFFICIAL:

J. S. BURKLE
Captain MC USN
Director


S. E. SYKES
Commander MSC USN
Executive Officer

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