

COLLECTION DB/M

BOX No. 3377

FOLDER NA ~~REPORT OF VISIT TO THE BIOPHYSICS DIVISION, AIR FORCE  
SPECIAL WEAPONS CENTER, KIRTLAND AIR FORCE BASE, NEW  
MEXICO, BY CAPTAIN JAMES L. LIVERMAN~~

BIOMEDICAL BRANCH

I arrived in Kirtland on Sunday night, May 10, 1959 and reported for duty at 8:00 A.M. Monday. The first half-day was spent with Major J. L. Terry, Chief, Biomedical Branch, and with Captain Dale Lindall and Dr. T. S. Mobley, members of the branch.

A. Review of Off-site Research Contracts.

The various contracts which the branch monitors with civilian organizations were discussed in detail as to their present status.

1. The Lovelace Foundation, Albuquerque, is conducting research on the determination of alpha emitters in urine. This project has only recently been activated and no progress report has been submitted to date although its proximity to the case allows monitoring to be done continuously.

2. Alderson Research Laboratories - This contract for making manikins for neutron dose studies has been completed and the manikins have been delivered to the Los Alamos Scientific Laboratory.

3. Biology Operation, Hanford AEC Works - These studies have to do with the inhalation of plutonium. The levels of activity are 5,000, 50,000 and 500,000 disintegrations per minute per cubic meter of air. Approximately 50 dogs are involved and they are allowed to breathe particles of 1, 1 - 5, and 5 - 10 microns for one hour and sacrificed at times up to 2 weeks after inhalation. The uptake, retention and metabolism of plutonium in various organs is being studied.

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4. University of Arkansas - This contract has to do with recovery from acute radiation and is being monitored by Captain Lindall. He reports that satisfactory progress is being made and a number of progress reports are on file.

5. The University of Minnesota - This contract entitled "Research Services and Materials for Determining the Effects of Irradiation Upon Large Animals Simulating Man" was negotiated by WADC following its initiation by the ANPO and was transferred to AFSWC for monitoring and control. The aim of this particular study is to determine the neurological and neurophysiological effects following cobalt-60 irradiation to the heads of burros. The money which was given the first year was supposed to be enough to complete the contract in 18 months, however, a renewal proposal for another year was received from the University of Minnesota about April 1, and was sent to the AFSWC Procurement Office for proper handling. Apparently only \$15,000 had been projected for this work during the second and subsequent years in spite of the fact that the contract was initiated at about the level of \$100,000. A telephone conversation between Major Terry and Mr. Bando, RDZN, Headquarters ARDC, indicated that the proposal should be evaluated by the AFSWC staff and forwarded to Bando for funding. The letter forwarding this proposal from AFSWC to Bando was signed by Lt. Col. Lifton on 17 April 1959. Up to this time no information has been received from Headquarters ARDC concerning funding or assurance that it will be funded. Information must be forthcoming almost immediately to allow the University of Minnesota time to readjust their staff if the contract is not to be renewed. A telephone conversation with RDZN on May 26, 1959 reveals that that office has forwarded the

proposal to ANPO for action. Lt. Col. Gillespie in the ANPO indicates that Lt. Col. C. M. Barnes is in charge of the project but it was his general impression that the project was intended to be only for 1 - 1½ years and the small projection was for cleanup funds.

RECOMMENDATIONS: There appears either to have been a misunderstanding, bad planning or an inappropriate projection made for the July 1959 - July 1960 funding to let it fall to such a level when costs could be expected to be approximately the same as outlined in their initial proposal.

If this contract is to be handled under AFSWC's 7801 program and if they are to control and monitor it, then funds should be transferred directly from RDZN to RDRHM along with the various projections to prevent recurrence of this type of incident since it makes for overall bad public relations for the Air Force. On the other hand, if the contract was to be operative for only one year then the channels of communication should be unplugged to see that all interested parties are fully informed of the intentions, particularly the University of Minnesota.

#### B. Current Biomed In-house Effort

*4 people* The current Biomed in-house effort was discussed with Dr. Mobley since he appears to be the only one doing such research. His efforts have been stymied as indicated in the problems section below but he is making small efforts in trying to study the uptake of fission products by guppies and also in studying Rad prot irradiation effects in mice. He did some experiments last fall on studying the effects of radioprotective agents on the irradiation of hibernating ground squirrels. The results while only preliminary are very interesting and the experiments should be continued since they may offer ideas concerning the nature of resistance

to radiation of hibernating animals and this may well lead to a better understanding of ways in which pilots, and crews of aircraft can be protected from radiation.

C. Various aspects of the program in Biomed were discussed with each of the above named individuals and the various problems encountered in the performance of their mission were discussed. A determination was also made of what they felt their missions were in a more specific way. These are discussed below in two sections.

1. Problems

a. There is very limited laboratory space available for in-house research. Present space would be adequate for some effort except that the air is constantly filled with dust which completely prevents obtaining sterile conditions. In addition, since sterile conditions cannot be maintained, a number of problems are encountered in conducting any type of experiment whether it involves sterile conditions or not because of the enormous layering out of dust on equipment and on surfaces even in as short a period as overnight.

b. The air circulating system in the laboratory is continuous with that of the whole building and this completely prevents use of isotopes in research since the possibility of contamination of the whole building exists, including the low level laboratory.

c. Hoods are completely lacking in the laboratory.

d. There are no adequate facilities for keeping experimental animals in this laboratory nor have they been provided elsewhere.

e. At the present time there is no suitable source of radiation, either X-ray, gamma or neutron. It appears that it is almost impossible to accomplish their mission without sources of this type.

f. A particularly sore problem is the procurement of supplies of the type used in biological and medical experiments. It has been necessary in the past for the Ph.D. or M.D. who desired the supplies to "bird dog" the request from its initiation until final receipt of the material since the items are not available through the usual supply channels and must be purchased from off-site suppliers.

g. Funds appear to be completely inadequate for conducting in-house research in spite of there being four professional level staff (one DVM, one Ph.D., two M.D.s) capable of doing research. All of the active duty people have been through the Keel College course and Dr. Mobley was trained by Father Bachofer of the University of Notre Dame, one of the leading radiobiologists in the nation. Most of these people indicated a desire to do research if facilities were available. In searching the files it appears that they have requested that space for biological type experiments be made available but these have been turned down by Headquarters AFDC. Instead, the approval has been given for the installation of a whole body counter. Thus it appears that the cart must be before the horse in this particular case, i.e., before there is a well developed radiobiology or Biomed program, an expensive piece of equipment is made available which, to be properly used, requires a rather well developed and well planned research group.

The possibility of securing facilities by modification of local structures for biological research were discussed with Major Martin of the Biophysics Division and with Col. Giller, Assistant Director for Special Projects of AFSWC, formerly Director of the Research Directorate. Col. Giller indicated that the proposal for facilities had never really

been pressed for very hard by members of the Biomedical Branch or the Biophysics Division, but he felt that facilities for expansion for animal quarters and such related things could be made available by altering present facilities. He indicated the possibility of using a portion of the cryogenic laboratory for this work if the facilities, after inspection, appeared to satisfy the needs. It therefore seems possible that they will be able to modify existing facilities for use of the Biomed group. This consideration may be one reason for asking for the whole body counter instead of the other more urgently needed facilities. In this same connection, Dr. Mobley showed me preliminary drafts of justifications for facilities for an atomic radiations effects facility which the Biomed Branch is currently developing. These should reach Headquarters ARDC in the near future unless the decision is made locally to fund the construction or modification of already existing facilities for this purpose.

## 2. Mission

Points which came out in the discussion with members of the Biomed Branch concerning what they felt their mission as assigned by AFSWC and Headquarters ARDC were the following:

a. To do research as directed or permitted by Headquarters ARDC and as related to the mission of AFSWC, both basic (fundamental radiobiology) and applied research (reactor burn-up, aircraft contamination and related things).

b. To monitor or act as project officers of off-site research contracts administered through the Biomedical Branch of the Division.

c. To cooperate with other branches and divisions of AFSWC as well as to cooperate with the rest of the Armed Forces, particularly

all portions of the Air Force, in an advisory capacity concerning biological and medical problems related to the development of atomic weapons.

d. To prepare or cause to be prepared bibliographies, summaries, evaluations and related materials of work connected with the radiation problems encountered in weapons development.

D. General appraisal of the Biomedical Branch Activity

Evaluation:

- ✓ 1. The Biomed Branch appears to maintain adequate control of the off-site research contract program within the limits of their capability which in the past has been imposed by lack of adequate communication between RDZN, ANPO, HQ ARDC, and AFSWC.
- s 2. The development of an in-house research capability has progressed slowly because of supply, equipment, and facility problems. In addition it appears ----not from direct evidence of written or spoken words, but rather from an intuitive feeling for the situation---- that in the past there has been a lack of full appreciation by management of the Biophysics Division and of the Research Directorate of the important contribution which a strong biomedical program could make to the accomplishment of AFSWC's mission. It is recognized that priority restrictions may have been responsible for much of this attitude. It is also recognized that the present management at both levels is very much aware of the possibilities of a biomedical program.
3. The training, experience and inclination of the personnel of the Biomedical Branch is such that they could do a considerable amount of in-house research if adequate facilities were provided.
4. The Biophysics Division, in particular the Biomedical Branch, has been assigned the responsibility for conducting certain in-house research in urgent problem areas by the Technical Program Planning Documents. The necessary financial, facility, and moral support is not immediately obvious.

Recommendations:

1. Means for insuring better communication between all echelons of command and AFSWC should be instituted.
2. Either the in-house research capability should be developed by providing adequate facilities and financial support or the program

should be severely curtailed and the in-house research responsibility reassigned to another center. The five contracts now in operation could be quite adequately handled by a single competent scientist.

3. This recommendation is contingent upon action on the previous one. If it is decided to support the in-house effort, then qualified airmen, or civilian personnel should be provided to give laboratory technician level aid to the four scientists constituting the branch. If any kind of continuing program is to be developed this aspect is essential since it is likely that there will be a program in the future requiring the extended absence (three weeks - 6 weeks) of some of the scientists. Probably two technicians or airmen would be completely adequate unless it is decided to expand the program considerably.
4. The decision to purchase and install a whole body counter demands that adequate personnel be made available to develop program, and conduct a continuing program on using the facility to solve operational and basic research problems of interest to the Air Force. If it is not intended to expand the personnel of the Branch to man and use this facility then it should be killed now before it is built.

REACTORS BRANCH

The various programs which are either supervised or conducted by this branch were discussed with Lt. Col. DeLorenzo and his staff. These are discussed below.

1. Project Kiwi -- This program was discussed in general and in its relation to the total ANP program was outlined. One problem area outlined here and one which appears to be more or less of general occurrence in connection with the development of all weapons systems is that the physical scientists and engineers dominate the planning and operational aspects of the development program. This domination leads to neglect of the inclusion of biological scientists on the planning stages of experiments, i. e., the aspects of the program which finally will limit their usefulness are not considered at an early enough stage.

RECOMMENDATION:

It is recommended that every effort be made by RDREM to insure that persons responsible for weapons systems development be instructed to make full use of biological hazards evaluation personnel in the planning stages of experiments so as to insure that the biological aspects of the program do not lag behind.

2. Simulated Reactor Burn-Down Experiments at Dugway Proving Ground. Considerable time was spent discussing the burn-down of fuel elements at the Dugway Proving Ground, Utah to allow the measurement of the distribution of fission products which might arise as a result of a reactor accident. The experiments are directed specifically toward an assessment of the biological hazards connected with such

an incident. These experiments are to be continued during the summer of 1959 on an enlarged scale over an area covering a 60° arc with a radius of 20 miles from the burndown site. Samples will be collected at approximately 0.5° intervals on the arcs closest to the burn-down and at 2.0° intervals at the arcs most distant. These experiments have been conducted in conjunction with Dr. Bob Thomas, University of Rochester AEC Project, and he will again participate during the current tests.

A number of specific problems have been encountered in connection with the conduct of this program which sorely need to be resolved. These are enumerated below.

a. Late payment of Rochester participants.

The personnel from the University of Rochester AEC Project participated in the tests during the summer of 1958 under the assumption that payment for their services would be forthcoming either during or immediately subsequent to the tests. The records show that payment was actually not received by the New York Operations Office of the Atomic Energy Commission who handles the funding of the Rochester Project until approximately one month ago. This very late payment of the obligation led to considerable unrest on the part of the Rochester people as well as members of the Reactors Branch of AFSWC who had to negotiate with them for their services during the coming summer.

b. Late notification of AFSWC that 1959 tests would be conducted.

An equally important and just as critical a problem as that outlined in a. above arose in connection with the 1959 summer tests. I was informed by the Reactors Branch that they were notified on approximately March 15, 1959 that the burn-down program for the summer of 1959 would be funded. This late notification meant a crash program in order to secure the participation of the Rochester group and when the problem outlined in a. above was met the situation became one of very tender nature. In order to determine the present status of the contract with Rochester for the coming summer I called the New York Operations Office of the AEC and determined that negotiations are currently under way to fund this work at a level of \$80,000.00. I was referred by the NYOO to a memorandum written by Dr. John Bower, Medical Branch, Division of Biology and Medicine, USAEC concerning a conversation between Dr. Bower and Dr. William Newman of the Rochester Project. The gist of this memo was to the effect that unless the Air Force could plan further in advance in the future and could be more expeditious in paying its obligations that it would be necessary for the AEC to withdraw from the cooperative arrangement.

In view of this current thought on the part of the AEC, it seems doubly important that the AEC, especially RD&M, ANPO, and AF&WC exert every effort to prevent recurrence of the events of the summer of 1958 and the attendant payment for services rendered.

RECOMMENDATION:

It is recommended that the line of communications and methods of contracting for and financing of research through ANPO and RD&M

be cleared of obstructions or else that funds for conduct of the proposed research be transferred to RDRHM for funding to prevent recurrence of events such as those which have happened in the past.

It is further recommended that the Rochester Group be asked to add another column of data to their report, namely, one showing the internal dose in rads or rems or some such measurement of dose instead of in terms such as DPM (disintegrations per minute) which have no real meaning without recalculation. This change in manner of presenting data would make it possible to know the dosage directly without conversion factors.

RADIOLOGICAL BRANCH

The mission and operations of this branch were discussed with Major James L. Dick, Chief (who is presently leaving to join the CSR of ARDC in Washington) and Major Jack C. Bentley who is to become Chief of the branch. This group did not outline any really critical problems which needed resolving.

FIELD OPERATIONS BRANCH

A considerable amount of time was spent with Major Theodore P. Martin, Chief of the branch and also Executive Officer of the Biophysics Division. The overall operation of the Division was discussed more than the operations of the Branch itself. Again there did not appear to be any really critical problems which needed immediate resolution.

INSTRUMENTATION BRANCH

I was particularly impressed by the developmental and support programs being conducted by personnel of this branch under the guidance of Lt. Col. L. T. Boatwright, Jr. and Mr. Richard Merian. Merian appeared to be a particularly well qualified individual and it is most discouraging to see an individual of his talents accept a position with FGC which puts him in an administrative slot and out of the instrument laboratory where his talents are sorely needed. The instrument which this group has developed for use in the burn-down experiments this summer and which can be used in the laboratory after completion of the field tests this summer is a particularly unique one. When used in conjunction with a 256 channel

analyzer, it will be possible to determine both quantitatively and qualitatively the occurrence of fission products arising from fuel element burn-down.

About the only problem in this Branch was one related to morale. It had to do specifically with the recent assignment to WADC<sup>CP</sup> the responsibility for instrumenting the reactor component as well as the rest of the aircraft for the nuclear powered aircraft program. It was felt that the capability at WADC did not begin to approach that of the AFSC Instrumentation Group.

**RECOMMENDATION:**

It is strongly recommended that the decision to assign the responsibility for the nuclear powered aircraft instrumentation program to WADC be reviewed completely to determine if indeed it should have been assigned to WADC instead of AFSC. Certainly the AFSC group is a capable one and has a real interest in the whole field of instrumentation.

EXECUTIVE OFFICER, RESEARCH DIRECTORATE

I attended a debriefing session in the office of the Executive Officer, Research Directorate immediately prior to departure. I was accompanied by Major Ted Martin, Biophysics Division, and the general tenor of my evaluation of the whole program was discussed. It was requested that I forward, or have forwarded to that office, a copy of my final report to HQ AFSC. Since any actions which may be taken as a result of this report directly affect the Research Directorate and the Biophysics Division, I concur in their request.

MEETING WITH COLONEL GILLER, DEPUTY DIRECTOR OF AFSWC FOR SPECIAL PROJECTS

During the course of my stay at Kirtland AFB I had two or three discussions with Colonel Giller concerning the overall attitude toward the Biomedical possibilities, how they could be realized and why the whole body counter had been placed higher on the priority list than other more urgently needed radiation effects facilities. He indicated that previously other priorities had pushed the Biomed program into the background. These priorities are not so demanding at the present time and it was felt that there was a real possibility that the Biomed program would get its basic needs satisfied. The fact that the Air Force did not have a capability in the whole body counter field had led AFSWC to place that item higher on the list than the radiation effects laboratory. In addition the cost of the radiation effects laboratory were much larger than was the cost of the whole body counter.

THE ARGUS PROJECT

On Wednesday I saw the film developed by personnel on Project Argus as a report to HQ AFDC on the project. This was a most informative film and should be made widely available to all Reserve Program elements of AFDC.

ATTENDANCE AT HQ USAF FACILITIES INSPECTION TEAM (11/1/72)

On Thursday AM, May 14, a survey team from HQ USAF visited Kirtland to hear the oral presentations concerning the need for new construction money. I sat in on the deliberations so as to get a better overall picture of AFSWC and its program and needs.