Mfg 1750
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1743

MEDICINE, HEALTH AND SAFETY 3

RADIATION

RADIATION Vol 3

Vol. 3 Correspondence beginning with 8-16-60 to 12-31-61
Vol. 4 Correspondence beginning with 1-1-62 to

MH&S 3 Radiation

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2	12-16-60	Atomic Bomb Casualty Commission	skw	ouo					
3	12-12-60	Consumers Union Radioactivity Food Study	skw	u					
4	3-1-61	AEC 604/48 Van Middlesworth, Dr. Lester	skw	ouo					
5	3-8-61	AEC 604/49 World Health Assembly	skw	u					
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7	5-5-61	AEC 604/50 Sheep, Irradiation Mitchell Case Irradiation of Sheep	vee						
8	5-25-61	AEC 604/51	skw	u					
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14	8-1-61	HEW	vee						
15	10-4-61	AEC 604/57	skw						
16	10-11-61	AEC 604/58 Electromagnetic Effects & Eye Injuries Eye Injuries frm. Nuclear Devices	vee						
17	12-4-61	AEC 604/59 Radiological Safety Criteria for Tests	skw						
~~18~~	~~1-2-62~~	~~AEC 604/60~~ ~~Radiation Exposure Guidance for NTS Manager~~	~~vee~~	~~c~~					

See also Legal Rpts & Bldg 7-142 files

See Vol. 2

UNCLASSIFIED

AEC 604/59

December 4, 1961

COPY NO. 75

ATOMIC ENERGY COMMISSION

RAISING RADIOLOGICAL SAFETY CRITERIA FOR TESTS

Note by the Secretary

The attached letter from Dr. Clinton S. Maupin of Reynolds Electrical and Engineering Company is circulated for the information of the Commission. Copies have been sent to the General Manager for appropriate action and to the Director of Regulation for information.

W. B. McCool
Secretary

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AEC 604/59

UNCLASSIFIED

REYNOLDS ELECTRICAL AND ENGINEERING CO., INC.

November 15, 1961

Raising the Radiological Safety
Criteria for Tests

James E. Reeves, Assistant Manager

U. S. Atomic Energy Commission
Office of Field Operation
Post Office Box 2088
Las Vegas, Nevada

Gentlemen:

Hazards are measured by their seriousness and by their frequency of occurrence. Efforts are made to control circumstances leading to hazardous conditions by applying rules and regulations to minimize both the frequency of occurrence and the severity. The term inherently denotes a risk or a danger which would result in some sort of injury to persons or things. As such, the aim of any safety program is to control conditions so that injuries are infrequent and the chance of their being severe is reduced. In practice, all reasonable measures are taken to achieve safe operations. Reasonable in this sense means that the extent of such efforts will not be economically infeasible from a cost standpoint nor be so difficult to achieve and so time consuming that they interfere with the work completion. Regardless of the effort put out, the only method of completely preventing accidents and injuries is to cease operation.

In considering radiation hazards, attempts have been made to prevent injuries to individuals by establishing exposure criteria which are extremely stringent. The general approach to this problem arises out of the unproven concept that all radiation exposure is harmful regardless of amount or rate of acquisition. As such, peace time maximum permissible exposure levels have been made exceedingly low on the grounds that possible genetic effects of a deleterious nature or life shortening will result to those who receive extremely low-level exposures over a working lifetime.

Considerable work has been done by the Military to try to determine what is an injurious dose of radiation; injuries being defined in this case as that quantity of radiation which would render troops non-effective to a very mild degree. All evidence points to the fact that this type of injury will occur only if an acute dose of whole-body radiation received in a period of 24 hours or less exceeds 200 Rad. Non-effectiveness of troops as units is not assumed to occur at values less than 200 Rad. Symptoms of radiation sickness of a subjective nature other than psychological, are not expected to occur, nor have they been observed in doses less than 100 Rad.

With the finest laboratory techniques, excellent technicians, with a series of base line laboratory procedures consisting of blood counts several times a day over a period of several weeks, it might be possible to detect exposures as low as

25 Rad of acute whole-body radiation if any aberrations in the counts go outside the probable error of the base line. No connection between prolonged radiation in the low dose range less than 100 R has definitely been shown between radiation and the three conditions of consideration: life shortening, deleterious genetic effects, and leukemogenesis. There is some evidence that in the higher dose ranges among the Japanese survivors from Hiroshima and Nagasaki that there is an increased incidence of leukemia. However, in the Rongelap natives who received an estimated 175 R from fallout radiation in 48 hours, no cases of leukemia have occurred during the seven years following their exposure. It has also been shown that the effects on biological systems is less when the total dose is received over a period of days, weeks, or longer, than if received in a short period of time. Consequently, any quarterly dose of radiation received, or yearly aggregate, is certainly less effective than the same dose received as acute radiation. It is certain that aggregate doses in the vicinity of 25 R per year are definitely less effective biologically than 25 R of acute radiation, which is the ultimate limit of determination of radiation response of humans from an objective standpoint. An exposure limit of 3 R per quarter and 5 R per year is obviously an extremely safe limit when considered from a standpoint even of subjective findings and completely outside the spread of subjective symptoms of injury

The previously adopted test operations criteria of 3.9 R per quarter, with the prerogative of the Test Manager to increase the exposure limits to doses required to complete an urgently required operation up to even 25 R, has so far not resulted in any detectable damage in operational personnel through 14 test series. As a matter of fact, with the exception of highly urgent projects, it has been possible to accomplish most of the work within the 3.9 R per quarter limit. During the present operation, in spite of great efforts to comply with radiological safety regulations, including rigid controls, hiring additional personnel for rotation purposes, and thrice daily processing of film badges, it has not been possible to achieve the ultimate goal of no one receiving more than 3 R per quarter or 5 R per year As long as the requirements and extreme pressures exist to meet schedule dates, it will probably not be possible to continue similar operations without again exceeding the maximum permissible doses.

It is my opinion that we have gone past all reasonable effort to live with the current criteria because it appears that economically, fiduciarily, and from a standpoint of human effort, the law of diminishing returns is prevailing. These conditions will continue to prevail as long as the unreasonable and unrealistic attitude of considering low-level exposures of a non-effect-producing variety to be more serious and more horrible than accidents up to and including death from conventional construction operations and vehicle travel. Necessary defense work will be hampered and other conventional-type hazards which will begin to be apparent subjectively and objectively will occur more frequently as a result of fatigue and utilization of inexperienced personnel in critical positions. It is my studied, professional opinion that the only sensible thing to do is to increase the maximum permissible allowable exposure to realistic levels as long as any yearly dose does not reach or exceed the lowest dose in which one might expect to find subjective signs or symptoms, namely, 25 R.

It is, therefore, my recommendation that we return to the operational set of criteria which will apply to all test operations, both weapons testing and nuclear reactor testing. The levels I recommend are 3.9 R per calendar quarter with the added provision that the Test Manager, acting upon the advice of his advisors, be authorized to extend a dose to as high as 25 R where exigencies of the program and the urgency of obtaining data so dictate. Further, that every operation be carried out with the minimum radiation exposure consistent with accomplishing the mission. The Test Manager and his staff of advisors, their laboratories, and the contractors, have, through the years, shown themselves to be extremely responsible individuals, who, under any criteria, have tried to perform their job in the safest manner possible consistent with reason. I see no evidence to indicate that future action will be otherwise. I, therefore, urgently recommend that the above criteria be adopted in order that the Test Manager may be able to properly carry out the requirements laid upon him by higher authority.

Very truly yours,

REYNOLDS ELECTRICAL & ENGINEERING CO., INC.

/s/ Clinton S. Maupin

Clinton S. Maupin, M.D.
Radiological Safety Advisor
to the Test Manager

FORM AEC-204
(8-57)

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

DATE:

INDEX: MH&S 3 Radiation

TO:

FROM:

SUMMARY: AEC 859/8 - STUDIES OF BIOLOGICAL CONSEQUENCES OF NUCLEAR WAR
To determine the Commission's role and to establish the Commission's program and organization for studies of the biological and environmental consequences of nuclear warfare.

FILED: MH&S 3 Radioactive Fallout

INDEXER: date of paper: 12-13-61

REMARKS:

12-13-61

Chm-12-HEW

~~OFFICIAL USE ONLY~~

Reference Section

November 17, 1961

Dear Mr. Jones:

I am enclosing for your records a copy of the Summary Notes of the meeting between Commissioner Graham and Secretary Ribicoff held at our "E" Street office on Tuesday, August 1. The Notes include the revisions suggested by Secretary Ribicoff.

Sincerely yours,

Original signed
W. B. McCool

W. B. McCool
Secretary to the Commission

Enclosure: filed in date order: 8-1-61
As noted above.

Mr. Boisfeuillet Jones
Special Assistant to the Secretary
Department of Health, Education and Welfare
Washington 25, D. C.

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SURNAME ▶						
DATE ▶						

FORM AEC-004
(9-47)

DATE:

[redacted]

INDEX: MH&S-3-Radiation

[redacted]

TO:

FROM:

SUMMARY: AEC 762/14: FACT SHEETS ON EFFECTS OF SOVIET 50 MT AND 100 MTG NUCLEAR TEST DETONATIONS. Report on the above subject and also attached supplements which provde additional details on the effects of a high altitude 50 MT burst, as well as information on local effects for various other burst conditions.

FILED:

INDEXER: MH&S-3-Radioactive Fallout

REMARKS: date of paper: 10-25-61

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

10-25-61

☆ U. S. GOVERNMENT PRINTING OFFICE—1955—362404

FORM AEC-804 (8-57)

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

DATE:

INDEX: MH&S-3-Radiation

TO:

FROM:

SUMMARY: AEC 762/13: COMPARISON OF EFFECTS OF 20 MEGATON & 30 MEGATON AIR BURSTS. Memo to the General Manager from the Director, DMA transmitting, in response to the GM's request of 10-23-61, tables which compare the prompt radiation, blast and thermal effects of a 20 megaton and 30 megaton air burst.

FILED:

INDEXER: MH&S-3-Radioactive Fallout

REMARKS: date ofpaper: 10-24-61
date of memo: 10-24-61

[redacted]

[redacted]

AEC 604/58

October 11, 1961

COPY NO. 28

ATOMIC ENERGY COMMISSION

ELECTROMAGNETIC EFFECTS AND EYE INJURIES FOR DETONATION OF 100 MEGATON DEVICE AT HIGH ALTITUDE

Note by the Secretary

The attached memorandum and enclosure from the General Manager is circulated for the information of the Commission.

W. B. McCool

Secretary

[redacted]

SPECIAL REVIEW FINAL DETERMINATION Class.: UNCL. Reviewers Class. Date Joe Dise 9/22/80

By: J Hahn 5/3/83

CONFIRMED UNCLASSIFIED/DECLASSIFIED BY: Richard Dikeman

DD, SO-70

07-01-2002

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AEC 604/58

[redacted]

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[redacted]

19-11-01

[redacted]

[redacted]

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

September 25, 1961

MEMORANDUM FOR CHAIRMAN SEABORG

SUBJECT: FACT SHEET ON ELECTROMAGNETIC EFFECTS AND EYE INJURIES EXPECTED FROM A HIGH ALTITUDE DETONATION OF A 100 MEGATON NUCLEAR DEVICE

As orally requested, attached is a Fact Sheet on electromagnetic effects and eye injuries expected from a high altitude detonation of a 100 megaton nuclear device.

General Betts has been informally advised that the Weapons Effects Staff of DASA has undertaken a thorough study of the effects of a 100 megaton nuclear explosion and expects to complete the study within 2-3 weeks. It is anticipated that the results of this study will be made available to the AEC.

/s/ A. R. Luedecke
General Manager

Enclosure:
Fact Sheet

[redacted]

[redacted]

[redacted]

FACT SHEET

The following information relative to electromagnetic effects and eye injuries resulting from the high altitude detonation of a 100 megaton nuclear device was furnished by DASA and supplemented by The Effects of Nuclear Weapons.

Electromagnetic Effects

A nuclear explosion is accompanied by two principal types of electromagnetic effects. One involves the actual emission of an electromagnetic pulse of short duration from the explosion itself, whereas the other, through alterations to the electrical properties of the atmosphere (primarily in the ionosphere), can result in serious disturbance of electromagnetic waves such as are used in communications and for radar. The latter mechanism may cause systems operating in the high frequency range of 3-30 megacycles to be "blacked out" for several hours following the explosion.

It is estimated by an extreme extrapolation of DASA's model of the D-region blackout phenomena, that a burst of a 100 megaton device at 100 Km altitude or above would have blackout effects of wide extent and long duration on all high frequency communication circuits whose signal paths penetrate the D-region of the ionosphere in the vicinity of the explosion. Effects are estimated in the table which follows:

TABLE

Frequency - Time of Day		Radius of Outage	Duration of Outage
10 Mc	(day)	2000 miles	12 hours
10 Mc	(night)	1200 miles	6 hours
20 Mc	(day)	1500 miles	4 hours
20 Mc	(night)	1100 miles	1 hours

The "radius of the Outage" is the distance from a nuclear burst out to which propagation paths are affected - the terminals of the communication links in question may be much farther apart.

[redacted]

[redacted]

[redacted]

Also, at altitudes of up to about 20 kilometers the very low frequency communications may be severely attenuated.

Although there may be no deleterious physical effects from the creation of artificial aurorae, a 100 megaton burst at high altitude may create a very startling aurora. Such a phenomenon may be expected to be used for psychological effect in impressing the unsophisticated as to the "unsurpassed might" of the perpetrator. Very few people have seen a satellite in orbit; by picking the proper point of detonation, millions of people who have never seen any kind of an aurora may see quite a display from a high altitude 100 megaton explosion.

Also as a direct psychological effect it is noted that, a 100 megaton explosion at an altitude of 8000 miles would theoretically be seen at a surface range of 5600 miles; thus, a detonation at this altitude over the mid Atlantic would be directly visible to most of the population of 4 continents.

Explanation of Terms

Ionosphere -The region of the atmosphere, extending from roughly 40 to 250 miles altitude in which there is appreciable ionization. The presence of charged particles in this region profoundly affects the propagation of long wavelength electromagnetic radiations (radio and radar waves). These waves are reflected back from the ionospheric bands to the surface of the earth. Without such reflections, long distance radio communications would be impossible.

[redacted]

[redacted]

D-region — The lower of 3 more or less distinct layers of the ionsphere; at about 40 to 50 miles altitude having the lowest electron density of the 3 layers.

Very low frequency attenuation - Weakening of very low frequency radio signals.

Aurora - Luminous phenomenon due to ionized particles in the upper atmosphere. Ionized particles such as beta rays from bomb debris can create artificial aurorae.

Eye Injuries

The effects of thermal radiation on the eyes falls into two main categories: (1) permanent (chorioretinal burns) and (2) temporary (flash blindness). Concentration ofsufficient direct thermal energy, due to the focusing action of the eye lens, can cause the permanent damage. The focusing occurs, however, only if the fireball is in the individual's field of view. When this happens, chorioretinal burns may be experienced at distances from the explosion which exceed those where the thermal radiation produces skin burns.

In high altitude, high yield detonations, most of the thermal energy is emitted in very short times (90% in 100 milliseconds or less), thus the thermal radiation responsible for chorioretinal burns and flash blindness would arrive so soon after the explosion that reflex actions, such as blinking (50-150 milliseconds for man) and contraction of the eye pupil would give only very limited protection. In a high altitude detonation, the thermal radiation will generally traverse less dense atmosphere than for an air burst at the same slant range. Consequently, the atmosphere attenuation

[redacted]

[redacted]

[redacted]

will be less in the former case in the absence of clouds, and chorioretinal burns may be expected at greater distances from the point of burst for similar energy yields.

In order to obtain data concerning the possibility of eye injury, rabbits were exposed to the radiation from the Teak shot of a megaton-range weapon at an altitude of 252,000 feet (about 48 mi). Under nighttime conditions, chorioretinal burns occured at slant distances up to about 345 miles; however, no measurements were made at greater distances and so this cannot be considered as a threshold range for eye damage. Although extrapolation of the rabbit data to man is uncertain for high altitude shots, it is felt that there would be some danger to human beings at distances far greater than 200 miles under similar circumstances (3.8 MT at HOB of 252,000 ft.), and possibly as far as the eye can see at high altitude.

It may be concluded that the number of individuals who will be looking directly at the fireball in the event of an unexpected air burst would not be large; however, high altitude detonations will be visible over greater distances so that it is probable that more people will actually observe an explosion of this type. Calculations indicate that a large detonation at an altitude of 63 miles would be directly visible on the earths surface at a distance of 700 miles while at an altitude of 180 miles the detonation would be directly visible for about 1150 miles. Extrapolation of the Teak and Orange shot data indicates that in the case of a 100 megaton detonation at high altitude, human eye damage may be expected at surface distances in the order of 4 to 500 miles depending on prevailing atmospheric conditions at the time of detonation.

[redacted]

[redacted]

Temporary "flash blindness" or "dazzle" can occur in persons who are too far from the explosion to suffer chorioretinal injury or who do not view the fireball directly. Flash blindness results when more thermal energy is received on the retina than is necessary for image perception, but less than is required for burn. The effect is a localized blacking of the visual elements, with image persistance, after image formation, halo, etc. From a few seconds to several days may be required for the eye to recover its functions. Flash blindness occurs at greater ranges at night; however, the range of these effects also is highly dependent on atmospheric conditions prevailing at the time of detonation.

The extent of eye injuries that may result from the high altitude detonation of a 100 megaton device is unknown and considerable differences of opinion on this subject have been expressed by various members of the DASA staff. Studies on eye injury resulting from nuclear detonation are currently being conducted for DASA by the University of Virginia Medical College and the Lockheed Corporation. Studies of this nature based on theory and very limited test data are not expected to produce completely meaningful results. Data obtained as a result of actual detonations are regarded as the only reliable method of determining the extent of these effects.

[redacted]

MHL J-3-Radiation

UNCLASSIFIED

AEC 604/57

October 4, 1961

COPY NO. 61

ATOMIC ENERGY COMMISSION

HEALTH IMPLICATIONS OF FALLOUT FOR FEDERAL RADIATION COUNCIL CONSIDERATION

Note by the Secretary

1. The attached letter from the Chairman, Federal Radiation Council, is circulated for the information of the Commission. The matter will be discussed at an early Commissioners' Information Meeting.

2. The letter has been referred to the General Manager for appropriate action.

W. B. McCool

Secretary

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AEC 604/57

X. MHL J-3 Radiation Fallout
MHL A-7-USSR
84 M-7-Federal Radiation Council

19-A-01

UNCLASSIFIED

FEDERAL RADIATION COUNCIL
WASHINGTON 25, D. C.

September 29, 1961

Dear Mr. Chairman:

At the meeting of May 17, 1961, the Federal Radiation Council considered a Working Group recommendation to initiate a study of the health implications of fallout. The following statement concerning this recommendation appears in the minutes of that meeting:

> "This could be, depending upon world conditions, an item of prime importance to the Council."

In view of the resumption of atmospheric testing of nuclear weapons by the Soviet Union, I have asked the Working Group to undertake necessary studies and review of available data in order to present appropriate information on health implications of fallout for Council consideration.

I shall appreciate your advising me of any questions you may have concerning this action pending a meeting of the Council to be scheduled later.

Sincerely yours,

Abraham Ribicoff

Abraham Ribicoff
Chairman

The Honorable Glen T. Seaborg
Chairman, Atomic Energy Commission
Washington 25, D. C.

Mtg. S-3

OFFICIAL USE ONLY

September 28, 1961

MEMORANDUM FOR COMMISSIONER GRAHAM

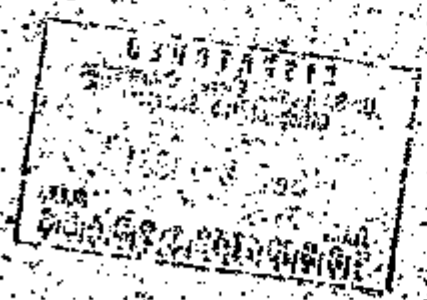
Subject: SUMMARY NOTES OF MEETING WITH REPRESENTATIVES OF HEW

Attached is a copy of the Summary Notes of the Meeting with Secretary Ribicoff on August 1, 1961, which has been revised to reflect comments received from HEW.

If you have no objections to the proposed revisions I will revise the Commission's record of the Meeting and transmit a copy of the revised Summary Note to HEW.

W. B. McCool
Secretary

Attachment:
As noted above



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9-28-61

Form AEC-318 (Rev. 9-53) U.S. GOVERNMENT PRINTING OFFICE 16—63761-2

MRS. 3 HEWLETT B-421

[Reprinted from the Federal Register of September 26, 1961, as corrected]

FEDERAL RADIATION COUNCIL

RADIATION PROTECTION GUIDANCE FOR FEDERAL AGENCIES

Memorandum for the President

SEPTEMBER 13, 1961.

Pursuant to Executive Order 10831 and Public Law 86-373, the Federal Radiation Council herewith transmits its second report to you concerning findings and recommendations for guidance for Federal agencies in the conduct of their radiation protection activities.

Background. On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations was published in the FEDERAL REGISTER on May 18, 1960. There was also released at the same time, Staff Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Protection Standards," dated May 13, 1960.

The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the term "Radiation Protection Guide" (RPG). It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose. It introduced as an operational technique, where individual whole body doses are not known, the use of a "suitable sample" of the exposed population in which the guide for the average exposure of the sample should be one-third the RPG for the individual members of the group. It emphasized that this operational technique should be modified to meet special situations. In selecting a suitable sample particular care should be taken to assure that a disproportionate fraction of the average dose is not received by the most sensitive population elements. The observations, assumptions, and comments set out in the memorandum published in the FEDERAL REGISTER, May 18, 1960, are equally applicable to this memorandum.

This memorandum contains recommendations for the guidance of Federal agencies in activities designed to limit exposure of members of population groups to radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. These recommendations include: (1) Radiation Protection Guides for certain organs of individuals in the general population, as well as averages over suitable samples of exposed groups; (2) guidance on general principles of control applicable to all radionuclides occurring in the environment; and (3) specific guidance in connection with exposure of population groups to radium-226, iodine-131, strontium-90, and strontium-89. It is the intention of the Council to release the background material leading to these recommendations as Staff Report No. 2 when the recommendations contained herein are approved.

Specific attention was directed to problems associated with radium-226, iodine-131, strontium-90, and strontium-89. Radium-226 is an important naturally occurring radioactive material. The other three were present in fallout from nuclear weapons testing. They could, under certain circumstances, also be major constituents of radioactive materials released to the environment from large scale atomic energy installations used for peaceful purposes. Available data suggest that effective control of these nuclides, in cases of mixed fission product contamination of the environment, would provide reasonable assurance of at least comparable limitation of hazard from other fission products in the body.

Establishment of the Federal Radiation Council followed a period of public concern incident to discussions of fallout. While strontium-90 received the greatest popular attention, exposures to cesium-137, iodine-131, strontium-89 and, in still lesser degrees to other radionuclides, are involved in the evaluation of over-all effects. The characteristics of cesium-137 lead to direct comparison with whole body exposures for which recommendations by the Council have already been made.

Studies by the staff of the Council indicate that observed concentrations of radioactive strontium in food and water do not result in concentrations in the skeleton (and consequently in radiation doses) as large as have been assumed in the past. However, concentrations of iodine-131 in the diets of small children, particularly in milk, equal to those permitted under current standards would lead to radiation doses to the child's thyroid which, in comparison with the general structure of current radiation protection standards, would be too high. This is because current concentration guides for exposure of population groups to radioactive materials in air, food, and water have been derived by application of a single fraction to corresponding occupational guides. In the case of iodine-131 in milk, consumption of milk and retention of iodine by the child may be at least as great as by the adult, while the relatively small size of the thyroid makes the radiation dose to the thyroid much larger than in the case of the adult. In addition, there is evidence that irradiation of the thyroid involves greater risk to children than to adults.

Recommendations as to Radiation Protection Guides. The Federal Radiation Council has previously emphasized that establishment of radiation protection standards involves a balancing of the benefits to be derived from the controlled use of radiation and atomic energy against the risk of radiation exposure. In the development of the Radiation Protection Guides contained herein, the Council has considered both sides of this balance. The Council has reviewed available knowledge, consulted with scientists within and outside the Government, and solicited views of interested individuals and groups from the general public. In particular, the Council has not only drawn heavily upon reports published by the International Commission on Radiological Protection (ICRP), the National Committee on Radiation Protection and Measurements (NCRP), and the National Academy of Sciences (NAS), but has had during the development of the report the benefit of consultation with, and comments and suggestions by, individuals from NCRP and NAS and of their subcommittees. The Radiation Protection Guides recommended below are considered by the Council to represent an appropriate balance between the requirements of health protection and of the beneficial uses of radiation and atomic energy.

It is recommended that:

1. The following Radiation Protection Guides be adopted for normal peacetime operations.

TABLE I—RADIATION PROTECTION GUIDES FOR CERTAIN BODY ORGANS IN RELATION TO EXPOSURE OF POPULATION GROUPS

Organ	RPG for individual	RPG for average of suitable sample of exposed population group
Thyroid	1.8 rems per year	0.6 rem per year.
Bone marrow	0.6 rem per year	0.17 rem per year.
Bone	1.8 rems per year	0.6 rem per year.
Bone (alternate guide)	0.003 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-228.	0.001 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-228.

It will be noted that the preceding table provides Radiation Protection Guides to be applied to the average of a suitable sample of an exposed population group which are one-third of those applying to individuals. This is in accordance with the recommendations in the first report of the Council concerning operational techniques for controlling population exposure. Since in the case of exposure of a population group to radionuclides the radiation doses to individuals are not usually known, the organ dose to be used as a guide for the average of suitable samples of an exposed population group is also given as an RPG.

Recommendations as to general principles. Control of population exposure from radionuclides occurring in the environment is accomplished in general either by restriction on the entry of such materials into the environment or through measures designed to limit the intake by members of the population of radionuclides already in the environment. Both approaches involve the consideration of actual or potential concentrations of radioactive material in air, water, or food. Controls should be based upon an evaluation of population

[Reprinted from the Federal Register of September 26, 1961, as corrected]

exposure with respect to the RPG. For this purpose, the total daily intake of such materials, averaged over periods of the order of a year, constitutes an appropriate criterion.

The control of the intake by members of the general population of radioactive materials from the environment can appropriately involve many different kinds of actions. The character and import of these actions may vary widely, from those which entail little interference with usual activities, such as monitoring and surveillance, to those which involve a major disruption, such as condemnation of food supplies. Some control actions may require prolonged lead times before becoming effective, e.g., major changes in processing facilities or water supplies. The magnitude of control measures should be related to the degree of likelihood that the RPG may be exceeded. The use of a single numerical intake value, which in part has been the practice until now, does not in many instances provide adequate guidance for taking actions appropriate to the risk involved. For planning purposes, it is desirable that insofar as possible control actions to meet contingencies be known in advance.

It is recommended that:

2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate actions related to ranges of intake of radioactive materials by exposed population groups.

In order to provide guidance to the agencies in adapting the graded approach to their own programs, the recommendations pertaining to the specific radionuclides in this memorandum consider three transient daily rates of intake by suitable samples of exposed population groups. For the other radionuclides, the agencies can use the same general approach, the details of which are considered in Staff Report No. 2. The general types of action appropriate when these transient rates of intake fall into the different ranges are also discussed in Staff Report No. 2. The purpose of these actions is to provide reasonable assurance that average rates of intake by a suitable sample of an exposed population group, averaged over the sample and averaged over periods of time of the order of one year, do not exceed the upper value of Range II. The general character of these actions is suggested in the following table.

TABLE II—GRADED SCALES OF ACTION

Ranges of transient rates of daily intake	Graded scale of action
Range I	Periodic confirmatory surveillance as necessary.
Range II	Quantitative surveillance and routine control.
Range III	Evaluation and application of additional control measures as necessary.

Recommendations on Ra-226, I-131, Sr-90, and Sr-89. The Council has given specific consideration to the effects on man of rates of intake of radium-226, iodine-131, strontium-90 and strontium-89 resulting in radiation doses equal to those specified in the appropriate RPG's. The Council has also reviewed past and current activities resulting in the release of these radionuclides to the environment and has given consideration to future developments. For each of the nuclides three ranges of transient daily intake are given which correspond to the guidance contained in Recommendation 2, above. Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II. For iodine-131 and radium-226, this value corresponds to the RPG for the average of a suitable sample of an exposed population group. In the cases of strontium-90 and strontium-89, the Council's study indicated that there is currently no known operational requirement for an intake value as high as the one corresponding the RPG. Hence, a value estimated to correspond to doses to the critical organ not greater than one-third of the RPG has been used.

The guidance recommended below is given in terms of transient rates of (radioactivity) intake in micromicrocuries per day. The upper limit of Range II is based on an annual RPG (or lower, in case of radioactive strontium) considered as an acceptable risk for a lifetime. However, it is necessary to use averages over periods much shorter than a lifetime for both radiation dose rates and rates of intake for administrative and regulatory purposes. It is recommended that such periods should be of the order of one year. It is to be noted that values listed in the tables are much smaller than any single intake from which an individual might be expected to sustain injury.

It is recommended that:

3. (a) The following guidance on daily intake be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

TABLE III—RANGES OF TRANSIENT RATES OF INTAKE (MICROMICROCURIES PER DAY) FOR USE IN GRADED SCALE OF ACTIONS SUMMARIZED IN TABLE II.

Radionuclides	Range I	Range II	Range III
Radium-226	0-2	2-20	20-200
Iodine-131 [1]	0-10	10-100	100-1,000
Strontium-90	0-20	20-200	200-2,000
Strontium-89	0-200	200-2,000	2,000-20,000

[1] In the case of iodine-131, the suitable sample would include only small children. For adults, the RPG for the thyroid would not be exceeded by rates of intake higher by a factor of 10 than those applicable to small children.

(b) Federal agencies determine concentrations of these radionuclides in air, water, or items of food applicable to their particular programs which are consistent with the guidance contained herein on average daily intake for the radionuclides radium-226, iodine-131, strontium-90, and strontium-89. Some of the general considerations involved in the derivation of concentration values from intake values are given in Staff Report No. 2.

It is recommended that:

4. For radionuclides not considered in this report, agencies use concentration values in air, water, or items of food which are consistent with recommended Radiation Protection Guides and the general guidance on intake.

In the future, the Council will direct attention to the development of appropriate radiation protection guidance for those radionuclides for which such consideration appears appropriate or necessary. In particular, the Council will study any radionuclides for which useful applications of radiation or atomic energy require release to the environment of significant amounts of these nuclides. Federal agencies are urged to inform the Council of such situations.

ABRAHAM RIBICOFF,
Chairman,
Federal Radiation Council.

The recommendations numbered "1" through "4" contained in the above memorandum are approved for the guidance of Federal agencies, and the memorandum shall be published in the FEDERAL REGISTER.

JOHN F. KENNEDY.

SEPTEMBER 20, 1961.

FORM AEC-324
(9-57)

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

DATE:

INDEX: MH&S-3-Radiation

[redacted]

TO:

FROM:

SUMMARY: AEC 1092: MUTUAL PROBLEMS OF HEALTH, EDUCATION AND WELFARE AND AEC. Letter from Dwight Ink to the Special Assistant to the Secretary (Health & Medical Affairs) Dept. of HE&W with re to interagency cooperation in various fields of radiation protection regulatory matters. Some of the subjects needed to be discussed include working closely together in terms of the collection of radioactive fallout data from the Soviet weapons tests, and the legislation needed in the area of air pollution problems.

FILED:

INDEXER: O&M-12-HEW

REMARKS: date of paper: 9-19-61
date of letter: 9-15-61

19-61-D

M165-3

August 24, 1961

MEMORANDUM FOR THE COMMISSIONERS

Subject: CORRECTION TO MEMORANDUM ON CONFERENCE ON BIOMEDICAL RADIATION RESEARCH RESPONSIBILITIES HELD JULY 26, 1961

Reference is made to my Memorandum to the Commissioners dated August 16, 1961 which transmitted a memorandum with an agenda and background material from the Director of Biology and Medicine on the above-mentioned conference.

Dr. Dunham's office has requested that a correction be made in his memorandum as follows:

Page 2, line 16: delete "availability" and substitute "shortage".

Harold S. Johnson
Acting Secretary

cc: A. R. Luedecke, General Manager
D. A. Ink, Assistant General Manager
C. L. Dunham, Director, Division of Biology & Medicine

D.C.Office

OFFICE ▶						
SURNAME ▶						
DATE ▶						

8-24-61

Form AEC-318 (Rev 9-53) U S GOVERNMENT PRINTING OFFICE 16—62761-3

MHS-3

August 14, 1961

Dear Mr. Jones,

I am enclosing a copy of the Summary Notes of the meeting between Commissioner Graham and Secretary Ribicoff held at our "H" Street office on Tuesday, August 1. We would appreciate any comments you might have on statements by your attendees.

Sincerely,

W. B. McCool
Secretary to the Commission

Enclosure:
As noted above

Mr. Boisfeuillet Jones
Special Assistant to the Secretary
Department of Health, Education and Welfare
Washington 25, D. C.

8-11-61

OFFICE ▶						
SURNAME ▶						
DATE ▶						

Form AEC-318 (Rev 9-56) U S GOVERNMENT PRINTING OFFICE 16—62761-3

AEC

B-425

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

No. D-191
Tel. HAzelwood 7-7831
Ext. 3446

FOR IMMEDIATE RELEASE
(Thursday, August 3, 1961)

FEDERAL AGENCIES APPROVE PLAN TO INTEGRATE RADIATION EMERGENCY ASSISTANCE

Eleven federal agencies have approved an interagency radiological assistance plan to provide advice and assistance upon request from organizations or individuals, in connection with incidents resulting in the loss of control of radioactive materials which involve a hazard or possible hazard to life, health or property.

Presently operating radiological assistance resources of the federal agencies, including the Atomic Energy Commission and Department of Defense emergency radiological assistance teams, are not intended to be replaced or changed by the interagency plan. The plan, however, considerably broadens the base of available emergency assistance through the participation of several federal agencies. As a practical matter, a request to any participating agency will bring into action appropriate aid from the nearest source.

Federal agencies participating in the plan are the Atomic Energy Commission; Department of Defense; Treasury Department (U.S. Coast Guard); Post Office Department; Department of Commerce (U.S. Weather Bureau); Department of Labor; Department of Health, Education, and Welfare; Office of Civil and Defense Mobilization; Interstate Commerce Commission; Federal Aviation Agency; and the National Aeronautics and Space Administration.

The interagency radiological assistance plan designates the AEC as the agency responsible for the administration of the plan with the cooperation of the other participating federal agencies.

(more)

D-36

Copy filed: MH-S-16-5

The Interagency Committee on Radiological Assistance, which has been responsible since its formation in May, 1958, for the development of the plan, will continue to function. This committee is made up of officials designated to represent the participating federal agencies. The committee is responsible for obtaining federal agency approval on policy matters, for interpretation, for making such changes in the plan as may be desirable in the future, and for assuring the participating agencies that the plan is carried out in a manner consistent with Federal statutes and executive orders related to radiological assistance. The plan provides that AEC will periodically inform the participating agencies on progress and development in the administration and execution of the objectives of the plan.

Under the new plan federal agencies will coordinate their radiological assistance health and safety activities with those of state and local health, police, fire, civil defense and other interested agencies. The plan also calls for setting up a system for the exchange of information among the national and local groups.

The plan proposes the encouragement of the development of local capability to cope with radiological incidents and the development of basic instructional material in radiation protection that will be made available for public safety and public health personnel.

Further information about the interagency radiological assistance plan may be obtained by writing the Director, Office of Operational Safety, U. S. Atomic Energy Commission, Washington 25, D. C.

- 30 -

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT ~~OFFICIAL USE ONLY~~

Read 8/1
5:10
pm

Memorandum

TO : A. R. Luedecke, General Manager
Harold L. Price, Acting Director of Regulation

DATE: August 1, 1961
Approved 8/2
AGL/HLP H. L. Price
Date AUG 2 1961

FROM : W. B. McCool, Secretary

SUBJECT: CHECKLIST OF MEETING WITH SECRETARY OF HEW, TUESDAY, AUGUST 1, 1961, 2:00 P.M., ROOM 1113-B, D. C. OFFICE

SYMBOL: SECY:WLW

Meeting with Secretary of HEW

Commissioner Graham designated Mr. Ink as AEC liaison to the Department of Health, Education, and Welfare for the coordination of policy matters. Those mentioned at the meeting included the following:

1. Control of the radioactivity level in the Columbia River;

2. Coordination of AEC and HEW research programs;

3. Delineation of responsibilities for the regulation of all "new devices" used for medical purposes; and

4. Exemption for AEC to monitor its facilities for health hazards.

(Ink)

Commissioner Graham requested coordination with HEW in the preparation of a statement to the Conference of Western Governors regarding responsibility for the safe operation of uranium mines. (Lowenstein, Ink)

The Bureau of the Budget is to be informed of the HEW-AEC agreed position on the "New Devices" legislation. (Ink)

Copy filed: OC M-6-Mtgs

Sec A cc 604/56

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K-OC M-12-HEW

10-1-8

[redacted] Mtg. S-3

[redacted]

August 10, 1961 Copy No. 7

ATOMIC ENERGY COMMISSION

SUMMARY NOTES OF MEETING WITH SECRETARY RIBICOFF AND OFFICIALS OF THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

Tuesday, August 1, 1961, 2:00 p.m., Room 1113-B

Commissioner

John S. Graham

General Manager

A. R. Luedecke

Acting Director of Regulation

Harold L. Price

General Counsel

Neil D. Naiden

Secretary

W. B. McCool

Staff

Arnold Fritsch
Anthony H. Ewing
Robert Lowenstein
W. L. Woodard
Nathan Woodruff
Max Zelle

HEW OFFICIALS

Abraham A. Ribicoff, Secretary
George Larrick, Commissioner, Food and Drug. Adm.
Boisfeuillet Jones, Special Assistant to the Secretary
Dr. John D. Porterfield, Deputy Surgeon General, Public Health Service
Rufus Miles, Director, Office of Administration
M. Allen Pond, Staff Assistant
James G. Terrill, Jr., Asst. Chief, Division of Radiological Health, Public Health Service

HEW Mtg.

Commissioner Graham welcomed the opportunity to meet with Secretary Ribicoff for a discussion of the health and safety responsibilities of the Atomic Energy Commission and the Department of Health, Education, and Welfare. He said he appreciated the Secretary's busy schedule and had a statement which he would like to present as an introduction to the discussion.

10-1-8

[redacted]

Copy filed Oc M-6. Mtgs

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Mr. Secretary, the Commission deeply appreciates your sparing us some of your valuable time to meet with us here today. I hope that a discussion of our areas of common interest and related problems will pave the way for developing a closer working relationship between our agencies in seeking solutions to these problems.

The development of the use of atomic energy and the assignment to the Commission of regulatory responsibility for the protection of the public health and safety in this area inevitably created some problems for our respective agencies. I am happy to say that from reports received and from my own observations there has been a continuing improvement in ability to work together on the solution of common problems.

I recognize that under existing laws there is considerable overlapping of responsibility in the area of public health and safety. The Commission is charged by law with such responsibility with regard to the production and use of special nuclear material and related by-products--isotopes. Your sphere of responsibility is much broader and includes, for example, all forms of radioactive materials. Another source of our common problems is the difference in our basic methods of operation. We have direct regulatory and enforcement responsibility and in areas where by law we have authority to turn over responsibilities to the States, we would do so on a "turn key" basis. That is, we would turn over the complete regulatory responsibility to the State upon a finding that the State can do the job. By contrast your agency, as I understand it, performs its mission primarily through a program of guidance and assistance to the States. While the approach is different I am certain that we each have a common objective, namely, protection of the public health and safety.

[redacted]

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The AEC regards public health and safety as paramount. This responsibility is often not clear in the minds of people outside the agency because we also have a seeming conflict for the promotion, development and production of atomic energy.

In some areas we have made substantial progress in working together on the solution of our common problems. For example, vigorous steps were taken to reduce the pollution of the Animas River in the Colorado Plateau. The Commission joined with the Public Health Service and the State health authorities to induce the operators of uranium refineries to install settling ponds and to take other remedial actions to reduce the amount of radioactive material discharged into the River. Steps were also taken to reduce dust concentrations and other hazardous conditions in the mills.

At our Hanford Plant there is now a coordinated effort on the problem of contamination of the Columbia River. Our Hanford Office and our contractor are working with the Columbia River Advisory Group. This group includes representatives of the Public Health Service and the States of Washington and Oregon. There are differences of opinion regarding the standards against which the contamination is

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and the States are satisfied with the steps being taken by the Commission. The Commission would certainly appreciate knowing if this is not the case.

Recent reports indicate that progress is being made in reducing radon and other hazards in uranium mines. Initially there was quite a problem in defining responsibility for safety enforcement as between the States and the several interested agencies. The Commission was not in a position to take enforcement action except in the case of mines operated under AEC leases. It took the joint efforts of the Public Health Service and the Bureau of Mines to interest the States in instituting effective programs for reducing the hazards in mines. You are to be commended for this effort.

These are some examples where joint efforts have paid dividends in reducing hazards to the public health and safety. There are, however, additional areas to be worked on and in some cases lines of communication and working relationships need to be developed or improved.

One such area is the licensing of major nuclear facilities. In this case the Commission is charged with the responsibility of making a finding of reasonable assurance regarding the protection of the public health and safety. In practically all cases there is the problem of discharge of radioactive material into the environment. This relates to both air and water and includes materials discharged during normal operations and in event of incidents or accidents. Obviously the States have a vital interest in the location of these facilities and their effect on the local population. The licensing of the facilities is a Federal function subject to public hearings in which the States may intervene. As I understand it, the Public Health Service has an important role as advisor to the

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States in matters related to environmental hazards and contamination. It is extremely important, therefore, that the Public Health Service and the Commission coordinate their positions and views on a timely basis.

Another area in which I am sure increased cooperation between our two agencies will pay substantial dividends is in the coordination of research and development. The Commission, in view of the nature and scope of its operation, has great interest in studies of the effect of radioactive and other materials on the environment. Obviously since your responsibilities cover the whole area of hazards in the environment your interest is equally vital. We can, I am sure, work out a plan whereby each of our particular capabilities can be brought to bear on this common problem. I am also confident that we can get maximum results per public dollar spent by reducing or eliminating overlapping and duplication. This type of coordination at the working level should make our paths much easier in processing our annual budgets through the Bureau of the Budget and the Congress.

The most critical need for an immediate and joint effort is to develop a solution to the problem of an inadequate supply of qualified radiation health personnel. We both have fellowship and other training programs with somewhat different incentives. I understand, however, that the number of candidates is never sufficient to fill available spots. We must find some means of overcoming the critical shortage in our own programs and those of the States.

It is my hope that in this meeting we can discuss some areas where increased cooperation would be profitable to both agencies and to explore the means for initiating a more informal and closer working relationship.

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Secretary Ribicoff said the Department of HEW desires close cooperation with the AEC at the policy level in the administration of their respective health and safety responsibilities, and designated Mr. Boisfeuillet Jones as liaison officer to the AEC for this purpose. Mr. Graham designated Mr. Dwight Ink as the AEC's liaison officer to the Department of HEW for the coordination of policy matters.

Mr. Boisfeuillet Jones introduced for discussion the following areas in which both AEC and HEW have responsibilities for the protection of the public health and safety.

Proposed "New Devices" Legislation

Mr. Jones noted a proposed bill ("Food, Drug and Cosmetic Amendments of 1961") is now under consideration by the Bureau of the Budget containing a "new devices" provision which would assign to the Food and Drug Administration of the Department of HEW the supervision of the safety and effectiveness of all new devices used for any medical purposes. Mr. Graham said although the Commission has no desire to exercise its authority in a field in which the Department of HEW has a special interest and greater competence, it does believe some new devices used for medical purposes, such as teletherapy units and medical research reactors, should be regulated through the AEC's licensing authority. He said the Commission suggests a provision be incorporated in the proposed bill whereby HEW shall by regulation exempt devices of this character[1] licensed by the AEC. Mr. Larrick, Commissioner of the Food and Drug Administration, believes his agency should be responsible for the regulation of such devices as tracer drugs, implants[1] and therapeutic devices, but stated the FDA would give full faith and credit to the licenses issued by the AEC for major medical devices which involved complicated engineering design and analysis. Secretary Ribicoff

1/ HEW

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and Commissioner Graham agreed that the jurisdiction of AEC and HEW should be delineated by regulations issued by the Secretary of HEW[1] under the proposed legislation so that HEW's authority will not duplicate the AEC's assigned responsibilities, and that the Bureau of the Budget should be informed of the agreement reached between AEC and HEW on the proposed legislation.

Jurisdictional Control of Radiation Hazards in Uranium Mines

The AEC and HEW are jointly concerned with the safety of uranium mining operations, and hence, Mr. Jones said, there is an imperative demand for close cooperation between AEC and HEW in this area. Mr. Woodruff agreed, and said AEC and HEW must jointly establish safety standards. With regard to the enforcement of safety standards, Mr. Graham noted that the AEC's licensing and regulatory controls do not cover mining operations since the Commission's licensing authority does not come into effect until after the removal of the source material from its place of deposit in nature. Mr. Naiden said it has been suggested that the AEC might have the legal power under provisions of the Walsh-Healey Act to attempt to improve health and safety conditions in uranium mines by exhortations addressed to the AEC's prime contractors, the milling companies. At present safety standards for uranium mining can only be enforced by the State governments. Mr. Jones said the Federal Government, although lacking statutory authority to enforce safe mining standards, should nonetheless vigorously encourage the States to enforce safety standards. Mr. Ribicoff said if the States will not act to enforce these safety standards, the Administration should request legislative authority to do so. He suggested the uranium mining States be informed that the Federal Government

1/ HEW

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shall request such authority to assure the safety of uranium mining operations if the states do not act by April, 1962. Pursuant to the Secretary's suggestion, Mr. Graham requested coordination with HEW in the preparation of a statement to the Conference of Western Governors stating the Federal Government's intention to assure the safe operation of uranium mines.

Liquid Effluents Discharged from Uranium Mills

All uranium mills are regulated by the AEC's licensing authority. The concentations of radioactive material that may be released in liquid effluents to unrestricted areas is governed by Part 20 of the Commission's Regulations. Under the Federal Water Pollution Control Act, HEW may determine whether radioactivity discharged from the uranium mills contributes to stream pollution. Some AEC licensed uranium mills release liquid effluents containing radioactive materials into rivers, primarily the Colorado River and its tributaries. The Department of HEW conducted a pollution study of the Animas River on the Colorado Plateau, which was expanded to include a similar study of the Colorado River and its tributaries. The AEC has participated in three conferences conducted by HE W based on these studies.

Mr. Graham recalled the substantial progress which was realized by the AEC and HEW in reducing the pollution of the Animas River. The Commission, along with the Public Health Service, and the State health authorities, have induced the operators of uranium refineries to install settling ponds and to take other remedial action to reduce the amount of radioactive materials discharged into the river.

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Mr. Graham noted similar remedial action is being taken to reduce the contamination of the Columbia River.

Mr. Jones said since the control of liquid effluents from uranium mills is of interest to both the AEC and HEW, it is important for the two agencies to coordinate their activities at both the working and policy levels. Mr. Terrill of the Public Health Service recalled that through the Columbia River Advisory Group (CRAG), composed of the United States Public Health Service, the Oregon State Sanitary Authority, the Washington Pollution Control Commission, and the Washington State Department of Health, ~~an effective~~ liaison[1] organization for the ~~control~~ study[1] of radioactive effluents in the Columbia River ~~has been~~ was[1] established about ten years ago.[1] ~~Although~~ Since[1] coordination with the AEC at the policy level is also desirable, Mr. Terrill ~~said~~ asked if[1] the cooperative working arrangement which was established within the framework of the CRAG should also be continued. Mr. Graham replied that those systems of liaison were undoubtedly desirable.[1]

Mr. Naiden said the Commission recognizes HEW's authority to abate the pollution of the nation's waterways, and is equally anxious to assure that effluents do not contribute to stream pollution. He recalled that informal discussions between technical personnel of the Public Health Service and the AEC regarding this problem has in the past assisted the AEC in evaluating the effects of uranium mill effluents, and thereby abating the contamination of streams. In view of past cooperation, Mr. Ribicoff said HEW would continue such cooperative programs with the AEC, and would coordinate its activities with the AEC at the policy level.

1/ HEW

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Coordination of AEC and HEW Research Programs

Mr. Jones recalled that in the past the AEC and HEW have effectively cooperated at the working level in the coordination of their research programs. In view of the beneficial results of coordination at this level, he suggested coordination be ~~extended to the policy level~~ /strengthened/ [1] in order to optimize their research programs /through meetings such as the August 26 meeting with the BOB and the staff of the President's Science Advisory Committee./ [1] Mr. Ribicoff suggested, and Mr. Graham agreed, that the coordination of research programs should be discussed periodically at the policy level.

Regulatory Responsibility for the Safe Operation of the AEC's Facilities

Mr. Jones noted the AEC is specifically responsible for assuring the safety of its facilities and installations, while HEW is generally responsible for protecting the public health and safety. He said since the AEC has continued to effectively monitor its facilities for health hazards, there is no need for HEW to intervene. Mr. Graham said the Commission is aware of its responsibility to assure the safe operation of its facilities and installations, and also recognizes HEW's authority to exempt the AEC from HEW's broader jurisdiction in those areas where the Commission's past performance and existing expertise assures the safe operation of its facilities.

After further comments, Mr. Graham expressed the Commission's appreciation for Secretary Ribicoff's attendance at the meeting.

1/ HEW

W. B. McCool
Secretary

[redacted]

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July 31, 1961

MEMORANDUM FOR THE COMMISSIONERS

Subject: MEETING WITH OFFICIALS OF THE DEPARTMENT OF HEALTH, EDUCATION AND WELFARE

A meeting with representatives of the Department of Health, Education and Welfare has been scheduled for August 2, 1961 at 2:00 p.m. Room 1113-B, D. C. Office. HEW officials will include Secretary Ribicoff, George Larrick, Commissioner, Food and Drug Administration, Brigadier Jones, Special Assistant to the Secretary, John D. Porterfield, Deputy Surgeon General, Public Health Service, and Bruce Hiles, Director, Office of Administration.

AEC 614/36 - Agenda for meeting between officials of AEC and HEW, has been circulated as a background document for this meeting.

W. B. McCool
Secretary

cc: General Manager

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7-31-61

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UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

July 31, 1961

MEMORANDUM TO ALL HOLDERS OF AEC 604/56

1. Copy (ies) 39 of AEC 604/56 was (were) distributed to your office on July 31, 1961.

2. Please insert the attached unnumbered page directly behind the cover page.

3. Please delete pages 36 through 38, and attach the revised pages 36 and 37.

W. B. McCool
Secretary

Attachment

7-31-61

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July 31, 1961

AEC 604/56

COPY NO. 39

ATOMIC ENERGY COMMISSION

AGENDA FOR MEETING BETWEEN OFFICIALS OF AEC AND HEW

Note by the Secretary

Attached for the information of the Commission is the Agenda for the meeting of the Commissioners and General Manager with officials of the Department of Health, Education and Welfare scheduled for 2:00 p.m., Tuesday, August 1, 1961, Room 1113-B, D. C. Office.

W. B. McCool

Secretary

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AEC 604/56

7-31-61

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HEW ATTENDEES AT HEW-AEC MEETING - AUGUST 1, 1961

Agraham A. Ribicoff, Secretary

George Larrick, Commissioner, Food and Drug Administration

Boisfeuillet Jones, Special Assistant to the Secretary

Dr. John D. Porterfield, Deputy Surgeon General,
Public Health Service

Rufus Miles, Director, Office of Administration

M. Allen Pond, Staff Assistant

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July 27, 1961

ATOMIC ENERGY COMMISSION

AGENDA

MEETING OF THE COMMISSIONERS WITH SECRETARY A. RIBICOFF AND DEPARTMENT OF HEALTH, EDUCATION AND WELFARE OFFICIALS, 2:00 P.M., TUESDAY, AUGUST 1, 1961, ROOM 1113-B, D. C. OFFICE

1. AEC Interest in Health Protection and Safety of Atomic Energy.- Chairman Seaborg or Mr. Graham

2. Brief Summaries of AEC Activities

   a. Health Protection and Safety Programs of AEC Installations

   b. AEC Biomedical Research Program

   c. AEC Regulatory Program

3. Discussion of Relationship between DHEW and AEC on Public Health Problems of Atomic Energy

   a. Coordination of Research

   b. Fuller Understanding of DHEW and AEC Advisory and Regulatory Functions

   c. Legislation coordination - Discussion Background- Federal Hazardous Substances Labeling Act, "New Devices" Bill, and Federal Water Pollution Control Act

   d. Jurisdictional Control of Radiation Hazards in Uranium Mines

   e. Animas River and Columbia River situations

4. Backup Items

Federal Radiation Council

Training and recruitment

Plowshare

Aerospace Safety

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BACKGROUND MATERIAL

Reference is made to the correspondence relative to subject meeting, AEC 604/51, which includes:

a. Letter of April 20, 1961, from Chairman Seaborg to Secretary Ribicoff.

b. Letter of May 10, 1961 from Secretary Ribicoff to Chairman Seaborg.

General

The Atomic Energy Act of 1954 and its amendments charges the Atomic Energy Commission with responsibility to protect the health and safety of both atomic energy workers and the general public from the use of atomic energy and its related materials. This responsibility overlaps in broad general fashion the legal functions of other Federal agencies having health and safety responsibilities. Some of the agencies involved are (1) the U.S. Public Health Service, (2) the Food and Drug Administration, (3) the Interstate Commerce Commission, (4) the Civil Aeronautical Board, (5) the Coast Guard, Department of Treasury, (6) the Department of Agriculture, (7) the Department of Labor (Walsh-Healey Act) and (8) the Bureau of Mines, Department of Interior.

The overlapping areas of health and safety responsibility between the AEC and many of the agencies listed above are narrow and have not required a great deal of attention to assure that AEC and agencies involved were working constructively towards the same objectives. However, in the case of the U.S. Public Health Service, Department of Health, Education and Welfare, and the Atomic Energy Commission, there exists a much broader overlap of responsibility and, consequently, considerable more effort and attention is required to assure that these agencies carry out their specific responsibilities in such fashion as to provide

the most effective health protection program possible and to avoid unnecessary duplication. Further, the respective responsibilities are of such a nature that continuous cooperation and collaboration between the Department of Health, Education and Welfare and the Atomic Energy Commission is essential.

With the advent of a new Federal administration, it appears desirable for the heads of DHEW and AEC to become acquainted with each other's respective programs to review in general terms areas of existing cooperative and collaborative activities for possible improvements, and to ascertain if other areas exist where cooperation and collaboration could be extended.

Relationship between AEC Biomedical Research Program and Radiological Research Program of the U.S.P.H.S. (Item 3a)

Reference is made to memo of May 22, 1961, by Dr. Charles L. Dunham, Director, Division of Biology and Medicine (Attachment 1) summarizing the long-term relationship of the U.S.P.H.S. and AEC biomedical research programs.

Points which might be discussed at the meeting:

(1) the U.S.P.H.S. should continue to increase its attention to epidemiological studies on the effect of radiation upon the population samples, such as response of population groups to ingestion of drinking water high in radium content; this may be very helpful in pinning down the effects of low levels of radiation on population groups subject to long term (life time) exposures.

(2) The Commission appreciates the increasing activity of the U.S.P.H.S. on the radon problem in uranium mines and the pressures being created on the states to pursue more vigorously the radiation protection program in the mines, and hopes this activity will continue.

(3) The U.S.P.H.S. should continue on a long-term basis the fallout surveillance activities both in this country and around the world; this is discussed in the last paragraph of Dr. Dunham's memorandum of May 22, 1961.

(4) The U.S.P.H.S. and AEC, particularly the Division of Biology and Medicine, continue in a positive manner, to develop and coordinate research proposals (and their accompanying budget requests) in a concerted effort to make them collaborative and complimentary. It is believed that the U.S.P.H.S. and the AEC, DBM, are the proper agencies to discover and adjust any programs which could be considered unnecessarily duplicating or to increase activities now being inadequately covered; the working arrangement include information interchange on research activities justification and costs. In appropriate cases it is urged that the agencies provide each other an opportunity for evaluation of specific projects with the view towards mutual support where desirable. These procedures would reduce to minimum the necessity for coordination by the Bureau of the Budget Presidential Scientific Advisory Committee and, on occasions, by Congressional Committees.

A great deal of effective cooperation has been achieved in this area to date; however, additional effort in this direction may prove to be beneficial to both agencies. Typical of such working relationship can be illustrated by the exchange of

correspondence between Dr. Francis Weber, Chief, Division of Radiological Health, Bureau of State Services, Public Health Service and Dr. Charles Dunham, Director, Division of Biology and Medicine, AEC (Attachment 2).

Fuller Understanding of USPHS and AEC Advisory and Regulatory Functions. (Item 3b)

Another important area where DHEW and AEC need to maintain, on a continuous basis, a clear understanding of each other's role is the administration of their respective responsibilities in the public health and safety aspects of nuclear energy activities. The complexity of the problems involved, and of the relationships of each of the two agencies with the individual states and the public, makes desirable not only an effort to carefully define the areas in which one agency or the other has the primary statutory responsibility, but also agreement on basic objectives and careful planning to assure that the efforts of the agencies in related activities are sufficiently compatible to avoid unnecessary confusion and waste.

One problem area involves the fact that while the Atomic Energy Act makes the AEC responsible for the control of radiation hazards in connection with certain nuclear energy activities within the states, one of the principal functions of the USPHS is to advise the states in problems of public health. While the states have an understandable concern for the effectiveness of the regulatory activities of the AEC, there are wide differences of opinion as to the extent to which the states and, in turn, the Public Health Service, can assume responsibility for activities which are regulated by the AEC. It is to the advantage of both agencies that we do not use the states as vehicles for expressing differences in philosophy or technical judgment and that our approaches to the states do not appear to involve differences which might be readily resolved with adequate coordination.

We believe that such an understanding can be further promoted by more careful attention, on the part of both agencies, to the

exchange of information on activities related to radiological health and safety. We understand that there have been occasions when members of the staff of the U.S. Public Health Service have felt that the AEC has not furnished completely or on a timely basis information desired by the USPHS for use in advising the states on the health and safety of proposed nuclear activities, principally in the reactor area, or when it was felt that such information came after a particular reactor project was "set."

On the other hand, members of the staff of AEC have on occasion been concerned about the extent to which the USPHS appeared to be independently engaged in information-gathering and consultations with state agencies regarding proposed atomic energy projects. This concern increases when the Public Health Service has not consulted the AEC on the problems that are troubling the Public Health Service or on the advice and position taken on a particular project by the Public Health Service. It would be helpful to AEC if it had the benefit of Public Health Service's views directly rather than through the state.

LEGISLATION (Item 3c)

Over the past few years HEW has sponsored bills which would give it greater authority in three principal areas in which the AEC is directly involved.

Federal Hazardous Substances Labeling Act - This bill, which was enacted by Congress in 1960, gave authority to HEW to require that "hazardous substances" be labeled as would be required by HEW by regulation to warn consumers. The scope of the proposed bill originally included all radioactive materials. AEC took the position that the bill should be amended specifically to exempt source, byproduct and special nuclear materials. BOB arranged a meeting between representatives of AEC and of HEW after which BOB agreed that AEC's comments should be forwarded to Congress. Congress enacted the law with the specific exemption we had requested.

"New Devices" Bill - Under this proposal HEW would be given authority to pass upon the safety and effectiveness of all "new devices" used for any medical purpose. HEW presently has such authority with respect to "new drugs." This extention of authority has been proposed by HEW for some time, but has not yet been introduced as a bill in Congress.

HEW has prepared a draft bill entitled "Food, Drug and Cosmetic Amendments of 1961" containing the "new devices" provisions. AEC has taken the position that while the Commission is presently exercising more extensive control of devices containing source, byproduct and special nuclear material, we recognize the special interest and competence of HEW in the medical field. We have suggested that responsibilities of the two agencies be delineated under the proposed bill so that HEW's authority would not duplicate or supplant AEC's controls. Specifically, we propose that a provision be incorporated in the bill that HEW shall by regulation exempt devices licensed by AEC.

Federal Water Pollution Control Act - The proposed bill would have amended the existing statute to provide that the HEW would have the authority to issue orders to persons which were found, after public hearing, to be polluting interstate waters. This procedure would have replaced the existing provision that HEW must request the Attorney General to bring formal court action to abate any pollution. Under the proposed amendment, HEW could have issued orders to both AEC licensees and contractors. AEC objected to the granting of such authority vested in the Commission. Representatives of the Commission and HEW met at a White House conference on March 28, 1961, at which time it was agreed that if the bill were enacted, HEW would not issue any orders to AEC licensees or contractors but instead would refer the matter with its recommendations to the AEC for appropriate action. Under this agreement AEC withdrew its recommendation that the bill be amended specifically to include provision that no order be issued in AEC cases. The HEW bill was introduced in Congress, but an amended version which was enacted by Congress eliminated all authority of HEW to issue regulatory orders and maintained the requirement that enforcement of pollution statement be made through the Attorney-General.

JURISDICTIONAL CONTROL OF RADIATION HAZARDS IN URANIUM MINES
(Item 3d)

Since 1950 Dr. H. J. Magnuson and others of the USPHS have been examining underground uranium miners for possible adverse effects (principally lung cancer) of radiation encountered in the mines. Earlier experiences in the mines of Germany and Czechoslovakia had shown that miners of uranium-containing ores had had a very high mortality from lung cancer. Examinations performed by USPHS in 1960 as compared to those in 1957 showed some rise (0.09 to 0.9) in the number of miners who showed positive reaction to a sputum examination technique (Papanicolau) for suspected cancer cell. Further, a study of the cause of death of 108 miners (as of December 1960) showed respiratory cancer deaths to be higher than would be expected when compared with causes of death of total male populations of the mining regions. This information stimulated increased attention to ways of achieving better compliance of underground milling operations with accepted radiation protection standards.

To this end, the Secretary of the Department of Health, Education and Welfare, with the cooperation of the Department of Labor, Bureau of Mines and the Atomic Energy Commission called a conference of the Governors of uranium mining states to advise them more completely of findings of medical examinations and the causes of death in the miners and to determine ways of maintaining better radiation protection in the mines. Work by the AEC and operators in mines leased from the AEC show that significant reductions in radiation levels of underground mines could be achieved by (1) providing increased mine ventilation and (2) walling off

unused mining faces to prevent movement of radioactive gases in to the active working areas. There were also indications that inadequate radiation safety inspections and corrective actions were being made.

Effort at the December 1960 meeting was made to increase the interest of the various mining states inforcing better control of potential radiation hazards in the minings. There are indications that the states are increasing the attention given to uranium mine safety.

Before and after the December 1960 meeting, the AEC examined its positions relative to its legal authority to regulate radiation hazards in the uranium mining industry. In respect to the Atomic Energy Act 1954, the AEC licensing authority (Section 62) does not come into effect until after removal of the source material (uranium and thorium) from its place of deposit in nature. Further, there is nothing in the legislative history of the 1954 Act, or the 1946 Act, which indicates that Congress may have intended to permit AEC to regulate uranium mining practice. For the coal mining industry, the Congress passed very specific legislation for its control by the Federal government and paid special attention to the problem of Federal-State relationship. It is therefore very doubtful if the AEC has regulatory authority over uranium mining under the Atomic Energy Act. This position has been made known to Joint Committee on Atomic Energy; Department of Health, Education and Welfare; Bureau of Mines and interested agencies of the various uranium mining states.

There is a question of AEC authority inforcing safe mining conditions under its uranium concentrate procurement contracts with processing mills. It is to be noted that these contracts are for processed uranium concentrates not for the procurement of ore.

There are provisions in the processing contracts, inserted pursuant to the Walsh-Healey Public Contracts Act, which require the contractors to comply, in their activities under the contract, with health and safety standards promulgated by the Department of Labor, the agency charged with administration of that Act. Under Department of Labor interpretations of the Walsh-Healey Act, these contract provisions would provide a basis for enforcement proceedings by the Department of Labor for violation of safety requirements in captive mines. The Labor Department is the agency which has the legal authority and responsibility for citing Walsh-Healey violations, and it has established procedures, subject to the Administrative Procedures Act, for determining violations, penalties and black-listing.

So far as we know, the independent mine owners' agreements to sell ore to the mills do not contain Walsh-Healey Act provisions. Department of Labor representatives, who some months ago took the position that both the captive and independent mines were subject to the Walsh-Healey Act, have since informally advised us that they are reconsidering their position with respect to the independent mines.

Last January the Department of Labor asked for our comments on suggestions that the Commission remind the milling contractors of their responsibility for compliance with the Walsh-Healey Act in the mines they own or control, and arrange with the contractors not to purchase from independent mines ore which was mined under unsafe or hazardous conditions. In view of the questions that would be raised about interpretation of the Walsh-Healey Act, and further in view of the fact that the Labor Department is responsible for enforcing the Act, the General Manager's reply of February 17, 1961 stated that in our opinion the Department of Labor should undertake any communications with the contractors and with independent mine owners. Our letter further pointed out that the AEC action suggested by the Labor Department could be misconstrued as an effort by AEC to avoid honoring purchasing commitments.

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LIQUID EFFLUENTS DISCHARGED FROM URANIUM MILLS
(Item 3e)

All uranium mills are regulated by AEC by license. The concentrations of radioactive material that may be released in liquid effluents to unrestricted areas is governed by Part 20. Under the Federal Water Pollution Control Act, HEW may determine whether radioactivity discharged from uranium mills contributes to stream pollution. Some AEC licensed uranium mills release liquid effluents containing radioactive materials into rivers, primarily the Colorado River and its tributaries. HEW conducted a pollution study of the Animas River. This study has been expanded to include similar study of the Colorado River and its tributaries. AEC has participated in three conferences conducted by HEW based on these studies.

By the exercise of its regulatory authority, AEC has required the mills which discharge radioactivity into streams to take many precautionary measures to meet Part 20 limits. These include installation of bariet treatment processes, installation of settling ponds to remove solids, and in some instances impounding of liquid waste to prevent discharge to streams altogether. IN order to bring mills into compliance with Commission regulations, the Commission has in the past issued orders to 11 mill licensees, although only one such order related directly to the discharge of liquid effluent. In addition, notices of violation and conferences with mill executives also have been utilized on several occasions as part of the program to reduce radioactivity in effluents.

Nine mills have been authorized by AEC, as provided in Part 20, to discharge liquid effluents in a manner which allows them to take advantage of the dilution provided by streams so that concentrations of radioactive material at points of utilization, rather than the point of discharge, are within drinking water

levels. Before AEC will amend a license to permit the licensee to take advantage of stream dilution, the licensee must demonstrate that he has taken all reasonable measures to reduce the radioactivity discharged into the stream at the mill as much as possible. Seven of these mills have been visited by representatives of the AEC accompanied by representatives of the PHS, to determine that reasonable measures had been taken to reduce concentrations as low as practicable, and to gather data for further study. Only four mills have been authorized by the AEC to take advantage of stream dilution. Informal discussions between technical personnel of the PHS and AEC regarding this problem has assisted the AEC in evaluating the effect of uranium mill effluents.

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SUBJECT: Status of Columbia River Environmental Studies for Hanford Works Area

The effects of introducing radioactive effluents into the Columbia River from the Hanford Works are being studied under an expanded environmental study program. The program is being conducted by the AEC in cooperations with several Federal and state agencies in the Northwest to obtain a better overall understanding of the Columbia River. Previous studies have principally been performed by the Commission's Hanford contractor, General Electric Company and laboratories of the University of Washington. In addition, the U.S. Public Health Service and several Northwest state agencies have been engaged in evaluating Columbia River water quality.

A dual Columbia River environmental evaluation study has recently been performed for the Columbia River Advisory Group (CRAG) and AEC Hanford Operations Office by the U.S. Public Health Service and the General Electric Company, respectively. The main area of disagreement between the two evaluations is the appropriate radiation standard to be applied to individuals in the vicinity of an atomic energy installation. The U.S. Public Health Service advocates the use of 1/30 occupational MPC values for any groups in the general public while General Electric Company uses 1/10 occupational MPC values for the small group near Ringold who is in the vicinity of an atomic energy installation and 1/30 occupational MPC values for all other groups. The applicable standard for this small group has not been resolved between U.S.P.H.S. and U.S.A.E.C.

The results of the two evaluations did show reasonable agreement in respect to the estimated radiation exposure received by residents of the Tri-City area and these exposures were judged to be within currently accepted limits for large population groups. Recommendations based upon these separate evaluations are being

implemented into the expanded AEC co-operative environmental study program. Due to the recent reduction of permissible radiation exposure levels to the public and the results of the Columbia River environmental evaluation studies, the recommendation has been made by both CRAG and AEC that the concentration of radioisotopes in the river, at least in the vicinity of the Hanford works, should not be allowed to increase above the present level.

Radioisotopes released to the river may contribute to the exposure received by man in one or more of the following ways: drinking water, irrigation of crops, concentration to varying degrees by specific aquatic organisms which ultimately are consumed by man. Research which will be initiated or expanded may include some or all of the following: (1) the extent to which specific isotopes are found in the river at various locations and their ultimate fate, (2) the effect of dilution by other rivers entering the Columbia River downstream from Hanford, (3) the possibility of accidental releases of excessive quantities of radioisotopes to the Columbia River and a review of existing plans for protecting the public in the event of an incident, (4) the further reduction of isotope concentration in the Hanford effluents by improvements in water treatment techniques or modification in reactor operating procedures, (5) the extent to which fish and other foodstuffs which have picked up radioisotopes from Columbia River water are included in the diets of persons living near the river, (6) the extent to which other chemicals used in the Hanford process enter the river and their pollutional effect, and (7) studies of river flows, temperatures, chemical characteristics, the mechanism of effluent dispersion in the river and the effects of these parameters on the biological systems in the river.

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Attachment 1

May 22, 1961

TO : Dr. N. H. Woodruff, Director
Office of Operational Safety

FROM : Charles L. Dunham, M.D., Director
Division of Biology and Medicine

SUBJECT: RELATIONSHIPS BETWEEN AEC BIOMEDICAL RESEARCH PROGRAM AND USPHS

The AEC biomedical research program is broadly based and, except for specific areas involving peaceful uses of nuclear energy and its byproducts in biological and medical sciences, has been geared to the developing needs of the AEC operating program and the atomic energy industry as a whole from the standpoint of radiation health and improved occupational health practices. It is designed to provide to the AEC supporting information for its control of all aspects of the radiation health problems which stem from atomic energy operations and is a program in depth with respect to the biological effects of radiation and the fundamental biophysical and biochemical mechanisms involved. It attempts to anticipate the hazards inherent in new developments in the atomic energy program, such as nuclear propulsion devices and nuclear power devices for space vehicles.

Historically the National Institutes of Health was brought into the picture at the very beginning of the AEC biomedical program via Dr. Egon Lorenz, National Cancer Institute, who carried out key whole body radiation studies in extremely close collaboration with the group at the Metallurgical Laboratory under the MED. When the Division of Biology and Medicine was established the Director of the Division was invited to attend and participate in all meetings of the National Cancer Advisory Council and this relationship has continued to date. At about the same time, the USPHS personnel were detailed to Oak Ridge for training, study, and participation in waste disposal activities and waste disposal research projects. When the Radiation Committee of the NIH, which later became the Radiation Study Section, was established in about 1952 active participation in its deliberations by the staff of the Division of Biology and Medicine began and has continued to date. In fact, the inception of this particular activity at the NIH was largely at the instigation of Dr. Shields Warren, then Director of DBM, resulting from direct conferences with Dr. Norman Topping in the Office of the Director of NIH.

Recently members of the staff of DBM have been made liaison participants in the meetings of a number of the NIH Study Sections. So much for the formal realtionships.

During the past decade and particularly during the past few years, as the USPHS research in radiation health has been expanded, the day-to-day relationships between USPHS staff and the AEC have increased and a number of jointly sponsored and/or cooperative projects have been developed. Such activities include: (1) the development jointly of the radiological air surveillance network

which is now taken over in its entirety by the USPHS except for observations at AEC sites; (2) joint participation in development of data on Strontium-90 in human bones in persons living in the general vicinity of NTS. This project has also been taken over now completely by the USPHS; (3) the detailing of young Public Health Service officers to the Atomic Bomb Casualty Commission program in Japan; (4) programs involving research on the environmental hazards associated with specific AEC operations such as Hanford Works, Savannah River Plant, Shippingport reactor, and the like have been carried out from their inception on a cooperative basis; (5) the planned early participation by the USPHS in the epidemiological aspects of the ANL studies on waters of high radium content in the Middle West; (6) the planned assignment of USPHS personnel to the new AEC fission product inhalation laboratory at Sandia Base under the direction of the Lovelace Foundation.

It should be pointed out that during the past two years the AEC has been rapidly phasing out its fallout surveillance activities both in this country and around the world but is continuing and actually intensifying its studies on the mechanism, transport and deposition of radioactive materials both natural and man-made in the atmosphere, and that the AEC is gradually phasing out its program of sampling of foods but will continue and intensify its efforts to understand the mechanisms of the movement of radionuclides in the soil and into the food chain.

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Attachment 2

May 16, 1961

Dr. Francis J. Weber, Chief
Division of Radiological Health
Bureau of State Services
Public Health Services
Washington 25, D. C.

Dear Dr. Weber:

I was very pleased to receive your letter of May 9 setting forth the clear interests on the part of the Division of Radiological Health in at least three projects currently sponsored by the AEC. I was particularly gratified that Dr. Abrahams is prepared to move into the feasibility study of the radium epidemiology problem in Illinois and Iowa, and you may be assured that we stand ready to assist in any way possible.

As to the Lovelace project, I think it would be particularly valuable to both our organizations if Dr. Tompkins could assign persons acceptable to Dr. White to that project.

We would also be happy to discuss with you joint participation in the studies underway now at Cornell under Dr. Comar.

With this in mind, I will plan to contact your office in the near future with a view to setting up a meeting between our respective staffs to discuss these and perhaps other areas which might be appropriate for joint participation.

Sincerely yours,

Charles L. Dunham, M.D.
Director, Division of
Biology and Medicine

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
WASHINGTON 25, D. C.

May 9, 1961

Dr. Charles Dunham
Director, Division of Biology and Medicine
Atomic Energy Commission
Washington 25, D. C.

Dear Dr. Dunham:

This letter is to inquire whether you and members of your staff would be interested in meeting with members of the Division of Radiological Health to discuss the possibilities of extending our collaborative projects into additional areas of mutual interest.

We have budgeted funds in fiscal year 1962 to permit establishing the feasibility of the radium epidemiology study which we discussed previously. I have been advised by Dr. Abrahams that he will be prepared to become active on this in the near future.

The projects of interest which we would like to bring up for consideration at the present time are the possibilities of DRH participation in the Atomic Energy Commission-sponsored inhalation toxicity studies being conducted by the Lovelace foundation and in the fallout evaluation studies being conducted at Cornell University.

I have been advised by Dr. Tompkins that he is prepared to support the Lovelace project with the assignment of personnel who may be considered desirable by the Lovelance group. Earlier informal conversations between Dr. Tompkins and Dr. White elicited the fact that Dr. White would be interested in such an arrangement, and we are certainly willing to do our best to support this study. We have before us a request from Dr. Thomas who recently joined the Lovelace group for us to assign Dr. Stara, a member of our staff now at Rochester University, to his organization. In addition, Dr. Grant Kuhn may soon be joining the Division staff, and has also indicated interest in the possibility of the Lovelance program. Dr. White has indicated he would be most happy to have Dr. Kuhn's participation in the program. It is my fealing that we would make our best contribution if we had some understanding with you as to the nature of our participation as well as its extent, and also had advice from the Lovelace group as to the type of personnel in whom they would be most interested.

If you are interested in considering such joint participation, we will be most happy to discuss the matter further with you.

Sincerely yours,

Francis J. Weber, M. D.
Chief, Division of Radiological Health

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THE FEDERAL RADIATION COUNCIL
(Item 4)

The staff considered suggesting that the Commission might wish to discuss aspects of the work of the Federal Radiation Council (FRC). However, this was dropped from the proposed agenda because we felt it might not be appropriate to introduce this subject in the absence of members of the Departments of Labor, Commerce, and Defense. In view of the possibility that the subject might be introduced by the Department of Health, Education and Welfare (DHEW) the following background discussion is provided.

Three (3) major questions are involved.

(1) Is the FRC the optimum device for establishing Federal positions in connection with problems of radiation protection?

(2) What should be the scope of the Council's activities?

(3) How should the Council operate?

Prior to the establishment of the FRC, the Government had no mechanism for the development and establishment of policy in connection with the radiation hazards of either the military or peaceful uses of nuclear energy. Individual agencies were largely dependent upon recommendations of such non-governmental groups as the National Committee on Radiation Protection (NCRP) and in areas where these did not apply, upon their own expertise. While the recommendations of the NCRP were commonly presumed to be the direct result of scientific evaluation, they do, in fact, involve value judgments covering a wide range of considerations, for some of which members of the Committee have no particular qualifications and no responsibility. While the conditions under which the FRC operates present real problems, it appears necessary in seeking to eliminate these problems to choose methods which would strengthen rather than weaken the Council.

Currently before the Council are two (2) proposals for approval by the Council. One of these is on the modus operandi of the FRC and the other is on a specific study on products containing radioactive material for use by the general public. The latter proposal is inspired in large part by a request from the Commission to the Council for comments on a proposal to license the use of tritium in lock illuminators.

At the present time the detailed work of planning the activities of the Council and evaluating proposed recommendations is performed by a Working Group made up of senior technical representatives from each of the member agencies. It is estimated that these individuals devote from ten to fifteen percent of their time to the work of the Council. The groundwork for such recommendations is done by temporary staffs, members of which are detailed by the agencies to the Council to devote either fulltime or a major portion of their time to a particular study until it is completed. The Working Group proposes to increase its capacity to carry on simultaneous studies by using study groups, also detailed from the agencies, in planning studies which may be conducted by temporary staffs.

From the point of view of the individual agencies, either of these modes of operation represent a serious cost to the agencies in terms of loss of availability of senior staff for other activities. The Director of Regulation considers that it would be more economical of manpower as well as more appropriate for the principal agency or agencies to make the basic studies. He is particularly concerned about the extent to which members of the staff of the AEC are put in the position of making studies in the name of the Council and then securing concurrence of interested groups within the AEC. While this characteristic of the operation of the Council cannot be entirely eliminated, discussion with other agencies might seek ways of minimizing these problems.

The proposed study to develop general policy on the control of radioactive material in products for use by the general public provides a concrete illustration of the problems discussed above.

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TRAINING PROGRAMS FOR STATE AND LOCAL GOVERNMENT PERSONNEL AND THE RECRUITING PROBLEM
(Item 4)

Public Law 86-373 authorized the AEC to provide training, with or without charge, to employees of, and such other assistance to any state or political subdivision thereof or group of states as the Commission deems appropriate.

Early in the program the possibility of a cooperative effort in the training of state personnel was discussed between members of the staff of AEC and PHS but for various reasons the AEC developed its training program almost independently of the PHS.

Training courses in this field began in January 1960 with a ten-week course at Oak Ridge, arranged by the Division of Biology and Medicine. Since that time courses have been given by the State-AEC Relations Branch and two, ten-week courses have been given at NYOO and Oak Ridge. Attendance to these courses have been at two-thirds their capacity. Two additional ten-week courses were offered but cancelled for lack of participants. Post-graduate training has been offered at Harvard and Michigan Universities for two years. These were attended at one-third their capacity.

Among the various reasons given by state and local grovernments for non-attendance to these courses, two are prominent: (1) Lack of funds for travel and living expenses, (2) Shortage of personnel to replace persons in training.

To meet these problems the State-AEC Relations Branch is considering sponsoring extension courses in universities so that state and local government personnel can attend in the evenings. A pilot study of university extension courses is underway.

During the past year representatives of the State-AEC Relations Branch have discussed with the Chief, Radiological Health Training, U.S. Public Health Service regarding a consolidated training course. Half of this course would be conducted at an AEC Operations Office

and half at the U.S. Public Health Service Training Center. The advantage of such a course would be that students could get that knowledge required by the AEC for agreement purposes and that knowledge needed for X-ray control and the organization of a radiation control program in the health department from the USPHS. Field experience in both areas is deemed important.

There has also been discussed with the USPHS the possibility of a training film on the radiation control program and a joint exhibit for the forthcoming American Public Health Association convention. The feasibility of these joint efforts is dependent upon legal status and budgetary considerations.

The general area of training state and local personnel for activities in the field of radiological health appears to be potentially a very fruitful one for cooperative activity between the AEC and the USPHS.

An important adjunct to training is the recruitment of personnel with basic education and general interest to enter the radiation health protection and safety field. To many people this type of work is not as glamorous and attractive as research, developmental or production activites. Ways must be found to influence a larger number of competent personnel to enter this field. We believe it would be mutually helpful for the USPHS and the AEC to attack jointly a program to increase the attractiveness of the radiation safety field as careers for individuals with inclinations toward science and engineering.

SUMMARY OF PLOWSHARE SAFETY MEASURES
(Item 4)

There are five phenomena associated with nuclear detonations representing potential hazards in the use of nuclear explosives for peaceful purposes. These are thermal radiation, air blast, fallout, underground deposits of radioactive debris and seismic shock. Each of these phenomena is discussed below and an indication is given as to the nature and extent of safety measures being taken with respect to them.

Thermal Radiation - Nuclear explosives release vast quantities of thermal energy. However, this energy is relatively easily suppressed and the thermal energy is completely confined to the shot site by much shallower depth of burst than would be used in the excavation application. No consideration is being given at this time for Plowshare projects involving surface burst or air burst. Therefore, for all projects presently under consideration the depth of burial provides sufficient suppression of thermal radiation.

Air Blast - There might be some air blast associated with all nuclear detonations; however, this probably would only become a limiting factor in those experiments involving relatively shallow depth of burial, particularly those explosives for excavation purposes. The extent to which air blast can be suppressed or directed is being investigated as a part of our excavation program. Specifically, the Sandia Corporation is making microbarographic measurements in connection with each of the high explosive experiments being conducted at the Nevada Test Site and similar measurements are incorporated into the safety program for Project Chariot. The data provided by these experiments will be used to supplement the information already available on air blast characteristics from weapons tests.

Seismic Shock - Underground nuclear explosions will produce seismic shock which, under some conditions, could produce damage to property. As a part of the feasibility determination of each Plowshare experiment and before the experiment itself is undertaken, an evaluation is made of the potential hazards of ground shock. In Project Gnome, for instance, project Gnome high explosive shots were fired to assist in this evaluation and a panel of experts was hired by Albuquerque Operations Office to give an independent judgment as to whether the ground shock from Gnome was likely to damage nearby property. On January 12, 1960, members of this panel of experts met with the Commission and presented in detail their views on this possible hazard. Very briefly, this panel concluded that the likelihood of damage to property was sufficiently small to permit proceeding with the project. At this meeting Dr. Newmark, one of the panel of consultants, stated that although more information might be desirable he believed all necessary investigations had been made.

The three phenomena discussed so far apply to the use of all kinds of explosives, and in the application of nuclear explosions differ from chemical explosions only in degree.

Fallout - In these Plowshare experiments in which there is no breaching of the surface, no fallout is involved. However, fallout becomes a potential hazard in the excavation hazard and other uses which might involve venting to the surface. The only Plowshare experiment planned to date in which such venting is a result of the experiment is Project Chariot. In Project Chariot the Commission has gone into the safety aspects in great detail. One of the criteria for site selection for Project Chariot was the bio-environment. In this site selection Dr. Lauren K. Donaldson, Head of the Department of Radiation Biology at the University of Washington, gave advice to the Commission. Then after the site

was selected, a detailed bio-environmental survey program was undertaken and a bio-environmental study committee was established to advise the Commission of the biological aspects of Project Chariot. This committee is headed by Dr. John N. Wolfe of the Division of Biology and Medicine, and has representatives from the University of Alaska, University of Washington, University of California at Los Angeles, U.S. Public Health Service, U.S. Weather Bureau, U. S. Geological Survey, and the Fish and Wildlife Service. A biological survey program was initiated during the summer of 1959 and is continuing through 1960. This program includes eleven survey teams investigating all facets of the ecological system in the vicinity of the Chariot site. There will be no recommendation to proceed with the Chariot experiment unless the bio-environmental committee gives assurance that the experiment can be conducted without significant biological damage. Also, one of the major purposes of the Chariot experiment is to determine more precisely the extent to which radioactive debris can be contained underground in an excavation operation by appropriate selection of burial depth.

Deposition of Radioactive Debris Underground - There will be some radioactive debris deposited underground is all currently planned Plowshare experiments. These deposits represent potential hazards and in each experiment steps must be taken to assure that usable ground water is not contaminated. Hydrology surveys have been made for both Project Chariot and Project Gnome. In Chariot the hydrology work is a part of the bio-environmental program and the investigations are being made by the USCS. In Project Gnone the hydrology survey work is also being conducted by the USCS and, in addition, a hydrologist was added to the panel of consultants which has been hired by ALOO to advise the Commission of the safety aspects of Project Gnone. One of the criteria for selecting the Gnome site was that the site be "vertically removed from ground

water sources as far as possible." In the January 12 meeting with the Commission Dr. Maxey, the hydrology consultant, stated that on the basis of available information, he believed there is no problem of contamination of usable water in Gnome but in the off-chance that this might occur there are positive controls. In addition tp the work already done we have drilled, on the advice of the USCS, two holes to permit the evaluation of the movement of ground water in the vicinity of the Gnome site and to monitor for any possible contamination of ground water from the experiment. In the instructions to San Francisco Operations Office authorizing the construction for project Gnome, radioactive safety criteria were set forth. These criteria are consistent with those used for reactors and for the Rover program, and in addition were reviewed by the Division of Biology and Medicine and the Office of Health and Safety to assure that they are in conformity with safety radioactive criteria for peaceful uses of atomic energy.

It is believed that the best way to handle the problem of undesirable radioactivity in the Plowshare program, whether deposited underground or in the form of fallout, is to minimize the amount of radioactive debris created. In this connection, Lawrence Radiation Laboratory is working on designs of nuclear explosives especially for Plowshare. Devices so designed, if successful, will do much to reduce the potential hazard of radioactivity from Plowshare.

It is possible that it might be desirable to do more in the safety program for Plowshare. However, it is unlikely that any of these fields can be investigated until it is exhausted. What is needed is sufficient information to assure the potential hazards and to assure that adequate precautions are taken to protect public health, safety and property. In each experiment to

date the Commission has obtained outside expert opinion and assistance in assuring adequacy of the safety measures.

Aspects of Public Safety are also reviewed for the Commission by the Plowshare Advisory Committee

UNCLASSIFIED

SUMMARY OF AEROSPACE NUCLEAR SAFETY TECHNOLOGY, RESPONSIBILITIES, AND MANAGEMENT CONSIDERATIONS FOR NUCLEAR ROCKETS AND NUCLEAR AUXILIARY POWER SYSTEMS (Item-4)

This summary is intended to provide a brief, yet comprehensive description of the aerospace nuclear safety technical problem areas, and approaches to their solutions thus far considered. It has been prepared to serve as a first enclosure to a letter on these subjects from the Chairman, Atomic Energy Commission, to the Administrator, National Aeronautics and Space Administration, and the Secretary of Defense.

Safety Aspects of the Nuclear Space Program

In analyzing the possible hazards from nuclear space power sources, there are three basic considerations:

1. The potential contribution of radioactive materials (normal operations or accidents) to the atmosphere, assuming a reasonable dispersal after release;

2. The local amounts of direct radiation or release of radioactivity from the use of these devices; and

3. The areas of the world which might experience this localized radioactivity.

Basic safety objectives for all space nuclear power devices have been developed. Namely that:

1. Under the most adverse conditions, these devices do not add materially to the general background atmospheric radioactivity.

2. The use of these devices at a launch pad, operational base, or test range be such as to contain all harmful radiation, either within the device itself or within the prescribed exclusion area;

3. On return to earth, the devices do not create a local hazard for people who might happen to be in the area.

There has been an intensive, nuclear safety experimental program for the nuclear aircraft since 1956. Much of this information is useful, and gives confidence to the safety analyses

for nuclear rocket and SNAP devices. Results indicate that hazards can be minimized by careful attention to engineering design, and adherence to the following operational safety features:

1. Careful site selection with appropriate exclusion areas;

2. Operation of the device over water after launch;

3. Precise knowledge of position;

4. Selection of as long-lived an orbit as possible;

5. Flights under favorable meteorological conditions;

6. Development of countermeasure techniques; and

7. Proof of reliability of the total system through an extensive preliminary testing program.

Launch complex and range safety controlling factors are: radioactive contamination of the environment; conventional fire and explosion; and the danger from falling objects.

Launch pad problems extending through the cone of destruct can be handled effectively by safety features inherent in missile range operations. If the vehicle lifts off in poor trajectory, the normal destruct devices operate with a high degree of reliability (failing less than 1 in 10,000). This reliability, coupled with accurate impact prediction and long range communications, assures positive control.

It is anticipated that a Rover rocket could be flight tested in the SATURN system from Cape Canaveral: first, as an upper stage in a high altitude lob shot; and then, as an upper stage with orbital start-up; assuming adequate destruct control, on a southeast trajectory. This progression in flight testing would provide opportunity for safety analyses and valuable data on which to base future decisions for specific additional uses of Rover. Meanwhile, Rover static tests and experimental nuclear safety tests will continue to be carried out at the Nevada Test Site.

An appraisal of engineering design for safety reveals that:

a. SNAP Safety Design

Currently designed SNAP isotope and reactor devices have been thoroughly tested to be capable of burn-up on re-entry to the atmosphere at speeds above 24,000 feet per second for a burn-up time of 300 seconds or more (conditions met 10,200 miles downrange). Heat rates under these conditions are adequate to insure complete burn-up above 100,000 feet.

To facilitate exposing reactor fuel elements to aerodynamic heating, the structural materials surrounding the reactor are held together by fusible links that will melt at about 2,500°F, and allow the reactor components to fall apart on re-entry to the atmosphere.

It is concluded, then, that the isotope and small reactor devices being developed in the SNAP program can probably be flown safely with existing technology on either a polar orbit trajectory at the Pacific Missile Range, or a southeast trajectory (below the tip of Africa) at the Atlantic Missile Range. Both trajectories provide a 12,000 to 15,000 mile expanse of open ocean and Antarctic waste into which intact, or partially intact, devices which fail to achieve orbit can fall, and insures that speeds above 24,000 feet per second will be achieved before any populated land mass is encountered.

b. Nuclear Rocket Safety Design

For the Rover nuclear rocket, the major engineering design problem is to prevent random return of a hot nuclear reactor. As a booster, impact can be limited to the established missile range. A nuclear second stage rocket on an orbit trajectory, however, presents the problem of disposal of a hot reactor which theoretically could land anywhere along its trajectory if it failed to achieve orbit. An upper stage rocket might also soon return to earth due to a highly elliptical, low perigee, short-lived orbit, or to the application of thrust in the wrong direction due to control malfunction. In addition, both latter uses of the nuclear rocket carry with them the possibility of a cold reactor returning to earth. As presently designed, with the reactor materials currently in use, these reactors would require positive countermeasures such as an escape trajectory, controlled ocean impact, or their burn-up or destruction on re-entry to the atmosphere.

In testing for safety reliability, we will want to consider:

a. Broad Future Operational Objectives for SNAP and Rover

Aside from the Pacific Missile Range polar trajectory, and the Atlantic Missile Range southeast trajectory, almost any other trajectory would overfly a populated land mass sooner. Before using such other trajectories safely, precise information is needed on heat transfer during atmospheric re-entry, burn-up reliability, impact prediction of thrust devices, and

patterns of distribution of radioactivity injected into the atmosphere on burn-up. This type of analysis, for example, was conducted prior to approval by the Commission of the use of a SNAP device in the Transit 4A trajectory.

b. Nuclear Rocket Reliability for Safety

For the nuclear rocket, it will be necessary to develop techniques and equipment to achieve reliability of: controls; orbital start-up and shutdown; destruct controls and methods; and controlled re-entry techniques. A number of concepts have been considered, such as an excursion of the reactor core, disintegrative destruction with explosives, and the thermal shock and oxidation of flushing liquid oxygen or fluorine through a hot reactor. The use of deep space for disposal also merits consideration. These studies will merge with programmed flight tests to develop the nuclear rocket systems themselves. It appears desirable to conduct a series of reliability tests to prove the safety for each intended use of the nuclear rocket systems.

c. SNAP Reliability for Safety

With knowledge gained from a test program, it might be possible to trade off a lower melting point core (which permits earlier burn-up on re-entry) for reliability of radioisotope containment at the launch pad. Although SNAP safety criteria are directed primarily toward personnel protection, the stipulation of containment of the isotope fuel under all launch pad failure situations is not an absolute personnel safety requirement, but rather serves to simplify procedures and eliminate the cost and delay of a launch pad contamination.

The present fuel core blocks are over-designed to guarantee 100% assurance of radioisotope containment on the launch pad over all conceivable launch pad abort situations. Further, when they were designed, no consideration was given to now-conventional techniques for ejection of the device clear of an aborting vehicle. These techniques have now been developed and tested. An assurance of some less, but still acceptable, measure of launch pad safety might permit design of a fuel block for which burn-up on re-entry at speeds of between 18,000 to 20,000 feet per second would be assured. Burn-up could then be guaranteed at any speed which would carry the missile beyond 4,000 to 5,000 miles downrange. Answers to this problem will be sought in research work within a reasonable time.

For SNAP reactors, the problems similarly center around developing a reactor that can be vaporized and dispersed at re-entry speeds between 18,000 to 20,000 per second.

Five special subjects merit consideration in this summary:

a. Extra-terrestrial Contamination from Power Source Radioactivity

No serious problem is foreseen in the contamination of extra-terrestrial regions with radioactivity, or in the complication of long range scientific studies on the origin of matter and on ambient space radiation.

b. Ambient Space Radiation

Recent reports have indicated that crew exposure to this radiation, on passing through the Van Allen belts, or during and after solar flare activity, may present a serious shielding problem - perhaps of greater magnitude than the requirement for crew shielding from nuclear power sources.

c. Manufacture, Transportation and Ground Handling

The manufacture, transportation and ground handling of space nuclear power sources do not present unusual health and safety problems, and can be adequately covered by established AEC and ICC regulations.

d. National Committee on Radiation Protection and Management and Federal Radiation Council Guides

It is believed that the present Guides provide a baseline for the protection of the population. Operational costs to achieve this protection, though admittedly high, can be kept within reason.

e. Space Law

An important area related to safety bears special mention, namely the legal considerations that arise in questions of: liability; the right to control and recover space vehicles; and other jurisdictional factors concerning the national sovereignty in space.

In concluding the technical analysis, appraisal of the radiation risks that have been discussed reveals them to be no more than those risks encountered in the progressive development of steam and electric power, the airplane, the automobile or the rocket. Just as the uses of these older forms of energy have been governed by considerations of safety, so will the ultimate role of nuclear energy in space be in some measure determined by its safety.

ENCLOSURE I

PLAN FOR AEC PARTICIPATION IN AEROSPACE NUCLEAR SAFETY ACTIVITIES

From the foregoing study, it has been concluded that this Plan would contain the following sections:

A. AEC responsibilities in aerospace matters consistent with the Atomic Energy Act.

B. Concept of Interagency coordination.

C. Statement of Policy.

Under (A) above, these responsibilities would be:

1. Prescription of standards for health and safety to be applicable during research, development and testing of nuclear devices conducted by the AEC, its contractors, or licensees;

2. Provision of advice and assistance to the using agency on conditions essential for safe employment of specific developed items in the operational environment;

3. Review and approval of nuclear safety standards, criteria, and procedures of the using agencies;

4. Participation in and arrangement for the conduct of feasibility studies in cooperation with the user;

5. Establishment of safety design criteria for development of specific devices for use under the predicted operational conditions of employment as specified by the user;

6. Participation in and arrangement for the conduct of tests of the nuclear devices under experimental flight conditions as necessary to confirm that nuclear safety design criteria have been satisfied;

7. Functions under licensing requirements to the extent that licensing is required; and

8. Issuance of regulations to the extent necessary to protect health and to minimize danger to life or property.

Under (B) above would come the following:

1. Licensing of Reactors, (with respect to reactors and special nuclear materials);

   a. Reactors under AEC development projects and joint agency projects (e.g., AEC-NASA) will be exempt from licensing to the extent that work is performed under contracts with and for the account of the Commission.

b. Reactors to be used by DOD will be authorized for military purposes under Section 91(b) of the Act, and will be exempt from licensing.

c. In accordance with present legislation, reactors to be used by NASA will be subject to licensing, mandatory ACRS review and public hearings. The practicability of licensing NASA reactors for space missions has not, as yet, been fully explored. It is possible that new legislation may be needed.

2. Licensing of Byproduct Materials.

Under AEC regulations, only those AEC contractors are exempt from licensing who operate AEC-owned plants and laboratories on behalf of AEC. DOD, NASA and their contractors have no exemption from byproduct licenses. The Commission has authority to grant exemptions under the terms stated in Section 81. The AEC will consider the possibility of granting exemptions under Section 81 of the Act on an individual basis, provided conditions for use of the particular device can be defined, and can be determined as not constituting an unreasonable risk to the common defense and security, and to the health and safety of the public.

3. Advice and Assistance.

Upon completion of development of an item, the AEC will transmit a report to the potential user. This report will cover safety design criteria which have been satisfied by test or adequate study. During the development of items, the AEC will coordinate with the using agency on rules and regulations for the predicted concept of operational employment. Subsequent to transfer of items under Section 91(b) or to issuance of a license for a device to be used in aerospace operational missions, the AEC will continue to provide the using agency with advice and assistance on matters related to nuclear safety.

Under (C) above:

The basic instrument of interagency agreement will be a Statement of Policy executed between the AEC and the using agency. This Statement will outline policy and procedures, and will indicate the basis for subsequent execution of Memoranda of Understanding for individual projects.

AEC

Mutual Radiation

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

No. D-176
Tel. HAzelwood 7-7831
Ext. 3446

FOR IMMEDIATE RELEASE
(Tuesday, July 18, 1961)

AEC PUBLISHES ATMOSPHERIC RADIOACTIVITY AND FALLOUT RESEARCH PAMPHLET, FOURTH IN A SERIES DESCRIBING THE COMMISSION'S BIO-MEDICAL PROGRAM

The Atomic Energy Commission has published the fourth pamphlet in a series describing its life sciences research program. The purpose of the series of pamphlets is to acquaint scientists, students and interested members of the general public with the objectives of the Commission's bio-medical program.

The booklet, titled "Atmospheric Radioactivity and Fallout Research," summarizes work in progress at 36 institutions under 40 research contracts or projects.

The first dozen pages of the pamphlet contain a brief history of this type of research. It covers the growth of networks for detection of radioactive fallout and their expansion through successive weapons tests series between 1947 and 1958.

Beginning in 1959, following suspension of nuclear weapons tests on October 31, 1958, and expansion of environmental survey programs by the Department of Health, Education and Welfare, the Commission, in its fallout studies program, has reduced fallout survey and monitoring activities and placed greater emphasis on fallout research. The Commission has assisted in training personnel of the Food and Drug Administration in the radiochemical analysis of food samples. At the same time, support by the Commission of nationwide and world-wide sampling networks -- using surface air filters, gummed paper, soil and human bone for fallout measurement -- has been discontinued or greatly curtailed.

This booklet reflects the increasing attention now being given to the investigation of atmospheric radioactivity problems associated with other areas of the Commission's work, such as the development of nuclear power for missiles and space vehicles.

(more)

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The broad study areas within which the present research efforts are being conducted are:

1. determination of the concentration and physical and chemical characteristics of radioactive fallout and other trace materials in the atmosphere including analysis of samples collected by balloons, jet aircraft and rockets, as well as by ground stations (atmospheric chemistry);
2. theory and observation of the nature of atmospheric motions which transport, mix, and deposit radioactive contaminants and tracers (atmospheric dynamics);
3. influences of conditions, such as height of burst, at the time of nuclear detonations (whether in air, water or soil) on the characteristics of resulting fallout (fallout formation and source effects); and,
4. the relationship of diet, fallout rate and accumulated fallout to observed human body burdens of man-made radioactive materials (radioactivity in soil, food and man).

The introduction to the booklet (pages 1-11) includes a discussion of problems and questions which prompt research efforts in these areas. The remainder of the 72 pages of the pamphlet is devoted to technical and semi-technical descriptions of the studies in progress under each research project. Presently published references pertaining to each study accompany the descriptions. The booklet concludes with a list of selected AEC headquarters publications.

Funds provided during fiscal 1961 for the operation of the Commission's fallout studies program described in the booklet are as follows:

	Category of Research	Estimated Costs
1.	atmospheric chemistry	$2,174,000
2.	atmospheric dynamics	938,000
3.	fallout formation and source effects	56,000
4.	radioactivity in soil, food and man	1,286,000
	Total	$4,454,000

The publication "Atmospheric Radioactivity and Fallout Research" (TID-12616), may be bought from the Office of Technical Services (OTS), U. S. Department of Commerce, Washington 25, D. C., at 75 cents a copy. The first three

pamphlets in the series on the Commission's life sciences research program, also available from OTS, are "Marine Sciences Research" (TID-4040) 50 cents a copy; "Genetics Research" (TID-4041) $1.25 a copy; and, "Cancer Research" (TID-11132) $2.25 a copy.

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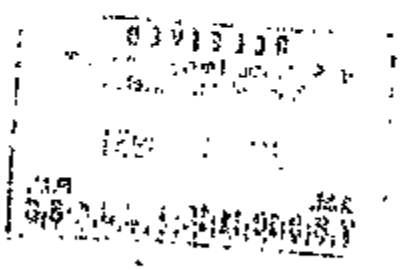

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AEC 604/55

July 18, 1961

COPY NO. 53

ATOMIC ENERGY COMMISSION

DRAFT FEDERAL RADIATION COUNCIL MEMORANDUM TO THE PRESIDENT

Note by the Secretary

The General Manager and the Acting Director of Regulation have requested that the attached report be circulated for consideration by the Commission at an early date.

W. B. McCool
Secretary

AEC 604/55

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
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ATOMIC ENERGY COMMISSION

DRAFT MATERIAL RADIATION COUNCIL MEMORANDUM FOR THE PRESIDENT

Report to the General Manager and the Acting Director of Regulation by the Director, Office of Radiation Standards

THE PROBLEM

1. To consider proposed revision of alternate Radiation Protection Guides for bone and corresponding Ranges of Transient Rates of Intake for radium-226 in the Draft Federal Radiation Council Memorandum for the President dated June 1, 1961. (Appendix "B")

SUMMARY

2. At Meeting 1743 on May 31, 1961, the Commission considered and approved certain suggestions by the staff in AEC 604/52 for modifications of the Draft FRC Memorandum for the President which summarized the recommendations of FRC Draft Report No. 2 concerning exposure of general population groups to radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. The modified Memorandum was subsequently approved by the Federal Radiation Council and is attached as Appendix "B".

3. The alternate Radiation Protection Guides (RPG) for bone in the Memorandum are .01 microgram of radium-226 in the adult skeleton or the biological equivalent of this amount of radium-226 for individuals in a population group, and .003 microgram for a suitable sample of exposed population groups. The corresponding intake values are: Range I, 0 - 3; Range II, 3 - 30; Range III, 30 - 300 micromicrocuries per day.

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4. The recommended "maximum permissible body content" of radium-226 for occupational exposure is 0.1 microgram. The National Committee on Radiation Protection (NCRP) has recommended that, for members of the general population living in the vicinity of nuclear installations, the permissible body content of a radioisotope should not exceed one-tenth of that permitted for occupational exposure. These considerations led to the alternate RPG's of 0.01 microgram and 0.003 microgram for bone, as recommended in the Memorandum.

5. In undertaking to revise the Federal Radiation Council Draft Staff Report No. 2 (March 20, 1961) to conform to the Memorandum, the Secretary of the Council concluded that he was unable to support the alternate Radiation Protection Guide for the skeleton (0.01 microgram of radium-226) and that some modification of the values to be recommended in the Memorandum would be appropriate. Under conditions of continuous exposure by the general population to the long-lived radium-226, an integrated lifetime dose from 0.01 microgram of radium-226 might be as much as one-third rather than one-tenth of that from occupational exposure under current standards, indicating a need for further reduction by a factor of about one-third in the RPG for exposure of the general population. Such a reduction would result in alternate RPG's for bone of 0.003 microgram for individuals in a population group and 0.001 microgram for a suitable sample of exposed population groups.

6. The upper limit of Range II for Transient Rates of Intake recommended in the Memorandum is 30 micromicrocuries per day, given as the constant rate of intake corresponding to an average of 0.003 microgram of radium-226 in the skeleton. On the basis of available data, this intake value is quite conservative and need not be reduced as much as the value for body content. A reduction

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of the intake value by a factor of about two-thirds to 20 micromicrocuries per day is estimated to correspond to an RPG of 0.001 microgram.

STAFF JUDGMENTS

7. The Divisions of Licensing and Regulation, Biology and Medicine, Compliance, Military Application, Production, Raw Materials, and Reactor Development, and the Offices of Operational Safety, Radiation Standards, and Isotopes Development concur in the recommendation of this paper. The Office of Public Information concurs in the staff judgment that no public announcement should be issued.

CONCLUSION

8. It is concluded that the Draft Memorandum for the President (Appendix "B") should be modified according to the following recommendation.

RECOMMENDATION

9. The General Manager and the Acting Director of Regulation recommend that the Atomic Energy Commission:

a. Approve for the guidance of the AEC member of the Federal Radiation Council, the following modifications of the Memorandum for the President (Appendix "B").

(1) The alternate RPG's for bone (Table 1, Appendix "B") should be changed from 0.01 microgram of radium-226 for individuals to 0.003, and from 0.003 microgram for a suitable sample of exposed population groups to 0.001.

(2) The Ranges of Transient Rates of Intake (in micromicrocuries per day) for radium-226 (Table 3, Appendix "B") should be changed from 0 - 3, 3 - 30, 30 - 300, to 0 - 2, 2 - 20, 20 - 200.

b. Note that the Draft Federal Radiation Council Report No. 2 will be revised to conform with the recommendations in the Memorandum for the President and issued as a supporting document.

c. Note that no news release or advice to the Joint Committee on Atomic Energy is required.

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LIST OF ENCLOSURES

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APPENDIX "A"

BACKGROUND

1. On March 20 the Working Group of the Federal Radiation Council completed a Draft Report No. 2, which was circulated to the agencies for concurrence. The report was concerned with guides for the protection of population groups against hazards from exposure to iodine-131, strontium-90, strontium-89, and radium-226. A fundamental feature of the approach used was adoption of a Radiation Protection Guide (RPG) for each case considered on the basis of a professed attempt to balance, for that case, biologic risk against reasons for accepting exposures of the magnitude stated in the guide. This was a departure from the practice, used by the International Commission on Radiological Protection (ICRP) and the National Committee on Radiation Protection (NCRP), of establishing a "maximum permissible dose" for each of the various organs or tissues, considered to be applicable to all radioisotopes for which that organ or tissue is considered to be the "critical organ."

2. A number of the members of the AEC staff objected to the approach taken by the Draft Report and proposed that:

a. the FRC should maintain the concept of a basic guide for each organ, and

b. if there were insufficient reason for using the full latitude of the guide for a specific radionuclide, this should be reflected by recommending rates of intake lower than those which would result in the maximum radiation dose permitted by the RPG.

In the latter case, the report would state that higher rates of intake could be used without excessive risk if there were sufficient reason for a higher rate.

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3. In addition, the Division of Licensing and Regulation objected that the proposed recommendations would return standards for Ra^{226} to 10 micromicrocuries per day, the level from which they had been raised by the January revision of Part 20, in accord with revisions contained in the most recent report of the NCRP (22 micromicrocuries per day).

4. Before the differences between the Working Group of the FRC and the staff of the AEC were resolved, the Working Group issued a Draft Memorandum for the President dated May 11, 1961, summarizing the recommendations of the Draft Report No. 2 in a form considered suitable for the President's approval as guidance to Federal Agencies. In an effort to resolve the differences between the staff of the AEC and the Working Group, members of the AEC staff drafted proposed revisions of the Memorandum for the President which they persuaded the Working Group to accept with minor changes. The resultant Memorandum dated June 1, 1961, was approved (with some additional changes) by the Commission and by the Council with the understanding that the Draft Report No. 2 would be rewritten to reflect the changes which had been made in the Memorandum for the President.

5. The Radiation Protection Guides and Ranges of Transient Rates of Intake recommended in the Memorandum for the President are included in Tables 1 and 2, respectively, with the pertinent values for radium-226 underlined.

Table 1. Radiation Protection Guides for Certain Body Organs in Relation to Exposure of Population Groups

Organ	RPG for Individuals	RPG for Average of Suitable Sample of Exposed Population Group
Thyroid	1.5 rem/yr	0.5 rem/yr
Bone marrow	0.5 rem/yr	0.17 rem/yr
Bone	1.5 rem/yr	0.5 rem/yr
Bone (alternate guide)	0.01 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-226	0.003 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-226

Appendix "A"

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Table 2. Ranges of Transient Rates of Intake (uuc/day) for Use in Graded Scale of Actions

Radionuclides	Range I	Range II	Range III
Radium-226	0 - 3	3 - 30	30 - 300
Iodine-131*	0 - 10	10 - 100	100 - 1,000
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 - 200	200 - 2,000	2,000 - 20,000

*In the case of iodine-131, the suitable sample would include only small children. For adults, the RPG for the thyroid would not be exceeded by rates of intake higher by a factor of 10 than those applicable to small children.

DISCUSSION

6. The Secretary of the Council undertook to rewrite the Draft Report No. 2 to conform with the Memorandum for the President and concluded that he was unable to support the alternate Radiation Protection Guide for the skeleton (0.01 micrograms of radium-226 in the adult skeleton) recommended in the Memorandum. This value had been supported by members of the AEC staff on the basis that it is the value for the radium content of the skeleton deduced from a recommendation of the NCRP that, in the case of members of the general population living in the vicinity of nuclear installations, the permissible body content of a radioisotope should not exceed one-tenth of that permitted for occupational exposure. (The recommended "maximum permissible body content" of radium-226 for occupational exposure is 0.1 microgram.) However, in the case of radium-226, the relative protection afforded by the factor of one-tenth is probably substantially less than in the case of radioisotopes which remain in the body for much shorter periods of time.

[redacted]

[redacted]

[redacted]

7. Although the occupational RPG for radium-226 is said to be 0.1 microgram of radium in the skeleton, under conditions of controlled exposure the recommendations of the NCRP limit rates of intake to values estimated to result in not more than 0.1 microgram of radium in the skeleton after 50 years of occupational exposure. Under these conditions, the average radiation dose to the skeleton is much less than if the 0.1 microgram had been present throughout the occupational lifetime. In the case of constant environmental exposure, however, it is believed that the concentration in the skeleton would be reasonably constant throughout life. Thus, in practice, an RPG of 0.01 microgram of radium-226 for constant lifetime exposure may represent an integrated lifetime radiation dose about one-third rather than one-tenth that which might be received from occupational exposure under current standards.

8. One may further reason that the relative hazard from lifetime exposure to the radiation from 0.01 microgram of radium-226 might be considerably greater than one-third that from occupational exposure to quantities of radium-226 increasing gradually to 0.1 microgram near the end of life. Because of the delayed nature of radiation effects, a unit of radiation received early in life may be more hazardous than if it had been received late in life. In the case of occupational exposure under the conditions described above, a substantial portion of the total radiation dose would be received late in life, so that the total effect might be much less than if the same integrated dose had been received at a uniform rate throughout the occupational lifetime. The validity of this reasoning rests on the hypothesis that there is no threshold dose below which increased incidence of bone cancer will not occur.

[redacted]

[redacted]

OFFICIAL USE ONLY

9. After staff discussion of these considerations, it was concluded that the Secretary of the Council is justified in his position that:

a. the derivation of an RPG for the exposure of members of the general population to radium-226 by application of a factor of one-tenth the RPG for occupational exposure may not provide the degree of safety to be expected from the use of this factor in most other cases, and

[redacted]

[redacted]

[redacted]

11. To recapitulate, it is proposed that the RPG's for radium-226 stated in the Memorandum for the President, as recently approved by the Federal Radiation Council, be reduced by a factor of one-third; and that the intake values for radium-226 contained in the Memorandum be reduced by a factor of two-thirds.

12. The AEC presently operates on the basis of a "maximum permissible concentration" of radium-226 in water of 10 micro-microcuries per liter. This is commonly considered to be equivalent to an intake of 22 micromicrocuries per day. This number is based upon a daily intake of 2.2 liters at the "maximum permissible concentration", although actual intake might be much less. It is not expected that the values proposed above would require any change in AEC standards.

13. These considerations do not affect the RPG's for other long-lived bone-seeking nuclides, such as strontium-90. These RPG's are obtained by direct comparison of the radiation dose to the bone marrow with an RPG for the whole body of 0.5 rem/year for individuals or 0.17 rem/yr for a suitable sample of a population group. These values for the whole body exposure are assumed to be applicable throughout life and are recommended by the FRC as well as by the ICRP and the NCRP.

[redacted]

[redacted]

[redacted]

DRAFT: 6/1/61

APPENDIX "B"

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Radiation Protection Guidance for Federal Agencies

Pursuant to Executive Order 10831 and Public Law 86-373, the Federal Radiation Council herewith transmits its second report to you concerning findings and recommendations for guidance for Federal agencies in the conduct of their radiation protection activities.

Background

On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations was published in the Federal Register on May 18, 1960. There was also released at the same time, Staff Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Protection Standards," dated May 13, 1960.

The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the term "Radiation Protection Guide". It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose. It introduced as an operational technique, where individual whole body doses are not known, the use of a "suitable sample" of the exposed population in which the radiation protection guide for the average exposure of the sample should be one-third the RPG for individual members of the group. It emphazized that this operational technique should be modified to meet special situations. In selecting a

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suitable sample particular care should be taken to assure that a disproportionate fraction of the average dose is not received by the most sensitive population elements. The observations, assumptions and comments set out in the memorandum published in the Federal Register on May 18, 1960, are equally applicable to this memorandum.

This memorandum contains recommendations for the guidance of Federal agencies in activities designed to limit exposure of members of population groups to radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. These recommendations include (1) Radiation Protection Guides for certain organs of individuals in the general population, as well as averages over suitable samples of exposed groups; (2) guidance on general principles of control applicable to all radionuclides occurring in the environment, and (3) specific guidance in connection with the exposure of population groups to radium-226, iodine-131, strontium-90, and strontium-89. It is the intention of the Council to release the background material leading to these recommendations as Staff Report No. 2 when the recommendations contained herein are approved.

Specific attention was directed to problems associated with radium-226, iodine-131, strontium-90, and strontium-89. Radium-226 is an important naturally occurring radioactive material. The other three were present in fallout from nuclear weapons testing. They could under certain circumstances also be major constituents of radioactive materials released to the environment from large scale atomic energy installations used for peaceful purposes. Available data suggest that effective control of these nuclides in cases of mixed fission product contamination of the environment would provide reasonable assurance of at least comparable limitation of hazard from other fission products in the body.

[redacted]

[redacted]

[redacted]

Establishment of the Federal Radiation Council followed a period of public concern incident to discussions of fallout. While Strontium-90 received the greatest popular attention, exposures to cesium-137, iodine-131, strontium-89 and, in still lesser degrees to other radionuclides, are involved in the evaluation of over-all effects. The characteristics of cesium-137 lead to direct comparison with whole body exposures for which recommendations by the Council have already been made.

The pros and cons of nuclear testing are not considered in this report. However, reviews during the past several years by scientific groups in the hearings before the Joint Committee on Atomic Energy of the Congress of the United States have indicated that radiation doses from fallout have, in fact, been small compared to average population doses from other sources of radiation. Although there have been wide differences of opinion on the possible magnitudes of biological risks associated with such exposure, it has been generally apparent that individual risks have been very small and that the primary question has been that of comparing over-all risks with reasons for conducting the weapons tests which produce fallout.

Studies by the staff of the Council indicate that observed concentrations of radioactive strontium in food and water do not result in concentrations in the skeleton (and consequently in radiation doses) as large as have been assumed in the past. However, concentrations of iodine-131 in the diets of small children, particularly in milk, equal to those permitted under current standards would lead to radiation doses to the child's thyroid which, in comparison with the general structure of current radiation protection standards, would be too high. This is because current concentration guides for exposure of population groups to radioactive materials in air, food, and

[redacted]

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[redacted]

water have been derived by application of a single fraction to corresponding occupational guides. In the case of iodine-131, in milk, consumption of milk and retention of iodine by the child may be at least as great as by the adult, while the relatively small size of the thyroid makes the radiation dose to the thyroid much larger than in the case of the adult. In addition, there is evidence that irradiation of the thyroid involves greater risk to children than to adults.

Recommendations as to Radiation Protection Guides

The Federal Radiation Council has previously emphasized that establishment of radiation protection standards involves a balancing of the benefits to be derived from the controlled use of radiation and atomic energy against the risk of radiation exposure. In the development of the Radiation Protection Guides contained herein, the Council has considered both sides of this balance. The Council has reviewed available knowledge, consulted with scientists within and outside the government, and solicited views of interested individuals and groups from the general public. In particular, the Council has not only drawn heavily upon reports published by ICRP, NCRP and NAS, but has had, during the development of the report, the benefit of consultation with and comments and suggestions by several members of NCRP and NAS and of their subcommittees. The Radiation Protection Guides recommended below are considered by the Council to represent an appropriate balance between the requirements of health protection and of the beneficial uses of radiation and atomic energy.

It is recommended that:

1. The following Radiation Protection Guides be adopted for normal peacetime operations.

[redacted]

[redacted]

[redacted]

Table 1. Radiation Protection Guides for Certain Body Organs in Relation to Exposure of Population Groups

Organ	RPG for Individuals	RPG for Average of suitable sample of exposed population group
Thyroid	1.5 rem/yr	0.5 rem/yr
Bone marrow	0.5 rem/yr	0.17 rem/yr
Bone	1.5 rem/yr	0.5 rem/yr
Bone (alternate guide)	0.01 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-226	0.003 micrograms of Ra-226 in the adult skeleton or the biological equivalent of this amount of Ra-226

It will be noted that the preceding table provides Radiation Protection Guides to be applied to the average of a suitable sample of an exposed population group which are one-third those applying to individuals. This is in accordance with the recommendations in the first report of the Council concerning operational techniques for controlling population exposure. Since in the case of exposure of a population group to radionuclides the radiation doses to individuals are not usually known, the organ dose to be used as a guide for the average of suitable samples of an exposed population group is also given as an RPG.

Recommendations as to General Principles

Control of population exposure from radionuclides occurring in the environment is accomplished in general either by restriction on the entry of such materials into the environment or through measures designed to limit the intake, by members of the population, of radionuclides already in the environment. Both approaches involve the consideration of actual or potential concentrations of radioactive material in air, water, or food.

[redacted]

[redacted]

[redacted]

Controls should be based upon an evaluation of population exposure with respect to the RPG. For this purpose, the total daily intake of such materials, averaged over periods of the order of a year, constitutes an appropriate criterion.

The control of the intake by members of the general population of radioactive materials from the environment can appropriately involve many different kinds of actions. The character and import of these actions may vary widely, from those which entail little interference with usual activites, such as monitoring and surveillance, to those which involve a major disruption, such as condemnation of food supplies. Some control actions may require prolonged lead times before becoming effective, e.g., major changes in processing facilities or water supplies. The magnitude of control measures should be related to the degree of likelihood that the RPG may be exceeded. The use of a single numerical intake value, which in part has been the practice until now, does not in many instances provide adequate guidance for taking actions appropriate to the risk involved. For planning purposes, it is desirable that insofar as possible control actions to meet contingencies be known in advance.

It is recommended that:

2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate actions related to ranges of intake of radioactive materials by exposed population groups.

In order to provide guidance to the agencies in adapting the graded approach to their own programs, the recommendations pertaining to the specific radionuclides in this memorandum

[redacted]

[redacted]

consider three transient daily rates of intake by suitable samples of exposed population groups. For the other radionuclides, the agencies can use the same general approach, the details of which are considered in Staff Report No. 2. The general types of action appropriate when these transient rates of intake fall into the different ranges are also discussed in Staff Report No. 2. The purpose of these actions is to provide reasonable assurance that average rates of intake by a suitable sample of an exposed population group, averaged over the sample and averaged over periods of time of the order of one year, do not exceed the upper value of Range II. The general character of these actions is suggested in the following table.

Table 2. Graded Scales of Action

Ranges of transient rates of daily intake	Graded scale of action
Range I	Periodic confirmatory surveillance as necessary
Range II	Quantitative surveillance and routine control
Range III	Evaluation and application of additional control measures as necessary

Recommendations on Ra-226, I-131, Sr-90, and Sr-89

The Council has given specific consideration to the effects on man of rates of intake of radium-226, iodine-131, strontium-90, and strontium-89 resulting in radiation doses equal to those specified in the appropriate RPG's. The Council has also reviewed past and current activities resulting in the release of these radionuclides to the environment and has given consideration to future developments. For each of the nuclides three ranges of transient daily intake are given which correspond to the guidance contained in Recommendation 2 above. Routine control of useful applications of radiation and atomic energy should be such

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[redacted]

[redacted]

that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II. For iodine-131 and radium-226, this value corresponds to the RPG for the average of a suitable sample of an exposed population group. In the cases of strontium-90 and strontium-89, the Council's study indicated that there is currently no known operational requirement for an intake value as high as the one corresponding to the RPG. Hence, a value estimated to correspond to doses to the critical organ not greater than one-third of the RPG has been used.

The guidance recommended below is given in terms of transient rates of (radioactivity) intake in micromicrocuries per day. It is to be noted, however, that the upper limit of Range II is based on an annual RPG (or lower, in case of radioactive strontium) considered as an acceptable risk for a lifetime. Therefore, to comply with the RPG's recommended in this report, the daily intakes averaged over a year should not exceed the upper limit of Range II. Further, the values listed in the tables are much smaller than any single intake from which an individual might be expected to sustain injury.

It is recommended that:

3. (a) The following guidance on daily intake be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

[redacted]

[redacted]

[redacted]

Table 3. Ranges of Transient Rates of Intake (uuc/day) for Use in Graded Scale of Actions Summarized in Table 2.

Radionuclides	Range I	Range II	Range III
Radium-226	0 - 3	3 - 30	30 - 300
Iodine-131*	0 - 10	10 - 100	100 - 1,000
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 - 200	200 - 2,000	2,000 - 20,000

* In the case of iodine-131, the suitable sample would include only small children. For adults, the RPG for the thyroid would not be exceeded by rates of intake higher by a factor of 10 than those applicable to small children.

(b) Federal agencies determine concentrations of these radionuclides in air, water or items of food applicable to their particular programs which are consistent with the guidance contained herein on average daily intake for the radionuclides radium-226, iodine-131, strontium-90, and strontium-89. Some of the general considerations involved in the derivation of concentration values from intake values are given in Staff Report No. 2.

It is recommended that:

4. For radionuclides not considered in this report, agencies use concentration values in air, water or items of food which are consistent with recommended Radiation Protection Guides and the general guidance on intake.

In the future, the Council will direct attention to the development of appropriate radiation protection guidance for those radionuclides for which such consideration appears appropriate or necessary. In particular, the Council will study any radionuclides for which useful applications of radiation or atomic energy require release to the environment of significant amounts of these nuclides. Federal agencies are urged to inform the Council of such situations.

Chairman
Federal Radiation Council

[redacted]

M H & S - 3 - Radiation

UNCLASSIFIED

July 14, 1961

AEC 604/54

COPY NO. 56

ATOMIC ENERGY COMMISSION

RADIATION PROTECTION GUIDANCE FOR FEDERAL AGENCIES

Note by the Secretary

The Acting General Manager has requested that the attached letter to the Chairman, Federal Radiation Council, be circulated for the information of the Commission.

W. B. McCool
Secretary

AEC 604/54

DISTRIBUTION	COPY NO.
Secretary	1
Commissioners	2 - 6,61,62
General Manager	7
Dir., of Regulation	8
Deputy Gen. Mgr.	9
Asst. Gen. Mgr.	10-11
Asst. Gen. Mgr. Mfg.	12
Asst. Gen. Mgr. R&ID	13
Asst. Gen. Mgr. Adm.	14
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Secretariat	56-60

7-14-61

UNCLASSIFIED

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

July 10, 1961

The Honorable Abraham A. Ribicoff
Chairman, Federal Radiation Council
Executive Office Building
Washington 25, D. C.

Dear Mr. Ribicoff:

In accordance with the Federal Radiation Council Memorandum for the President dated September 2, 1960, requesting each Federal Agency to report by August 1 of each year as to any operating criteria or regulations revised, adopted, or promulgated during the previous year under the Radiation Protection Guidance for Federal Agencies promulgated by the President, the Atomic Energy Commission is pleased to report the radiation protection standards currently used are in substantial agreement with the guides formulated by the Council.

The regulations prescribing standards of radiation protection for activities licensed by the Atomic Energy Commission have been revised to conform with the Federal Radiation Council guides and the Council has been informed accordingly.

No deviation from the guides is expected at this time. Should it become necessary to consider exposures to radiation higher than those prescribed in the Federal Radiation Council guides, the matter will be discussed with the Council.

Sincerely yours,

/s/

Harold L. Price
Acting Director of Regulation

OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

TO : W. B. McCool, Secretary
Office of the Secretary

DATE: July 10, 1961

FROM : Forrest Western, Director
Office of Radiation Standards

SUBJECT: FEDERAL RADIATION COUNCIL - LETTER TO THE HONORABLE ABRAHAM A. RIBICOFF, CHAIRMAN, FEDERAL RADIATION COUNCIL, DATED JULY 10, 1961

It is requested that the attached copy of letter to The Honorable Abraham A. Ribicoff, Chairman of the Federal Radiation Council, dated July 10, 1961 be circulated in the Commission as an information paper.

At Mr. Price's request, the copies of the letter have not been circulated because of the distribution in the staff paper.

Attachment:
As stated

MH & A-3-Radiation

UNCLASSIFIED

June 29, 1961

AEC 604/53

COPY NO. 60

ATOMIC ENERGY COMMISSION

FEDERAL RADIATION PROTECTION STANDARDS

Note by the Secretary

The attached letter from Chairman Seaborg to Mr. Abraham Ribicoff is circulated for the information of the Commission.

W. B. McCool

Secretary

AEC 604/53

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
Secretary	1	Public Information	34
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Dir., of Regulation	8	Licensing & Reg.	37-38
Deputy Gen. Mgr.	9	Military Application	39
Asst. Gen. Mgr.	10-11	Nuclear Matls. Mgmt.	40
Asst. Gen. Mgr. Mfg.	12	Operational Safety	41
Asst. Gen. Mgr. R&ID	13	Operations Analysis	42
Asst. Gen. Mgr. Adm.	14-15	Production	43-44
Asst. to the GM	16	Radiation Standards	45
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Biology & Medicine	21	Reactor Development	48-54
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Congr. Relations	32	D. C. Office	57-59
Ind. Participation	33	Secretariat	60-64

6-24-61

UNCLASSIFIED

ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

June 23, 1961

Dear Mr. Ribicoff:

This is to advise that the Atomic Energy Commission has no objection to the proposed Memorandum for the President (based on Federal Radiation Council Staff Report No. 2) in its revised form, as distributed to members of the Federal Radiation Council on June 5, 1961.

I should like to note, however, that the AEC, as a result of its statutory responsibilities may issue radiation protection standards for regulatory purposes. The AEC at that time would follow its usual procedure of obtaining public comments prior to issuance of the standards. For this reason there is a possibility that the AEC would make changes for regulatory purposes in the radiation protection guides contained in the proposed Memorandum for the President, depending upon public comments which are received.

Sincerely yours,

Chairman

The Honorable Abraham A. Ribicoff
Chairman
Federal Radiation Council

UNITED STATES GOVE. MENT ~~OFFICIAL USE ONLY~~ Reference Section

Memorandum

TO : Brig. Gen. A. W. Betts, Director
Division of Military Application

DATE: June 19, 1961

FROM : W. B. McCool, Secretary

SUBJECT: AEC PARTICIPATION IN STUDIES ON BIOLOGICAL EFFECTS OF NUCLEAR WAR

SYMBOL: SECY:JCH

1. We informed your office on June 16, 1961, that at Information Meeting 43 on June 16, the Commission requested recommendations on appropriate assignment of responsibility within the AEC to assure continuous participation by AEC in the studies of the Net Evaluation Subcommittee.

2. The General Manager has requested you take the action required by the above request.

cc: General Manager
Deputy General Manager
Asst. General Manager
General Counsel
Asst. to the General Manager

~~OFFICIAL USE ONLY~~

6-19-61

Radiation

1750th AEC Meeting 6-14-61 ojw

2. AEC 604/52 - Draft Federal Radiation Council Memorandum for the President

Commissioner Haworth requested, and the Commission agreed, the Minutes of Meeting 1743 should be revised to note that the Commission was not requiring publication for public comment of the Federal Radiation Council's draft radiation guide prior to its submission to the President but only noting standard administrative procedures required their publication for public comment if and when the Commission issues them as regulations.

19-61-3

DATE:

INDEX: MH&S-3-Radiation

[redacted]

TO:

FROM:

SUMMARY: AEC 1076: AEC PARTICIPATION IN INTERAGENCY RADIOLOGICAL ASSISTANCE PLAN. The AEC, DOD, OCDM, HHEW, FAA, NASA, GSA, ICC, Treasury, Commerce, Labor and Post Office are represented on the Interagency Committee on Radiological Assistance (ICRA) formed on May 28, 1958 to develop the Inter-Agency Radiological Assistance Plan (IRAP). The Policy of AEC is stated in AEC Manual Chapter 0526, RADIOLOGICAL ASSISTANCE PROGRAM, as follows: "To make available, upon request from an AEC licensee, AEC contractor, Federal, state or local official, private organization or person cognizant of an incident suspected to involve radioactive material, such advice & radiological assistance from AEC resources as may be appropriate to minimize injury to people, to minimize property damage, to cope with radiological hazards and to protect the public health & safety." The Program objective include, "to coordinate with other agencies in radiological assistance activities". The Director, Office of Operational Safety, serves as the AEC representative on the ICRA and is Acting Chairman of this Committee.

FILED:

INDEXER:

REMARKS:

FILED: MH&S-16-5-Accidents & Accident Prevention

date of paper: 6-13-61

6-13-61

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

FORM AEC-204

★ U. S. GOVERNMENT PRINTING OFFICE: 1949 - 633163

Mtg. 1748
6-8-61
OHC

1. Testimony for JCAE Hearing on Radiation Safety and Regulation

The Commission continued its review of Commissioner Olson's testimony on the regulatory program of the AEC.* Commissioner Wilson noted Mr. Olson had suggested inclusion in the testimony of a paragraph on the large overhead which would be incurred by the Government if a separate agency were established to carry out the Commission's present regulatory functions. Mr. Price pointed out that if Congress should determine a separate agency were necessary to adequately protect the public, the cost factor would not preclude its establishment.

At this point, Commissioner Haworth entered the Meeting.

Mr. Price suggested Mr. Olson testify on the present advantages of a single atomic energy agency responsible for both the promotional and regulatory functions of the program. He said particular emphasis should be given to the availability of technical information from the promotional staff for use by the regulatory staff within a single agency organization.

Commissioner Graham referred to the discussion on page 8 of Mr. Olson's testimony concerning the possible creation of a licensing board within the AEC organization and recalled that in early discussion with Congressman Holifield regarding the regulatory reorganization, the Commission had assured Mr. Holifield it had not irretrievably rejected the JCAE staff's suggestion for a three-man licensing board to exercise the Commission's review function. Mr. Graham noted that at one time the Commission had also considered the possibility of creating an appellate board as an intermediate body between the Commission and the U. S. Court of Appeals, analagous in function to the Tax Court of the United States. He suggested the Commission assure the JCAE that the Commission had not foreclosed the possibility of future establishment of a three-man licensing board. Mr. Price said the Hearing Examiner concept, in his judgment, had more merit than that of the licensing board. Mr. Naiden said he did not think it proper such a Board be created, but he stated reference could be made in Mr. Olson's testimony that it has been considered by the Commission. Mr. Graham said he did not think it should be eliminated completely in the testimony as a possibility and he recommended inclusion of a reference to it in Mr. Olson's statement.

Mr. Graham reviewed the draft statement outlining the Commission's regulatory procedures which he proposed as a supplement to Mr. Olson's testimony on June 15.

After further comments, the Commission approved, as revised, the Commission's testimony on Radiation Safety and Regulation.

MH. 5-3

June 8, 1961

MEMORANDUM FOR: CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER OLSON
COMMISSIONER WILSON

SUBJECT: REVISED DRAFT OF PROPOSED MEMORANDUM FOR THE PRESIDENT ON FEDERAL RADIATION COUNCIL STAFF REPORT NO. 2

Attached is a copy of subject memorandum which has been revised by the Working Group of the Federal Radiation Council to take into account suggestions which the Commissioners had made to the previous draft.

I believe this conforms with all our suggestions. However, if you have any comments, please let me know in the next few days.

Leland J. Haworth

Attachments

cc: General Manager
Secretariat, w/o attachment

aEchols 7/4/61

10-3-9

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

[redacted]

TO : File

DATE: June 2, 1961

FROM : Anthony H. Ewing, Chief
Meeting Branch

SUBJECT: EDITORIAL CHANGES TO AEC 604/52 - DRAFT FEDERAL RADIATION COUNCIL MEMORANDUM FOR THE PRESIDENT

SYMBOL: SECY:DCR

Attached are editorial changes suggested by Commissioner Haworth and noted by the Commission at Meeting 1743 on May 31, 1961, to be incorporated into AEC 604/52 - Draft Federal Radiation Council Memorandum for the President.

Attachments:
As noted above

SPECIAL REREVIEW FINAL DETERMINATION Class UNCL Reviewers Class. Date 5/2/61

By: J. Lewis 5/10/65

[redacted]

6-2-61

INSERT Page 23.

6th line from bottom, after "... dose."

It introduced as an operational technique where individual whole body doses are not known, the use of a "suitable sample" of the exposed population in which the radiation protection guide for the average exposure of the sample should be one-third the RPG for individual members of the group. It emphasized that this should be modified to meet special situations.

INSERT Page 25.

11th line from bottom - addition underlined:

This is especially true in the case of iodine-131 in milk, for which consumption of milk and retention of iodine by the child may be as great as by the adult, while the relatively small size of the thyroid makes radiation dose to the thyroid much larger than in the case of the adult.

INSERT: Page 26.

5th line from top - after "... public." ADD:

In particular, the Council has not only drawn heavily upon reports published by the ICRP and NCRP but has had the benefit of consultation with and comments and suggestions by individual members of the NCRP and of its subcommittees.

Page 26

In third row of table delete "(X and gamma equivalent)" to read:

Bone (X-and-gamma -or-equivalent)-	3.5 rem/yr	0.17 rem/yr

Page 27

Line 9 from top of page - Substitute - correction and additions noted:

... RPG. For this purpose, the average total daily intake of such materials, averaged over periods of the order of a year, constitutes an appropriate criterion.

Page 29.

Footnote to table to read:

* In the case of iodine-131, the suitable sample would include only small children. For adults the RPG for the thyroid would not be exceeded by rates of intake higher by a factor of 10 than those applicable to small children.

OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

MH-S-3

Memorandum

TO : Donald C. Ruschaupt
Office of the Secretary

DATE: June 1, 1961

FROM : Forrest Western, Director FW
Office of Radiation Standards

SUBJECT: AEC 604/52 (TABLE - PAGE 29)

This is in reply to your telephone request to our office this morning. Dr. Haworth, Dr. Woodruff, and I revised the table in accordance with the suggestions made by Chairman Seaborg to meet Dr. Wilson's objections as follows:

"

Table 3. Ranges of Transient Rates of Intake (μμc/day) for Use in Graded Scale of Actions Summarized in Table 2.

Radionuclides	Range I	Range II	Range III
Iodine-131 *	0 - 10	10 - 100	100 - 1,000
Radium-226	0 - 3	3 - 30	30 - 300
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 - 200	200 - 2,000	2,000 - 20,000

* In the case of iodine-131, the suitable sample would include only small children. For adults the RPG for the thyroid would not be exceeded by rates of intake higher by a factor of 10 than those applicable to small children.

"

Mtg 1743, May 31, 1961

12-1-9

Mtg.1743
5-31-61
DHO

2. Discussion of Testimony for the JCAE Hearings on Radiation Safety and Regulation

Chairman Seaborg referred to a letter dated May 17, 1961 from Congressman Holifield regarding the forthcoming hearings on radiation safety and regulation and inquired about the format of the Commission presentation. Mr. Ink said Mr. Price had agreed to serve as coordinator of the testimony except for that portion dealing with the SL-1 reactor accident. Mr. Price pointed out staff work would be completed at the end of the week and would be to the Commission by June 5; hearings were to commence on June 12. Mr. Ink said the SL-1 portion of the testimony was on a similar schedule of preparation. He said Mr. Pittman would present to the JCAE an introductory statement on the purpose, design, and safety organization of the SL-1 and would be followed by a brief review of the January 3 accident by Mr. Nelson and a discussion by representatives of Combustion Engineering on the qualification and training of their personnel. If time permitted, there would be a short presentation by the Idaho health and safety group. Lt. Col. Schrader and Mr. Beck from Headquarters would also be present to discuss the safety precautions taken after the accident.

Mr. Ink suggested the General Manager present to the JCAE information on the corrective steps being taken with regard to the SL-1. In answer to a question from Mr. Wilson, Mr. Ink said the hearing would be open to the public and the Report of the Investigating Board would be made public. He cautioned against issuing a report to the public after the hearing which included points not discussed during the hearing. Mr. Graham said the Commission could assure the JCAE staff that someone would be available to present a briefing on the corrective action taken on the SL-1, but that the Commission could not at this time designate the individual. Mr. Olson suggested the Idaho Manager, the AEC officer bearing the most direct responsibility be designated to testify on the matter.

After reviewing the Investigating Board's Report on the incident, the transmittal memorandum from Mr. Nelson to the General Manager covering this report, and a comprehensive report being prepared by Mr. Finan on the incident, the Commission discussed briefly the legal liability involved in the incident. Mr. Olson inquired if the Investigating Board's Report, to the extent it admits inadequacies in design or organization, could be useable in court. Mr. Ferguson pointed out, if litigation should arise the Report might be used to impeach or refresh recollection. Mr. Naiden recommended the Investigating Board Report should be published and said he did not feel it changed the facts of liability. Mr. Ink said he believed the Commission's responsibility to inform the public was paramount irrespective of its effect on possible liability allegations. Mr. Luedecke said it would have to be ascertained prior to publication that the Report did not unnecessarily jeopardize the Government. In response to a question from Mr. Graham, Mr. Finan said publication of the Investigating Board Report would not make the report he was preparing less meaningful. Mr. Nelson pointed out the Investigating Board Report did not speak to cause and responsibility of the accident, but these facts were set forth in the transmittal memorandum. Mr. Ink said that in addition to the Investigating Board Report the memorandum should also be published; he realized, however, that this was more sensitive than the report itself. Mr. Luedecke recommended and the Commission approved transmittal to the JCAE of the Investigating Board Report on the SL-1 incident and noted the memorandum would be considered for transfer after review of the Commission's full report on the incident.

5-31-61

Mtg.1743
5-31-61
QUO

1. AEC 604/52 - Draft Federal Radiation Council Memorandum for the President

Before the Commission for consideration was a proposed revision, prepared by the Council's Working Group, and incorporating suggestions by Commissioner Haworth and AEC staff, of the May 11 draft memorandum from the Federal Radiation Council to the President on radiation standards for presentation at the forthcoming meeting of the Council. Commissioner Wilson referred to the table (Ranges of Transient Rates of Intake) on page 29 of AEC 604/52 and suggested the ranges could better be stated in terms of average yearly dosage of radionuclides. He said he was concerned that the table, as currently drafted, might suggest, when taken out of context, that a few days of the indicated dose rate might be harmful.

Mr. Haworth stated that throughout the text of the memorandum and in the table on page 26 of AEC 604/52 yearly radiation doses were clearly indicated. The table on page 29, he continued, represented a guide for graded scales of action when ranges of transient rates of daily intake were exceeded and should serve to alert those concerned that action was necessary. To state the figures in terms of yearly averages would undercut the significance of the table. Mr. Wilson said he did not think it was proper to judge radiation on one day's intake and said he was more concerned about averages for a year or a month.

Mr. Haworth suggested proper use of the table on page 29 as a guide in implementing corrective action would serve to assure that yearly averages would not be approached. In view of the references to dosage in the table on page 29, Mr. Haworth said it was apparent the table could not be used without reference to the table on page 28, which defined the ranges and the graded scales of action. Mr. Ink said that at the risk of complicating the table on page 29, he thought it wise to indicate in some manner it could not stand by itself. The Chairman requested the staff to clarify the table to indicate it must be used in conjunction with the tables on pages 26 and 28; he further requested Mr. Wilson be permitted to review the revised table.* The Commission noted various editorial changes that were circulated prior to the Meeting to be incorporated in AEC 604/52.**

5-31-61

Mr. Price referred to page 4 of AEC 604/52 and suggested the Commission note the recommendation by the Division of Licensing and Regulation that the Atomic Energy Commission recommend to the President he not sign the memorandum until the substance of the memorandum and the Federal Radiation Council Report were given wide distribution for public comment. He said in order for the recommended federal radiation standard to be issued as an effective regulation public comment would have to be sought. Commissioner Graham noted the federal radiation standard was unique because it was to be forwarded to the President and suggested an effort be made to find a proper mechanism for seeking public comment for similar cases. Mr. Finan said from his experience with the BOB he presumed the Bureau would oppose issuance of the regulation for public comment primarily because it opposed public comment on executive recommendations prior to Presidential review. Mr. Haworth pointed out that the scientific community had been consulted on the radiation standards before the memorandum was written but had no opportunity to comment on the final form of this report. He said the standards would be essentially guides rather than regulations but that Dr. Gioacchino Failla of Columbia University and Chairman Holifield of the JCAE had recommended they be issued in the form of ragulations. Mr. Graham suggested that in the letter of transmittal to the Federal Radiation Council the Commission recommend the President not sign the memorandum until it had been distributed for public comment. Mr. Haworth reviewed the procedure for presenting the memorandum to the President through the Federal Radiation Council. The Chairman suggested to Mr. Haworth that he point out to the Federal Radiation Council that in case the Commission should decide to issue regulations based on these guides it would be necessary to invite public comment prior to issuance. In response to a question from Mr. Graham, Mr. Price said the Commission was not obligated to inform the JCAE of the proposed standards at this time as they were a matter of executive staff recommendations. Mr. Ink said he thought it important, however, to inform the JCAE prior to any issuance of the standards for public comment.

*The table from page 29 of AEC 604/52 revised according to the Commission's request is on file in the Office of the Secretary.

**These changes have been noted and incorporated in the file copy of AEC 604/52.

FORM AEC-204
(6-57)

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

DATE:

INDEX: MH&S 3

TO:

FROM:

SUMMARY: Transfer of OCDM to DOD - At Inof Mtg. 35 the Commission agreed that a ltr. be sent to DOD re the above and that time is appropriate to improve procedures for the devel. of estimates of biological effects of atomic warfare.

FILED: Security 16 Civil Defense

INDEXER: dateof ~~paper~~ memo: 5-31-61

REMARKS:

5-31-61

[redacted]

[redacted]

AEC 604/52

May 27, 1961

COPY NO. 52

ATOMIC ENERGY COMMISSION

DRAFT FEDERAL RADIATION COUNCIL MEMORANDUM FOR THE PRESIDENT

Note by the Acting Secretary

The General Manager and the Acting Director of Regulation has requested that the attached report by the Director of Radiation Standards be circulated for consideration by the Commission at an early date.

Harold D. Anamosa
Acting Secretary

AEC 604/52

SPECIAL REREVIEW FINAL DETERMINATION Class.: UNCL.	Reviewers	Class.	Date
	Lee Dix		9/22/80

By J. Houn 5/3/85

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
Secretary	1	Public Information	24
Commissioners	2-6, 57-58	Technical Information	25
General Manager	7	Inspection	26
Dir., of Regulation	8	Licensing & Regulation	27 - 28
Deputy Gen. Mgr.	9	Military Application	29
Asst. Gen. Mgr.	10 - 11	Nuclear Materials Mgmt.	30
Asst. Gen. Mgr. Mfg.	12	Operational Safety	31
Asst. Gen. Mgr. Safety	13	Operations Analysis	32
Asst. Gen. Mgr. R&ID	14	Production	33 - 34
Asst. Gen. Mgr. Adm.	15	Radiation Standards	35 - 37
General Counsel	16 - 19	Raw Materials	38 - 39
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Congr. Relations	22	D. C. Office	49 - 51
Ind. Participation	23	Secretariat	52 - 56

[redacted]

X - O & M - 7 - Federal Radiation Council
O & M - 12 - President

5-27-61

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ATOMIC ENERGY COMMISSION

DRAFT FEDERAL RADIATION COUNCIL MEMORANDUM FOR THE PRESIDENT

Report to the General Manager and the Acting Director of Regulation by the Director, Office of Radiation Standards

THE PROBLEM

1. To establish an AEC position on recommendations developed by the Working Group of the Federal Radiation Council.

SUMMARY

2. Secretary Ribicoff advised Chairman Seaborg, March 24, 1961, (Appendix "B") that the Working Group of the Federal Radiation Council has prepared for action by the Council a Draft Report No. 2* on radiation standards. To facilitate action on the report at a meeting scheduled for April 27, 1961, it was requested that Agency comments on the report be submitted to the Secretary of the Council by April 14, 1961. It was considered that this would permit the Working Group to try to resolve agency differences and to circulate to members of the Council before the meeting a summary of unresolved questions.

3. The time schedule proposed by Secretary Ribicoff proved to be inadequate and the meeting of the Council was postponed to May 17, 1961. The principal differences between the views of AEC staff and the recommendations of the Draft Report No. 2 were resolved in discussions held during the latter part of April and early May. Agreements reached during these discussions are reflected in the May 11, 1961 Draft Memorandum for the President, (Appendix "C"), circulated to the members of the Council before the meeting of May 17, 1961.

* On file in the Office of Radiation Standards

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4. The May 11, 1961, Draft Memorandum was discussed briefly by the Council at its meeting on May 17, 1961. Secretary Ribicoff indicated that the Memorandum was difficult to understand and expressed doubt that the members of the Council were competent to pass judgment on matters of this kind. Commissioner Haworth stated that a number of persons had raised questions about the recommendations contained in the Memorandum and expressed a desire for more time to consult with well-informed persons. It was agreed that the agencies represented on the Council would undertake to provide the Working Group with further comments, if any, by May 31, 1961 and on the basis of these comments the Working Group would prepare a revised draft for consideration by the Council.

5. Appendix "B" is a revision of the May 11 Draft Memorandum, prepared by Commissioner Haworth and the AEC Staff for Commission consideration.

6. Revision of the Draft Report No. 2 to make it consistent with the Draft Memorandum is in progress. If further revisions of the Memorandum are required, the Report will be revised accordingly.

7. The May 11, 1961, Draft Memorandum contains the following recommendations:

"1. The following Radiation Protection Guides be adopted for normal peacetime operations."

Organ	Radiation Protection Guide (RPG)	
	Individuals	Average of suitable sample of exposed population group
Thyroid	1.5 rem/yr	0.5 rem/yr
Bone marrow	0.5 rem/yr	0.17 rem/yr
Bone (X and gamma or equivalent)	1.5 rem/yr	0.5 rem/yr
Bone (alternate guide)	0.01 μgm of Ra-226 or its biological equivalent	0.003 μgm in adult skeleton

"

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...

"2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate actions related to ranges of intake of radioactive materials by exposed population groups."

...

The general character of these actions is suggested in the following table:

"

Ranges of transient rates of daily intake	Graded scale of action
Range I	Confirmatory surveillance
Range II	Quantitative surveillance and routine control
Range III	Evaluation and application of positive control measures

"

"3. (a) The following guidance on daily intake be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

Radionuclide	Ranges of Transient Rates of Intake (μμc/day) Range I	Range II	Range III
Iodine-131	0 - 10	10 - 100	100 - 1,000
Radium-226	0 - 3	3 - 30	30 - 300
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 - 200	200 - 2,000	2,000 - 20,000

(b) Federal agencies use RCG's applicable to their particular programs which are consistent with the guidance contained herein on average daily intake for the radionuclides iodine-131, radium-226, strontium-90, and strontium-89. Some of the general considerations involved in the derivation of RCG's from intake values are given in Staff Report No. 2."

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"4. For radionuclides not considered in this report, agencies continue to follow the recommendations in Report No. 1 that 'Federal agencies, as an interim measure, use Radioactivity Concentration Guides which are consistent with the recommended Radiation Protection Guides. Where no Radiation Protection Guides are provided, Federal agencies continue present practices.'"

STAFF JUDGMENTS

8. The Divisions of Biology and Medicine, Compliance, Office of Operational Safety, Office of Radiation Standards, Office of Isotopes Development, Division of Military Application, Division of Production, Division of Raw Materials, and the Division of Reactor Development concur in the recommendation of this paper. The Office of Public Information concurs in the staff judgment that no public announcement should be issued. The Division of Licensing and Regulation concurs in the recommendations of this paper but urges that the Atomic Energy Commission recommend to the President that the President not sign the Memorandum until the gist of the Memorandum and the Federal Radiation Council Report has been given wide public distribution for public comment.

RECOMMENDATION

9. The General Manager and the Acting Director of Regulation recommend that the Atomic Energy Commission:

a. Approve for the guidance of the AEC member of the Federal Radiation Council, the AEC Draft Memorandum for the President as shown in Appendix "D";

b. Note that suggestions for minor changes in the AEC Draft Memorandum in Appendix "D" will be submitted to the Working Group of the Council for consideration in the preparation of a final draft to be submitted to members before the next meeting of the Council.

c. Note that the Draft Federal Radiation Council Report No. 2 will be revised to conform with the recommendations in the Memorandum for the President and issued as a supporting document.

d. Note that no news release or advice to the Joint Committee on Atomic Energy is required.

LIST OF ENCLOSURES

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APPENDIX "A"

BACKGROUND

1. The Federal Radiation Council was established by Executive Order 10831, August 14, 1959 and by Public Law 86-373, September 23, 1959. The latter provides that

> "The Council shall advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with States ... (and) perform such other functions as the President may assign to it by Executive order."

The members of the Council are the Secretaries of the Departments of Commerce; Defense; Health, Education and Welfare; Labor; and the Chairman of the Atomic Energy Commission. The Secretary of Health, Education and Welfare is currently designated Chairman of the Council.

2. Prior to July 1960 Commissioner Floberg served as alternate to the Chairman in Council activities. Following Commissioner Floberg's resignation, Commissioner Wilson served as alternate.

3. On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations was published in the Federal Register on May 18, 1960. There was released at the same time Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Standards," dated May 13, 1960.

4. The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the terms "Radiation Protection Guide" (RPG) and "Radioactivity Concentration Guide" (RCG) to replace the terms "Maximum Permissible Dose" and "Maximum Permissible Concentrations." It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose.

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5. The recommendations contained in the first report of the Council were to a large extent consistent with corresponding standards of radiation protection which had been developed over a period of three decades by the National Committee on Radiation Protection and Measurements (NCRP) and the International Commission on Radiological Protection (ICRP). With respect to exposure of population groups, however, there is a significant difference. The recommendations of the NCRP and the ICRP specify that the whole body or genetic exposure of individual members of the general population shall not exceed 0.5 rem per year and that over a large population the average shall not exceed one-third of this value. The Council used the same level of 0.5 rem per year in its RPG for individuals in population groups but specified that

> "As an operational technique, where the individual whole body doses are not known, a suitable sample of the exposed population should be developed whose protection guide for annual whole body dose will be .17 rem per capita per year. It is emphasized that this is an operational technique which should be modified to meet special situations."

6. Possible implications of the "operational technique" recommended by the Council, when extrapolated to the control of exposures of population groups to radioactive materials, were not discussed in FRC Report No. 1. Where the radiation doses received by members of a population group are estimated on the basis of exposures to radioactive materials, the "operational technique" would seem to imply that at least in the cases of whole body and genetic exposure, exposures to any "suitable sample" should be limited to those estimated to give one-third the radiation dose permitted to individual members of the group. Draft FRC Report No. 2 accepts this implication and extends the factor one-third to exposures to all radioactive materials regardless of whether the critical portion of the body is considered to be the whole body, to the gonads, or to other specific organs or tissues.

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Comparison of this "operational technique" with recommendations of the NCRP and ICRP is made difficult by variations in statement and interpretation of the latter. Both this recommendation of the FRC and trends in the interpretation of recommendations of the ICRP-NCRP make it desirable for the AEC to consider whether concentration limits for exposure of members of the general public in current use should be lowered by a factor of one-third.

7. The first report of the Council did not deal with RPG's for individual organs or tissues of the body (except for genetic dose) in connection with exposures of population groups, nor with specific Radioactivity Concentration Guides for either occupational or population exposures. Rather, it recommended that

> "The Federal agencies, as an interim measure, use radioactivity concentration guides which are consistent with the recommended Radiation Protection Guides. Where no Radiation Protection Guides are provided, Federal agencies continue present practices."

"Present practices" are considered generally to be based on recommendations of the NCRP.

8. Following the issuance of Report No. 1 and the corresponding Memorandum for the President, it was agreed by the Council that the staff should consider Concentration Guides of those radioactive materials currently of greatest concern. The radioactive materials selected for study included strontium-90, strontium-89 and iodine-131, all of which have been significant contaminants of milk and other foods as a result of nuclear weapons tests; radium-226, which occurs in significant concentrations in a few community water supplies and has received attention during the past two years in studies by the U. S. Public Health Service of concentrations of radium in the Animas River below the uranium mill at Durango, Colorado; the radioactive decay products of radon-222 in the air of uranium mines; and mixtures of radioactive materials in the air of uranium mills. Concentrations of the decay products of radon in uranium mines are of concern

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not only because of problems of control but because of technical questions concerning the applications of existing standards of protection. The principal problem in uranium mills is that of relating ore dusts to existing standards of protection.

9. In June of 1960 this study was assigned to a full time temporary staff. The staff included one person from the Office of Health and Safety (AEC Headquarters); one person from Oak Ridge National Laboratory who has been active in the work of the NCRP and the ICRP; one person from the Armed Forces Institute of Pathology; and one person from the U. S. Public Health Service who has been active in problems of uranium mining and milling. This group, as a part of their studies, consulted with numerous persons with specialized knowledge in related fields. Following the completion of the first draft of the report by the temporary staff in September 1960, it appeared advisable to defer recommendations on radioactivity in mines and mills for further study. Since that time the Secretariat and Working Group of the Council have been engaged in preparing the report on radioisotopes of strontium, iodine, and radium currently under consideration.

10. In the course of its studies, the Working Group determined that it would be preferable to provide guidance in terms of total daily intake rather than in terms of concentrations of radioactivity in air, water or items of food. This will permit individual agencies to take into account considerations characteristic of their own operations in converting this guidance to specific concentrations.

11. The proposed recommendations are listed in Paragraph 6 of the SUMMARY above and are discussed briefly in the (5/12/61) Draft Memorandum for the President, Appendix "C". This discussion is not intended to substitute for that in the Memorandum but to indicate points which may be of special interest to the Commission.

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12. The Radiation Protection Guides contained in Recommendation No. 1 cover only the organs or tissues of interest in connection with radioisotopes of iodine, strontium, and radium. The values in the first three rows of the table differ somewhat from any which might be inferred from recommendations of the ICRP-NCRP. It is reasonably accurate to say that the values for the thyroid are one-half the most nearly comparable values to be inferred from recommendations of the ICRP. For bone, the ICRP-NCRP makes its recommendations on the basis of a comparison with radium-226.

13. The second recommendation represents a further effort to emphasize that daily rates of intake may vary widely without resulting in radiation doses higher than those specified in the Radiation Protection Guides. The use of Ranges of Intake or of Concentrations in the development of the concept of a graded approach to radiation protection problems is a departure from previous recommendations.

14. The ranges of transient rates of intake given in Table in 3(a) are constructed in such a manner that the values given at the top of Range II correspond to the average rate of intake which it is recommended should not be exceeded under normal peacetime conditions. In the cases of iodine-131 and radium-226, this is the average rate of intake which would result in radiation doses equal to those specified in the Radiation Protection Guides listed in Recommendation No. 1. However, in the case of strontium-90, it is estimated that an average rate of intake equal to that specified at the top of Range II would result in radiation doses only one-third of those given in Recommendation No. 1. This difference arises from complex technical and political situations discussed below in Paragraph 18.

15. The Draft Memorandum gives specific recommendations for exposure of population groups to only four radioisotopes. Concentration limits for more than 150 radioisotopes are listed in 10 CFR 20. The Working Group of

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the Council has taken the position that most of these are of insufficient importance at the present time to warrant individual study by the Council. Recommendation No. 4 proposes that agencies continue, as an interim measure, the use of Radioactivity Concentration Guides consistent with the recommended Radiation Protection Guides and where no Radiation Protection Guides are provided, Federal agencies continue present practices.

DISCUSSION

16. The proposal to provide guides for Federal use in terms of rates of intake of radioactive materials rather than in terms of Radioactivity Concentration Guides has been well received by the AEC staff.

17. The concept of defining environmental control actions in terms of ranges of transient levels of intake from the environment has met with general approval. However, a few persons have indicated fear that the intent might be misunderstood. This is believed to be due, in part, to the fact that adequate explanation of the concept requires more space than available in the Draft Memorandum. Such explanation is given in the Draft Report.

18. The most controversial portion of the report is that dealing specifically with strontium-90. The Working Group differs with the ICRP and the NCRP in two respects. It considers that radiation doses of strontium-90 in the skeleton can be compared with the biological effects of X and gamma radiation with greater confidence than with those of radium in the skeleton. The results of such a comparison lead to the values of 0.5 rem/year for the bone marrow and 1.5 rem/year for the bone as listed in Table of Recommendation No. 1. These levels of exposure to the bone are considered to be somewhat less hazardous than an exposure of 0.5 rem/year whole body dose which is generally accepted as the basic Radiation Protection Guide for individual members of the general population. Corresponding values for

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a "suitable sample" are 0.17 and 0.5 rem/year. It also estimates that the ratio of rate of intake of strontium-90 to the quantity deposited in the skeleton is from three to four times as large as assumed by the ICRP-NCRP. Radiation intake guides based on these results would lead to values ranging upward to the order of eight times some current interpretations of recommendations of the NCRP. For political reasons, the Working Group of the FRC and the staff of the AEC consider it unwise to recommend ranges of intake higher than one-third of those which would be based upon this result. The Memorandum, therefore, states in the case of strontium-90 and strontium-89 (the upper value of Range II) corresponds to an annual average dose to the critical organ which is lower than the average RPG. The Council study indicates that for these nuclides there is currently no known operational requirement for an intake value as high as the one corresponding to the RPG.

19. The foregoing considerations apply also to the treatment of strontium-89. However, if the Radiation Protection Guide is applied to strontium-89 in such a manner as to limit the dose from local depositions of strontium-89 in the skeleton, rates of intake of strontium-89 are limited to ten times those of strontium-90. By comparison the recommendations of the NCRP permit rates of intake of strontium-89 approximately one hundred times those of strontium-90.

20. In the case of radium-226, the Working Group considers that the ratio between average rate of intake and deposition in the skeleton is much larger than assumed by the NCRP. Data from studies by the Argonne National Laboratory have led the Working Group to use a ratio four times that used by the NCRP. Estimates by other persons have suggested that the actual ratio may be as much as ten times that used by the NCRP.

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21. The proposed values for rates of intake for iodine-131 are smaller by a factor of from about one-twentieth to one-sixtieth those deduced from recommendations of the NCRP-ICRP. Of the one-twentieth, one half is based on assignment of a higher radiosensitivity for children than for adults and one-tenth is based on the fact that the thyroids of small children are much smaller than those of adults. Depending upon how the recommendations of the NCRP-ICRP are interpreted, there may be an additional factor of one-third based upon the "operational technique" recommended in Federal Radiation Council Report No. 1 and discussed in Paragraph 6 above. Of these various factors, only the one-half based on differences in assigned RPG would seem to be open to question. On this point there is strong enough feeling on the part of a number of radiobiologists that it appears desirable to accept the more conservative value.

22. A check of AEC facilities indicates that operations will not be unduly restricted with the values proposed for iodine-131. Hanford, which has perhaps the most sensitive operation with respect to iodine-131, has indicated that current sampling and measurement techniques have a detection limit of 40 μμc of iodine-131 per liter in milk. Current milk data indicate that Hanford's routine operations are well within the intake value of 100 μμc per day. Although AEC licensees have not had an opportunity to comment on the proposed values, it is not anticipated that they will have difficulty in meeting the values.

23. The impact of the proposed guides for iodine-131, strontium-90, strontium-89, and radium-226 on AEC programs may be summarized as follows:

a. Corresponding concentration values for iodine-131 in air will be more restrictive by a factor of from one-half to one-third. Concentrations in milk will be more restrictive by a factor of the order of one-twentieth. Concentrations in water are of no practical interest.

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b. Corresponding values for radium-226 in water are approximately those currently used by the AEC.

c. Corresponding values for strontium-90 in water and food are approximately equal to those recommended by the NCRP for individuals in the general population and three times those recommended for exposure of large populations to strontium-90. The U. S. Public Health Service in its quarterly Radiological Health Data states,

> "The guide for average daily intake of strontium-90 used by the Department of Health, Education and Welfare is presently 33 micromicrocuries per kilogram of total dietary intake averaged over a period of one year. In the United States the daily per capita consumption is about 2.2 kilograms. The daily guide for the United States is therefore about 73 μμc of strontium-90."

d. Corresponding concentration values for strontium-89 in water and food are somewhat more restrictive from the point of view of biological hazard than those of strontium-90. However, in practical situations the average ratios of strontium-89 to 90 are generally much less than the ratio of rates of intake listed in the Table given in Recommendation 3 (a), Paragraph 6 of the Summary.

24. Appendix "D" contains a number of suggested minor changes in the Memorandum for the President which it is believed would aid in clarification and in preventing misinterpretations. It is intended that these suggestions along with any others that may be developed by the Commission will be transmitted informally to the Working Group of the Council for consideration in any revisions of the Memorandum which may be considered necessary before the next meeting of the Council.

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APPENDIX "B"

FEDERAL RADIATION COUNCIL
Executive Office Building
Washington 25, D.C.

March 24, 1961

Dear Mr. Chairman:

The Working Group of the Federal Radiation Council has informed me that they have prepared for action by the Council the second report on radiation protection standards. The report develops guides for use in connection with iodine-131, radium-226, strontium-89, and strontium-90. From the report a memorandum to the President will be developed containing the Council's recommendations for Presidential guidance to the Federal agencies.

I have asked that the report be distributed for consideration in advance of a Council meeting. It would greatly facilitate action at the meeting if the major policy issues, particularly those which have not been completely resolved, could be summarized by the Working Group prior to the meeting. Therefore, I propose the following course of action:

(1) that a Council meeting be held at 2 p.m., Thursday, April 27, 1961,

(2) that comments on the Working Group draft be submitted directly to the Secretary, Dr. Donald R. Chadwick, room 597 Executive Office Building, by Friday, April 14, and

(3) that the Working Group prepare and distribute in advance of the Council meeting a draft memorandum for the President containing the policy recommendations together with a summary of any unresolved questions which may remain.

If I do not hear from you to the contrary, I will assume that this course of action meets with your approval.

Sincerely yours,

(SIGNED) Abraham A. Ribicoff

Abraham A. Ribicoff
Chairman

The Honorable Glenn T. Seaborg
Chairman, Atomic Energy Commission
Washington 25, D. C.

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APPENDIX "C"

D R A F T

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Radiation Protection Guidance for Federal Agencies

Pursuant to Executive Order 10831 and Public Law 86-373, the Federal Radiation Council herewith transmits its second report to you concerning findings and recommendations for guidance for Federal agencies in the conduct of their radiation protection activities.

Background

On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations were published in the Federal Register on May 18, 1960. There was also released at the same time, Staff Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Protection Standards," dated May 13, 1960.

The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the terms "Radiation Protection Guide" (RPG) and "Radioactivity Concentration Guide" (RCG). It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose.

This memorandum contains recommendations for the guidance of Federal agencies in connection with radiation protection activities pertaining to the control of human exposure to

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radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. These recommendations include (1) Radiation Protection Guides for certain organs of individuals in the general population, as well as averages for suitable samples of exposed groups, (2) guidance on general principles of control applicable to all radionuclides occurring in the environment, and (3) specific guidance in connection with iodine-131, radium-226, strontium-90, and strontium-89. It is the intention of the Council to release the background material leading to these recommendations as Staff Report No. 2 when the recommendations contained herein are approved.

Specific attention was directed to problems associated with iodine-131, radium-226, strontium-90, and strontium-89. Three of these were present in fallout from nuclear weapons testing. They would also be present as a major constituent in many large scale atomic energy applications. Available data suggest that effective control of these nuclides in connection with mixed fission product contamination of the environment would provide reasonable assurance of at least comparable limitation of hazard from other fission products. The other nuclide, radium-226, is an important naturally occurring radioactive material.

Establishment of the Federal Radiation Council climaxed a period of several years of public concern over exposure to radiation. Much of this concern was over radioactivity from nuclear weapons tests. While strontium-90 received the greatest popular attention, exposures to cesium-137, iodine-131, strontium-89 and, in still lesser degrees to other radionuclides, are involved in the evaluation of over-all effects. The characteristics of cesium-137 lead to direct comparison with whole body exposures for which recommendations by the Council have already been made.

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Reviews during the past several years by scientific groups in the hearings before the Joint Committee on Atomic Energy of the Congress of the United States have indicated that radiation doses from fallout have been small compared to average population doses from other sources of radiation. Although there have been wide differences of opinion on the possible magnitudes of biological risks associated with such exposure, it has been generally apparent that individual risks have been very small and that the primary question has been that of comparing over-all risks with reasons for conducting weapons tests which produce fallout. This question is not considered in this report. However, it appears that observed concentrations of strontium in food and water do not result in as large concentrations in the skeleton as have been assumed in the past. In the case of iodine-131, however, differences between adults and small children make the radiation dose to the child's thyroid, resulting from the occurrence of the iodine in milk and other ingested materials, greater than predicted by comparison with occupational standards. In addition, there is evidence that irradiation of the thyroid involves greater risk to children than to adults.

Recommendations as to Radiation Protection Guides

The Federal Radiation Council has previously emphasized that establishment of radiation protection standards involves a balancing of the benefits to be derived from the controlled use of radiation and atomic energy against the risk of radiation exposure. In the development of the Radiation Protection Guides contained herein, the Council has considered both sides of this balance. The Council has reviewed available knowledge, consulted with scientists within and outside the government, and solicited views of interested individuals and groups from the general public. The Radiation Protection Guides recommended below are considered

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by the Council to represent an appropriate balance between the requirements of health protection and of the beneficial uses of radiation and atomic energy.

It is recommended that:

1. The following Radiation Protection Guides be adopted for normal peacetime operations.

Organ	Radiation Protection Guide (RPG)	
	Individuals	Average of suitable sample of exposed population group
Thyroid	1.5 rem/yr	0.5 rem/yr
Bone marrow	0.5 rem/yr	0.17 rem/yr
Bone (x and gamma or equivalent)	1.5 rem/yr	0.5 rem/yr
Bone (alternate guide)	0.01 ugm of ra-226 or its biological equivalent	0.003 ugm in adult skeleton

It will be noted that the preceding table provides Radiation Protection Guides to be applied to the average of a suitable sample of an exposed population group which are one-third those applying to individuals. This is in accordance with the recommendations in the first report of the Council concerning operational techniques for controlling population exposure. Since in the case of radionuclides occurring in the environment, organ doses of individuals are usually not known; the organ dose to be applied to the average of suitable samples of an exposed population group is also given as an RPG.

Recommendations as to General Principles

Control of population exposure from radionuclides occurring in the environment is accomplished in general either by restrictions on the entry of such materials into the environment or through measures designed to limit the intake of these

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radioactive materials by members of the population. Both approaches involve the consideration of actual or potential concentrations or radioactive material in air, water, or food. Controls should be based upon an evaluation of population exposure with respect to the RPG. For this purpose, the average total daily intake of such materials constitutes an appropriate criterion.

The control of the intake by members of the general population of radioactive materials from the environment can appropriately involve many different kinds of actions. The character and import of these actions may vary widely, from those which entail little interference with usual activities, such as monitoring and surveillance, to those which involve a major disruption, such as condemnation of food supplies. Some control actions may require prolonged lead times before becoming effective, e.g., major changes in processing facilities or water supplies. The magnitude of control measures should be related to the degree of likelihood that the RPG may be exceeded. The use of a single numerical intake value, which in part has been the practice until now, does not in many instances provide adequate guidance for taking actions appropriate to the risk involved. For planning purposes, it is desirable that insofar as possible control actions to meet possible contingencies be known in advance.

It is recommended that:

2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate actions related to ranges of intake of radioactive materials by exposed population groups.

In order to provide guidance to the agencies in adapting the graded approach to their own programs, the recommendations pertaining to specific radionuclides in this memorandum include in

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each case three ranges of daily intake. The general type of action appropriate in circumstances in which transient rates of daily intake of radioactive materials by suitable samples of an exposed population are estimated to fall into the different ranges is considered in Staff Report No. 2. The purpose of these actions is to provide reasonable assurance that average rates of intake of suitable samples of an exposed population group do not exceed the upper value of Range II. The general character of these actions is suggested in the following table.

Ranges of transient rates of daily intake	Graded scale of action
Range I	Confirmatory surveillance
Range II	Quantitative surveillance and routine control
Range III	Evaluation and application of positive control measures

Recommendations on I-131, Ra-226, Sr-90, and Sr-89

The Council has given specific consideration to the effects on man of the presence within the environment of iodine-131, radium-226, strontium-90, and strontium-89 in terms of intake values corresponding to the appropriate RPG's. The Council has also reviewed past and current activities resulting in the release of these radionuclides to the environment and given consideration to future developments. For each of the nuclides three ranges of transient daily intake are given which correspond to the guidance contained in Recommendation 2. Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II. For iodine-131 and radium-226, this value corresponds to the RPG for the average of a suitable sample of an exposed population group. In the case of strontium-90 and -89, this value corresponds

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to an annual average dose to the critical organ which is lower than the average RPG. The Council's study indicated that for these nuclides there is currently no known operational requirement for an intake value as high as the one corresponding to the RPG.

It is recommended that:

3. (a) The following guidance on daily intake be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

Radionuclide	Ranges of Transient Rates of Intake (uuc/day) Range I	Range II	Range III
Iodine-131	0 - 10	10 - 100	100 - 1,000
Radium-226	0 - 3	3 - 30	30 - 300
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 -200	200 -2,000	2,000 -20,000

(b) Federal agencies use RCG's applicable to their particular programs which are consistent with the guidance contained herein on average daily intake for the radionuclides iodine-131, radium-226, strontium-90, and strontium-89. Some of the general considerations involved in the derivation of RCG's from intake values are given in Staff Report No. 2.

It is recommended that:

4. For radionuclides not considered in this report, agencies continue to follow the recommendations in Report No. 1 that "Federal agencies, as an interim measure, use Radioactivity Concentration Guides which are consistent with the recommended Radiation Protection Guides. Where no Radiation Protection Guides are provided, Federal agencies continue present practices."

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In the future, the Council will direct attention to the development of appropriate radiation protection guidance for those radionuclides for which such consideration appears appropriate or necessary. In particular, the Council will study any radionuclides for which useful applications of radiation or nuclear energy require release to the environment of significant amounts of these nuclides. Federal agencies are urged to inform the Council of such situations.

Chairman
Federal Radiation Council

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APPENDIX "D"

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Radiation Protection Guidance for Federal Agencies

Pursuant to Executive Order 10331 and Public Law 86-373, the Federal Radiation Council herewith transmits its second report to you concerning findings and recommendations for guidance for Federal agencies in the conduct of their radiation protection activities.

Background

On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations was published in the Federal Register on May 18, 1960. There was also released at the same time, Staff Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Protection Standards," dated May 13, 1960.

The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the terms "Radiation Protection Guide" (RPG) and "Radioactivity Concentration Guide" (RCG). It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose. The observations, assumptions and comments set out in the memorandum published in the Federal Register on May 18, 1960 are equally applicable to this memorandum.

This memorandum contains recommendations for the guidance of Federal agencies in activities designed to limit exposure of

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members of population groups to radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. These recommendations include (1) Radiation Protection Guides for certain organs of individuals in the general population, as well as average over suitable samples of exposed groups. (2) guidance on general principles of control applicable to all radionuclides occurring in the environment, and (3) specific guidance in connection with the exposure of population groups to iodine-131, radium-226, strontium-90, and strontium-89. It is the intention of the Council to release the background material leading to these recommendations as Staff Report No. 2 when the recommendations contained herein are approved.

Specific attention was directed to problems associated with radium-226, iodine-131, strontium-90, and strontium-89. Radium-226 is an important naturally occurring radioactive material. The other three were present in fallout from nuclear weapons testing. They would also be major constituents of radioactive materials released to the environment from large scale atomic energy installations used for peaceful purposes. Available data suggest that effective control of these nuclides in cases of mixed fission product contamination of the environment would provide reasonable assurance of at least comparable limitation of hazard from other fission products in the body.

Establishment of the Federal Radiation Council followed a period of public concern over exposure to radiation. Much of this concern was over radioactivity from nuclear weapons tests. While strontium-90 received the greatest popular attention, exposures to cesium-137, iodine-131, strontium-89 and, in still lesser degrees to other radionuclides, are involved in the evaluation of over-all effects. The characteristics of cesium-137 lead to direct comparison with whole body exposures for which recommendations by the Council have already been made.

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Reviews during the past several years by scientific groups in the hearings before the Joint Committee on Atomic Energy of the Congress of the United States have indicated that radiation doses from fallout have, in fact, been small compared to average population doses from other sources of radiation. Although there have been wide differences of opinion on the possible magnitudes of biological risks associated with such exposure, it has been generally apparent that individual risks have been very small and that the primary question has been that of comparing over-all risks with reasons for conducting the weapons tests which produce fallout. The pros and cons of nuclear testing are not considered in this report. However, it appears that observed concentrations of strontium in food and water do not result in as large concentrations in the skeleton as have been assumed in the past. In the case of iodine-131, however, the current practice of deriving concentration guides for exposure of population groups to all radioactive materials in air, food and water by application of a single fraction to corresponding occupational guides may provide a lesser degree of protection than

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development of the Radiation Protection Guides contained herein, the Council has considered both sides of this balance. The Council has reviewed available knowledge, consulted with scientists within and outside the government, and solicited views of interested individuals and groups from the general public. The Radiation Protection Guides recommended below are considered by the Council to represent an appropriate balance between the requirements of health protection and of the beneficial uses of radiation and atomic energy.

It is recommended that:

1. The following Radiation Protection Guides be adopted for normal peacetime operations.

Organ	Radiation Protection Guide (RPG)	
	Individuals	Average of suitable sample of exposed population group
Thyroid	1.5 rem/yr	0.5 rem/yr
Bone marrow	0.5 rem/yr	0.17 rem/yr
Bone (x and gamma or equivalent)	1.5 rem/yr	0.5 rem/yr
Bone (alternate guide)	0.01 micrograms of Ra-226 in the adult skeleton or its biological equivalent	0.003 micrograms of Ra-226 in the adult skeleton or its biological equivalent

It will be noted that the preceding table provides Radiation Protection Guides to be applied to the average of a suitable sample of an exposed population group which are one-third those applying to individuals. This is in accordance with the recommendations in the first report of the Council concerning operational techniques for controlling population exposure. Since in the case of exposure of a population group to radionuclides the radiation doses to individuals are usually not known, the organ dose to be used as a guide for the average of suitable samples of an exposed population group is also given as an RPG.

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Recommendations as to General Principles

Control of population exposure from radionuclides occurring in the environment is accomplished in general either by restriction on the entry of such materials into the environment or through measures designed to limit the intake, by members of the population, of radionuclides already in the environment. Both approaches involve the consideration of actual or potential concentrations of radioactive material in air, water, or food. Controls should be based upon an evaluation of population exposure with respect to the RPG. For this purpose, the average total daily intake of such materials constitutes an appropriate criterion.

The control of the intake by members of the general population of radioactive materials from the environment can appropriately involve many different kinds of actions. The character and import of these actions may vary widely, from those which entail little interference with usual activities, such as monitoring and surveillance, to those which involve a major disruption, such as condemnation of food supplies. Some control actions may require prolonged lead times before becoming effective, e.g., major changes in processing facilities or water supplies. The magnitude of control measures should be related to the degree of likelihood that the RPG may be exceeded. The use of a single numerical intake value, which in part has been the practice until now, does not in many instances provide adequate guidance for taking actions appropriate to the risk involved. For planning purposes, it is desirable that insofar as possible control actions to meet contingencies be known in advance.

It is recommended that:

2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate

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actions related to ranges of intake of radioactive materials by exposed population groups.

In order to provide guidance to the agencies in adapting the graded approach to their own programs, the recommendations pertaining to the specific radionuclides in this memorandum consider three transient daily rates of intake by suitable samples of exposed population groups. The general types of action appropriate when these transient rates of intake fall into the different ranges are discussed in Staff Report No. 2. The purpose of these actions is to provide reasonable assurance that average rates of intake by a suitable sample of an exposed population group, averaged over the sample and averaged over periods of time of the order of one year, do not exceed the upper value of Range II. The general character of these actions is suggested in the following table.

Ranges of transient rates of daily intake	Graded scale of action
Range I	Confirmatory surveillance
Range II	Quantitative surveillance and routine control
Range III	Evaluation and application of additional control measures are necessary.

Recommendations on Ra-226, I-131, Sr-90, and Sr-89

The Council has given specific consideration to the effects on man of rates of intake of radium-226, iodine-131, strontium-90, and strontium-89 resulting in radiation doses equal to those specified in the appropriate RPG's. The Council has also reviewed past and current activities resulting in the release of these radionuclides to the environment and has given consideration to future developments. For each of the nuclides three ranges of transient daily intake are given which correspond to the guidance contained in Recommendation 2. Routine control of useful applications

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of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II. For iodine-131 and radium-226, this value corresponds to the RPG for the average of a suitable sample of an exposed population group. In the cases of strontium-90 and strontium-89, the Council's study indicated that there is currently no known operational requirement for an intake value as high as the one corresponding to the RPG. Hence a value estimated to correspond to doses to the critical organ not greater than one-third of the RPG has been used.

The guidance recommended below is given in terms of transient rates of (radioactivity) intake in micromicrocuries per day. It is to be noted, however, that the upper limit of Range II is based on an annual RPG (or lower, in case of radioactive strontium) considered as an acceptable risk for a lifetime. Therefore, to comply with the RPG's recommended in this report, the daily intakes averaged over a year should not exceed the upper limit of Range II. Further, the values listed in the tables are much smaller than any single daily intake which might be expected to result in injury.

It is recommended that:

3. (a) The following guidance on daily intake be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

Radionuclides	Ranges of Transient Rates of Intake (uuc/day) Range I	Range II	Range III
Iodine-131	0 - 10	10 - 100	100 - 1,000
Radium-226	0 - 3	3 - 30	30 - 300
Strontium-90	0 - 20	20 - 200	200 - 2,000
Strontium-89	0 -200	200 - 2,000	2,000 - 20,000

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(b) Federal agencies use RCG's applicable to their particular programs which are consistent with the guidance contained herein on average daily intake for the radionuclides iodine-131, radium-226, strontium-90, and strontium-89. Some of the general considerations involved in the derivation of RCG's from intake values are given in Staff Report No. 2.

It is recommended that:

4. For radionuclides not considered in this report, agencies continue to follow the recommendations in Report No. 1 that "Federal agencies, as an interim measure, use Radioactivity Concentration Guides which are consistent with the recommended Radiation Protection Guides. Where no Radiation Protection Guides are provided, Federal agencies continue present practices."

In the future, the Council will direct attention to the development of appropriate radiation protection guidance for those radionuclides for which such consideration appears appropriate or necessary. In particular, the Council will study any radionuclides for which useful applications of radiation or nuclear energy require release to the environment of significant amounts of these nuclides. Federal agencies are urged to inform the Council of such situations.

Chairman
Federal Radiation Council

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UNCLASSIFIED

May 25, 1961

AEC 604/51

COPY NO. 48

ATOMIC ENERGY COMMISSION

JOINT AEC AND HEW PROGRAMS

Note by the Acting Secretary

1. The attached exchange of letters with the Secretary of Health, Education and Welfare, is circulated for the information of the Commission. The letter of May 10, 1961, has been referred to the Office of Operational Safety.

2. It will be recalled that this matter was discussed at the morning meeting on May 15, 1961.

2 o'clock Aug. 1-

Harold D. Anamosa

Acting Secretary

AEC 604/51

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UNCLASSIFIED

ENCLOSURE I

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
WASHINGTON

May 10, 1961

Dear Mr. Chairman:

I appreciate very much your letter of April 20 and will be pleased to meet with you and some of your associates to discuss the areas of mutual interest to the Atomic Energy Commission and this Department.

In order to work out the details of such a meeting, I would suggest that you designate a member of your staff to be in touch with Mr. Boisfeuillet Jones, Special Assistant to the Secretary (Health and Medical Affairs).

I shall look forward to discussion of these important relationships.

Sincerely yours,

/s/ Abraham A. Ribicoff

Secretary

Honorable Glenn T. Seaborg
Chairman
Atomic Energy Commission
Washington 25, D. C.

Enclosure I

UNCLASSIFIED

ENCLOSURE II

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

April 20, 1961

Dear Mr. Ribicoff:

The public health and safety aspects of atomic energy are important to your Department as they are also to the Atomic Energy Commission. This community of interest has resulted in a close working relationship over the past several years. It is my desire, and of my fellow Commissioners, to continue and, if possible, to further strengthen this alliance. Although our respective participation in the Federal Radiation Council has contributed to an over-all Federal radiation policy, there are doubtless other areas where the public health and safety would be enhanced by close collaboration of your Department and the Commission.

It is my impression that our respective staffs have developed mutually complementary research programs encompassing biological effects of radiation and cancer research; I should, nevertheless, like to explore whether even closer collaboration might be achieved. A discussion of the possibility of improving the coordination of our regulatory work in such areas as stream pollution, drugs and medical devices should also prove to be constructive.

If you share my view I would suggest that mutually satisfactory arrangements be made for you and your associates to visit us at our H street office, or that we come over to your office. I mention our downtown office rather than our Headquarters at Germantown, Maryland, some 25 miles northwest of Washington. However, if you prefer an hour's automobile ride each way, we would be delighted to have you come to Germantown.

With kindest personal regards.

Sincerely yours,

/s/ Glenn T. Seaborg

Chairman

The Honorable Abraham A. Ribicoff
Secretary of Health, Education and
Welfare

OPTIONAL FORM NO. 10
5010-104
UNITED STATES GOVERNMENT

Memorandum

SmH.S.3

TO : W. B. McCool, Secretary
(THRU) H. L. Price, Acting Director of Regulation

DATE: MAY 24 1961

FROM : Forrest Western, Director
Office of Radiation Standards

FW

SUBJECT: DRAFT FEDERAL RADIATION COUNCIL MEMORANDUM FOR THE PRESIDENT

It is requested that the attached staff paper be circulated to the Commission for consideration. The paper recommends that the Commission approve for the guidance of the Commission member of the Federal Radiation Council the Draft Memorandum for the President, attached as Appendix "C" to the paper. This memorandum was discussed by the Council at its meeting on Wednesday, May 17, 1961 and Commissioner Haworth requested an additional two weeks for further consideration of the paper.

Attachment: Staff Paper

AEC-604/52

10-24-61

M.H. & I 3-Radiation

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AEC 604/50

May 5, 1961

COPY NO. 43

ATOMIC ENERGY COMMISSION

ALLEGED IRRADIATION OF SHEEP AT NRTS

Note by the Secretary

AEC 604/50

The attached incoming teletype from Idaho Falls is circulated for the information of the Commission. It was discussed this morning at Information Meeting No. 27.

W. B. McCool

Secretary

SPECIAL REREVIEW FINAL DETERMINATION Class.: UNCL.

Reviewers: Lee Dec

Class.:

Date: 9/22/80

by J. Hahn 5/3/85

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CONFIRMED TO BE UNCLASSIFIED BY AUTHORITY OF DOE/OC

Carl Wilson 4/4/84

REVIEWED BY T. Fehner 5/31/84

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10-5-5

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INCOMING TELETYPE

UNITED STATES
ATOMIC ENERGY COMMISSION
IDAHO FALLS

May 3, 1961

TO: NEIL D. NAIDEN

FROM: HOWARD K. SHAPAR

PURSUANT TO COURTS OULAHAN'S TELETYPE REQUEST OF APRIL 26, I VISITED THE WYOMING U.S. ATTORNEY IN CHEYENNE (JOHN RAPER) ON MAY 1 TO ASCERTAIN AS MANY FACTS AS POSSIBLE (WITHOUT CONTACTING COUNSEL FOR PLAINTIFFS) CONCERNING THE MITCHELL CASE (PRESTON MITCHELL ET AL. V. THE UNITED STATES, U.S.D.C., WYOMING, CIVIL ACTION FILE NO. 4498). I ALSO VISITED LT. COL. GRANT KUHN III, BASE VETERINARY OFFICER AT WARREN AIR FORCE BASE IN CHEYENNE WHO IN JULY OF 1959 HAD EXAMINED SOME OF THE MITCHELL SHEEP, AND DR. LOUIS SMITH, VETERIARIAN IN CHARGE, ANIMAL DISEASE ERADICATION BRANCH (ADE), AGRICULTURAL RESEARCH SERVICE U.S. DEPARTMENT OF AGRICULTURE, AT CHEYENNE. ON MAY 2 I WAS IN TELEPHONE CONTACT WITH DR. RUE JENSEN, DEAN OF THE COLORADO COLLEGE OF VETERINARY MEDICINE AT FORT COLLINS, COLORADO, WHO HAD PERFORMED A NECROPSY ON ONE OF THE MITCHELL SHEEP. I WAS UNABLE TO CONTACT ROBERT E. SUNDIN OF THE WYOMING DEPARTMENT OF PUBLIC HEALTH, CHEYENNE, WHO ALLEGEDLY MADE A REPORT ON THE MITCHELL SHEEP. SUNDIN WILL BE BACK IN CHEYENNE ON MAY 8. I HAVE ALSO SECURED COPIES OF VARIOUS DOCUMENTS RELATING TO THE MITCHELL SITUATION. THEY ARE BEING FORWARDED TO YOU UNDER SEPARATE COVER. AS I INFORMED TOM FLEMING BY TELEPHONE ON MAY 2, THE TIME MAGAZINE CORRESPONDENT IN DENVER, A MR. BOSHR OR BOSHAR, HAS CONTACTED COL. KUHN AND DR. SMITH'S OFFICE FOR INFORMATION ON THE MITCHELL CASE, AND AN ARTICLE CAN BE EXPECTED IN THIS WEEK'S ISSUE OF TIME.

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THE CRUCIAL ALLEGATIONS ON THE MITCHELL COMPLAINT ARE THAT U.S. GOVERNMENT EMPLOYEES, IDENTITIES UNKNOWN, NEGLIGENTLY CAUSED RADIOACTIVE SUBSTANCES TO FALL ON PLAINTIFFS AND THEIR REAL AND PERSONAL PROPERTY, AND THAT THE EMPLOYEES WERE THOSE OF THE AEC, DOD OR OTHER AGENCY OF THE UNITED STATES. PLEASE NOTE, FOR PURPOSES OF THE ANSWER AND OTHERWISE, THAT THE RADIOACTIVE SUBSTANCES ARE ALLEGED IN THE COMPLAINT TO HAVE BEEN PLACED BY LAW UNDER THE EXCLUSIVE POSSESSION, CONTROL AND DIRECTION OF THE DEFENDANT.

IT BECAME READILY APPARENT, DURING MY DISCUSSIONS WITH MR. RAPER, THE U.S. ATTORNEY, THAT HE HAD NO SIGNIFICANT ADDITIONAL FACTS TO COMMUNICATE. THE U.S. ATTORNEY'S OFFICE IN CHEYENNE IS COMPOSED OF TWO ATTORNEYS: MR. RAPER AND ONE ASSISTANT, A MR. KAUFMAN. BOTH OF THEM PLAN TO LEAVE THE OFFICE IN THE NEAR FUTURE - MR. RAPER, AS SOON AS THE NEW PRESIDENTIAL APPOINTMENT CAN BE MADE; AND MR. KAUFMAN, BY JUNE 15 OF THIS YEAR. MR. RAPER PLANS TO JOIN THE FIRM OF JOHN J. ROONEY AND WILLIAM G. WALTON IN CHEYENNE (FORMER MEMBER: U.S. SENATOR HICKEY OF WYOMING), WHICH IS ONE OF THE TWO FIRMS REPRESENTING THE PLAINTIFFS IN THE MITCHELL CASE. MR. RAPER VOLUNTARILY COMMUNICATED THIS INFORMATION AND SEEMS TO BE FULLY AWARE OF THE RATHER DELICATE CIRCUMSTANCES IN WHICH HE NOW FINDS HIMSELF. IN VIEW OF THEM, HOWEVER, IT IS RECOMMENDED THAT JUSTICE HEADQUARTERS, TEMPORARILY AT LEAST, ASSURE THAT THE WYOMING U.S. ATTORNEY'S OFFICE COMPLETELY DISASSOCIATE ITSELF FROM ALL CONNECTION WITH THE CASE. (SMITH AND KUHN AND OTHER POTENTIAL DEFENSE WITNESSES AND ADVISORS MAY NATURALLY SEEK OUT THE U.S. ATTORNEY TO CONVEY INFORMATION.) RAPER ADVISED ME THAT, BECAUSE OF THE CIRCUMSTANCES, HE HAS NOT TRIED TO OBTAIN ADDITIONAL INFORMATION CONCERNING THE CASE; ALSO, THAT THE FBI HAS NOT YET

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BEEN ASKED TO LOOK INTO THE CASE. RAPER FURTHER ADVISED ME THAT THERE HAS BEEN NO INDICATION THAT ANY OTHER GRAZERS IN THE NEIGHBORHOOD OF ALADDIN, WYOMING, INTENDED TO BRING SIMILAR ACTIONS, BUT THAT THE PUBLICITY FROM THE MITCHELL SUIT MIGHT WELL ENGENDER SUCH OTHER ACTIONS. RAPER ALSO STATED THAT IT WAS HIS IMPRESSION THAT PLAINTIFFS ATTORNEYS INTENDED TO TAKE DEPOSITIONS, BUT THAT HE WAS NOT AWARE OF WHO THE DEPONENTS WOULD BE. (IT SEEMS FAIRLY APPARENT THAT PLAINTIFFS WILL MAKE EXTENSIVE USE OF THE DISCOVERY PROCESS.) IN CONNECTION WITH ONE OF THE NEWS ARTICLES CONCERNING THE MITCHELL CASE TO THE EFFECT THAT MR. HUGHES, ONE OF THE PLAINTIFFS ATTORNEYS, ALLEGED THAT "THE AEC HAS ATTEMPTED TO DISCOURAGE THE FAMILY IN THE LEGAL ACTION", RAPER DISCLAIMED KNOWLEDGE OF THE "DISCOURAGEMENT", IF ANY, EXCEPT THAT HE HAD HEARD THAT SOME UNIDENTIFIED PERSONS, NOT NECESSARILY AEC EMPLOYEES, WHO WERE "TESTING" AND "DIGGING HOLES" IN THE NEIGHBORHOOD OF THE MITCHELL RANCH HAD ALLEGEDLY TOLD MITCHELL "NOT TO FILE SUIT" AND "TO KEEP QUIET". RAPER OFFERED, AT LEAST TWICE, TO PUT ME IN TOUCH WITH PLAINTIFFS ATTORNEYS, BUT I DECLINED.

LT. COL. KUHN IS VERY FAMILIAR WITH THE CIRCUMSTANCES SURROUNDING THE MITCHELL CASE. HE SPENT SOME YEARS AT OAK RIDGE AND HIS CONNECTION THERE WITH ADE PERSONNEL EXPLAINS HIS INVOLVEMENT. (UNFORTUNATELY, HE HAS PROBABLY DESTROYED THE NOTES OF HIS INVESTIGATION AT THE MITCHELL RANCH.) (I INTENTIONALLY REFRAINED FROM ASKING EITHER COLONEL KUHN OR DR. SMITH TO PREPARE ANY WRITTEN STATEMENTS.) COLONEL KUHN'S RECOLLECTION OF THE SIGNIFICANT EVENTS IS AS FOLLOWS: ABOUT JULY OF 1959, DR. RALPH C. KNOWLES OF THE ADE STAFF IN CHEYENNE, WHOM KUHN HAD KNOWN AT OAK RIDGE, TENNESSEE, CONTACTED KUHN AND ASKED HIM TO GO UP TO THE MITCHELL RANCH AND CHECK OUT MITCHELL'S

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CLAIM THAT HIS SHEEP HAD BEEN AFFECTED BY RADIATION. IT APPEARED THAT PLAINTIFF MITCHELL HAD CALLED UPON A DR. R. M. BUCK, A VETERINARIAN AT BELLE FOURCHE, SOUTH DAKOTA TO ASK FOR ADVICE CONCERNING HIS SHEEP. DR. BUCK WAS ILL AT THE TIME, BUT HIS ASSISTANT WENT OUT TO INSPECT MITCHELL'S SHEEP AND FOUND CONSIDERABLE PARASITISM AMONG THE SHEEP. THE ASSISTANT APPARENTLY DREW NO FURTHER CONCLUSIONS CONCERNING THE CONDITION OF THE SHEEP, AND WAS UNABLE TO DIAGNOSE THE SPECIFIC AILMENT. KUHN BELIEVES THAT DR. BUCK'S OFFICE CONTACTED THE OFFICE OF THE WYOMING STATE VETERINARIAN WHO IN TURN HAD CONTACTED DR. KNOWLES OF THE ADE. DURING THE SAME MONTH OF JULY, KUHN COMPLIED WITH KNOWLES REQUEST, AND, IN THE COMPANY OF BOTH KNOWLES AND A DR. WILLIAM A SCOTT, ADE FIELD VETERINARIAN AT NEW CASTLE, WYOMING, AT THE TIME, VISITED THE MITCHELL RANCH NEAR ALADDIN, WYOMING, WHICH IS NORTHEAST OF SUNDANCE AND NOT FAR FROM THE SOUTH DAKOTA LINE. SCOTT, ACCORDING TO KUHN, AT SOME TIME PRIOR TO THEIR VISIT, HAD TENTATIVELY CONCLUDED THAT THE MITCHELL SHEEP WERE SUFFERING FROM "PHOTOSENSITIZATION", AND THIS DIAGNOSIS WAS LATER CONFIRMED BY THE COLORADO COLLEGE OF VETERINARY MEDICINE. (KUHN DESCRIBES PHOTOSENSITIZATION AS RESULTING FROM AN ANIMAL'S GRAZING ON CERTAIN PLANTS THAT SENSITIZE THE ANIMAL TO ULTRA_VIOLET LIGHT. EXPOSURE TO THE ULTRA_VIOLET LIGHT ACTIVATES CHEMICAL CHANGES WHICH CAUSE NECROSIS OF THE EPITHELIUM. HAD THE ANIMALS BEEN FED A CERTAIN KIND OF HAY (BECAUSE OF EXCESS SNOW AND POOR FORAGE CONDITIONS), THE HAY MIGHT HAVE INCLUDED SUBSTANCES THAT CONTRIBUTED TO THE PHOTOSENSITIZATION.)) DURING THEIR VISIT WITH MITCHELL, MITCHELL RELATED THAT A COUPLE OF "STRANGERS" HAD COME TO THE MITCHELL RANCH SOME TIME PREVIOUSLY, PARKED THEIR CAR AWAY FROM THE ENTRANCE, AND THAT ONE OF THEM HAD A "BLACK BOX AROUND HIS NECK".

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MITCHELL RELATED THAT HE HAD TOLD THE STRANGERS ABOUT HIS TROUBLES, THAT ONE OF THE STRANGERS LOOKED AT ONE OF THE MITCHELL CHILDREN AND TOLD MITCHELL THAT THE CHILD HAD RADIATION SICKNESS. MITCHELL WENT ON TO TELL KUHN THAT, BECAUSE OF WHAT THE STRANGER SAID, HE BROUGHT HIS FAMILY TO BELLE FOURCHE, SOUTH DAKOTA, FOR BLOOD EXAMINATIONS AND THAT THE DOCTOR THERE CONCLUDED THAT ALL THE MITCHELL FAMILY HAD RADIATION SICKNESS, BUT WAS RECOVERING. KUHN BELIEVES THAT THE DIAGNOSIS CAUSED MITCHELL TO SUSPECT THAT THE AFFLICTIONS OF HIS SHEEP WERE ALSO ATTRIBUTABLE TO RADIATION. MITCHELL DESCRIBED TO KUHN THE FOLLOWING CONDITIONS AS OCCURRING ABOUT APRIL 1959 AND THEREAFTER: "BLUE SNOW" FELL ON THE MITCHELL RANCH; ALL THE FISH IN THE POND DIED; HIS CERTIFIED WHEAT LOOKED STUNTED AND STRANGE; THERE WERE MANY DEAD BIRDS; THERE WERE MORE DEAD DEER THAN WERE NORMALLY FOUND; HIS MILCH COW'S CALF GOT SICK, THEN RECOVERED BUT WAS STUNTED; HIS COW ALSO BECAME SICK (THE MITCHELL FAMILY DRANK HER MILK); HIS SHEEP GOT SICK SHORTLY AFTER THE COW AND CALF, AND DEVELOPED SKIN LESIONS AND A SLOUGHING OF WOOL; THEN MANY SHEEP DIED. MITCHELL IS ALSO REPORTED TO HAVE TOLD KUHN THAT OTHER RANCHERS IN THE AREA HAD SHEEP WITH SIMILAR AFFLICTIONS, BUT WERE AFRAID TO MAKE THE FACT KNOWN BECAUSE OF THE SOCIAL STIGMA ATTACHED TO RADIATION INJURY. DURING THE SAME JULY VISIT, MITCHELL ROUNDED UP HIS REMAINING SHEEP FOR KUHN, KNOWLES AND SCOTT. HE SEEMED UNCERTAIN (TO KUHN) AS TO JUST WHICH SHEEP WERE AFFLICTED. KUHN (ALL DURING THE SAME VISIT) SAW SKIN LESIONS ON SOME OF THE SHEEP AND ATTRIBUTED THEM TO PHOTOSENSITIZATION. HE ALSO SAW ENCRUSTATIONS ON THE EARS AND NOSES OF SOME OF THE SHEEP, AND ATTRIBUTED THEM ALSO TO PHOTOSENSITIZATION. ACCORDING TO KUHN, ALL THESE SYMPTOMS WERE HEALING. KUHN ALSO TOOK BLOOD AND FECAL SAMPLES FROM SOME OF THE AFFECTED ANIMALS (BUT SUBSEQUENTLY THREW AWAY THE RESULTS) AND FOUND PARASITISM. HE ALSO HAD BROUGHT ALONG A GEIGER COUNTER AND CHECKED THE SHEEP AND SOME MUD FROM THE MITCHELL COLLECTING POND FOR RADIATION. HE FOUND NOTHING ABOVE

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BACKGROUND. KUHN ALSO TOOK A BACTERIA SAMPLE FROM THE FISTULA OF THE WITHERS OF A SICK RAM, WHICH APPEARED TO HIM TO BE HEALING. KUHN FOUND NO EVIDENCE WHATSOEVER OF ANY RADIATION ILLNESS AMONG THE MITCHELL SHEEP AND NO EVIDENCE THAT ANY OF THE SYMPTONS WERE ATTRIBUTABLE TO RADIATION. KUHN DIAGNOSED PHOTOSENSITIZATION AND "GUESSED" THAT THE PHOTOSENSITIZATION MIGHT BE ATTRIBUTABLE TO MALNUTRITION FROM EATING NOXIOUS WEEDS. KUHN FOUND MITCHELL TO BE FAIRLY WELL EDUCATED AND QUITE FRIENDLY. KUHN BELIEVED THAT MITCHELL HAD A "PAT STORY" BY THE TIME OF THE JULY VISIT. KUHN SAID THAT MITCHELL HAD TOLD HIM THAT HIS OWN SYSMPTOMS AND THOSE OF HIS FAMILY INCLUDED (IN EFFECT); BLOODY DIARRHEA, ANEMIA, AND EPILATION. KUHN BELIEVES THAT THE "STRANGERS WITH THE BLACK BOX" MAY HAVE BEEN EMPLOYEES OF THE CONTRACTOR WHO WAS MAKING A RADIOLOGICAL SURVEY OF THE AREA IN CONNECTION WITH THE THEN PROPOSED SUNDANCE REACTOR. (ONE OF THE INDIVIDUALS WAS CALLED "DOCTOR".) KUHN STATED THAT THE COLORADO COLLEGE OF VETERINARY MEDICINE AT FORT COLLINS, COLORADO, HAD RECEIVED ONE OF THE AFFLICTED MITCHELL SHEEP, HAD SLAUGHTERED THE SHEEP AND PERFORMED AN AUTOPSY. (DR. SCOTT HAD RECOMMENDED TO MITCHELL THAT THIS BE DONE.) THE COLLEGE CONFIRMED THE DIAGNOSIS OF PHOTOSENSITIZATION. KUHN STATED THAT HE ASKED THE COLLEGE FOR THE BONES OF THE SLAUGHTERED ANIMAL, BUT THAT THEY HAD BEEN DISPOSED OF.

MUCH OF THE MATERIAL BEING SENT TO YOU UNDER SEPARATE COVER CAME FROM THE FILES OF DR. LOUIS SMITH, VETERINARIAN IN CHARGE OF ADE IN CHEYENNE. HE ASSUMED THE POSITION IN JUNE OF 1959, BY WHICH TIME ADE WAS ALREADY INVESTIGATING THE MITCHELL SITUATION, AND HE HAS NO SIGNIFICANT FIRST HAND KNOWLEDGE OF THE FACTS. HE IS, AT MY REQUEST, IN THE PROCESS OF OBTAINING THE NECROPSY REPORT FROM THE COLORADO COLLEGE OF VETERINARY MEDICINE. HIS RECORDS REVEAL THAT THE MITCHELL SHEEP WAS SLAUGHTERED THERE ON AUGUST 31, 1959 AND THAT THE DIAGNOSIS, AFTER THE PATHOLOGICAL POST-MORTEM EXAMINATION, WAS PHOTOSENSITIZATION.

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ACCORDING TO DR. SMITH, DR. RUE JENSEN, DEAN OF THE COLORADO COLLEGE OF VETERINARY MEDICINE IS AN OUTSTANDING PATHOLOGIST (BUT WITH APPARENTLY NO EXPERIENCE IN THE FIELD OF RADIATION). DURING MY PHONE CALL TO DR. JENSEN ON MAY 2, HE STATED THAT HE PERSONALLY, TOGETHER WITH DR. L. A. GRINER OF HIS STAFF, PERFORMED THE NECROPSY ON THE MITCHELL SHEEP, THAT ALL THE ORGANS WERE LOOKED AT, THAT NO CHEMICAL ANALYSES HAD BEEN PERFORMED, THAT HIS DIAGNOSIS WAS PHOTOSENSITIZATION, AND THAT HE WAS "VERY SURPRISED" THAT THE MITCHELL SHEEP HAD BEEN SUBMITTED AS A SUSPECTED RADIATION CASUALTY. HE IS LOOKING FOR THE NECROPSY REPORT ITSELF AND WILL SEND IT TO DR. SMITH AS SOON AS IT IS AVAILABLE.

THE FOLLOWING IS A SUMMARY OF THE MORE SIGNIFICANT DOCUMENTS BEING SENT TO YOU: (1) MEMORANDUM, DATED JUNE 25, 1959, FROM DR. LOUIS SMITH TO DR. WILLIAM SCOTT, STATING THAT THE (MITCHELL) SHEEP DIAGNOSIS IS TENTATIVELY PHOTOSENSITIZATION; (2) LETTER, DATED JULY 31, 1959, FROM COL. KUHN TO PRESTON MITCHELL, STATING (a) ON REVIEWING LABORATORY RESULTS ON SEVERAL SPECIMENS COLLECTED, HE CAN SEE NO EVIDENCE FOR ANY PRESUMPTION OF RADIATION DAMAGE IN THE MITCHELL SHEEP BAND, (b) THAT THE FACTS AT HAND, I.E, THE EXAMINATION OF THE MITCHELL PROPERTY AND ANIMALS, DO NOT POINT TO A REMOTE POSSIBILITY OF A RADIATION PROBLEM; (c) THAT THE SEEMINGLY BIZARRE SERIES OF EVENTS DESCRIBED BY MITCHELL HAVE FOR THE MOST PART LOGICAL EXPLANATIONS; AND (d) THAT HE (KUHN) WOULD HAVE THE UTMOST CONFIDENCE IN DR. SCOTT'S DIAGNOSIS OF PHOTOSENSITIZATION; (3) LETTER, DATED JULY 31, 1961, FROM COL. KUHN TO DR. R. M. BUCK, A VETERINARIAN IN BELLE FOURCHE, S. DAKOTA, (a) CONFIRMING EXISTENCE OF PHOTOSENSITIZATION, AND (b) GIVING RESULTS OF KUHN'S COMPLETE HEMATOLOGY EXAMINATION. SOME OF THE OTHER DOCUMENTS PROVIDE USEFUL INFORMATION, THOUGH THE FILE IS TOO LENGTHY FOR SUMMARY HERE. NONE OF THE DOCUMENTS POINTS TO ANY EVIDENCE OF RADIATION-CAUSED INJURY.

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THE FOLLOWING ARE LISTED AS POSSIBLE "LEADS" FOR FURTHER CONTACT (IN ADDITION, OF COURSE, TO COL. KUHN, ROBERT E. SUNDIN, AND DR. LOUIS SMITH); (1) DR. RALPH C. KNOWLES, FORMERLY OF ADE IN CHEYENNE, NOW WITH ADE IN TOPEKA, KANSAS, PRESENT ADDRESS; 1001 OAKLEY AVENUE, TOPEKA, KANSAS; (2) DR. WILLIAM A. SCOTT, FORMERLY WITH ADE IN NEW CASTLE, WYOMING , NOW WITH ADE FIELD FORCES IN MONTANA, CAN BE REACHED CARE OF DR. O. J. HALVERSON, P. O. BOX 197, HELENA, MONTANA; (3) DR. JAMES H. WOMACK, FORMERLY WITH ADE IN CHEYENNE, NOW WITH ADE IN SACRAMENTO, PRESENT ADDRESS: P. O. BOX 1086, 334 FEDERAL BLDG., SACRAMENTO, CALIF.; (4) DRS. RUE JENSEN AND L. A. GRINER, COLORADO COLLEGE OF VETERINARY MEDICINE, FORT COLLINS, COLO.; (5) TWO DOCTORS IN BELLE FOURCHE, SOUTH DAKOTA, WHO REPORTEDLY EXAMINED MITCHELL AND HIS FAMILY (IDENTITIES CAN PROBABLY BE EASILY ESTABLISHED); (6) DR. JAMES BUTLER, VETERINARIAN IN VALENTINE, NEBRASKA, WHO APPARENTLY PERFORMED POST-MORTEM ON ONE OF MITCHELL SHEEP; (7) DR. R. M. BUCK AND HIS ASSISTANT, TRI-STATE VETERINARY CLINIC, BELLE FOURCHE, S. DAK.; (8) DR. DAVID O. MANLEY, FORMERLY WITH ADE IN CHEYENNE, PRESENT ADDRESS: P. O. BOX 439, TOPEKA, KANSAS. ALSO, OTHER NAMES, SUCH AS THAT OF LOUIS GERBER AND DR. GOOD, SUGGEST THEMSELVES FROM SOME OF THE CORRESPONDENCE BEING FORWARDED TO YOU.

OTHER SUGGESTIONS AND RECOMMENDATIONS FOLLOW: (1) COL. KUHN RELATES A STRIKING SIMILARITY BETWEEN THE MITCHELL INCIDENT AND WHAT HE DESCRIBES AS THE "TAOS BLUE SNOW" INCIDENT WHICH OCCURRED NEAR TAOS, N. MEX. CIRCA 1954, VIZ: NUMBER OF COWS DIED AFTER APPEARANCE OF "BLUE SNOW" SUPPOSEDLY CAUSED BY POLLEN FROM CERTAIN PINE TREES; CATTLE AFFECTED WITH LESIONS ; BIRDS DIED; (1) YOU MAY WISH TO HAVE CONTACT MADE WITH DR. BERNARD F. TRUM, OFFICE OF THE DEAN, HARVARD MEDICAL SCHOOL, WHO REPORTEDLY INVESTIGATED TAOS SITUATION; (2) DIAGNOSIS OF PHOTOSENSITIZATION POINTS UP NEED FOR SERVICES OF EXPERT-ADVISOR WHOSE SERVICES

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SHOULD BE MADE PROMPTLY AVAILABLE TO PROVIDE FURTHER LEADS IN INVESTIGATION; (3) EPISODE OF "TWO STRANGERS WITH BLACK BOX" SHOULD BE INVESTIGATED; MARTIN COMPANY MIGHT BE GOOD INITIAL CONTACT IN VIEW OF ITS ROLE IN SUNDANCE REACTOR PROJECT (MATERIAL BEING FORWARDED CONTAINS ADDITIONAL INFO RE THIS EPISODE); (4) YOU MAY WISH TO CONSIDER POSSIBILITY OF HAVING ENVIRONMENTAL AND METEOROLOGICAL SURVEY CONDUCTED TO DETERMINE RANGE AND FORAGE CONDITIONS IN EARLY 1959 AND EARLIER IN CONNECTION WITH PHOTOSENSITIZATION CAUSATION; (5) FURTHER INVESTIGATION WARRANTED TO ESTABLISH WHETHER OR NOT, IN FACT, OTHER RANCHERS (AS ALLEGED BY MITCHELL TO KUHN) HAD SHEEP WITH SIMILAR AFFLICTIONS; (6) SURVEY OF AEC AND OTHER ACTIVITIES NEEDED TO ESTABLISH WHETHER ANY POSSIBILITY OF MEANINGFUL RELEVANT RADIATION SOURCE (DISCOVERY PROCESS ON PART OF PLAINTIFFS WILL UNDOUBTEDLY BE DIRECTED IN PARTS TOWARDS THIS FACET); AND (7) IT MAY BE DESIRABLE TO ARRANGE FOR EXHUMATION OF MITCHELL SHEEP CARCASSES (WHOLE-BODY RADIATION COUNT, CHEMICAL ANALYSES OF SKELETAL STRUCTURE, ETC.) AND ANALYSES OF SOIL SAMPLES FROM MITCHELL RANCH.

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C O P Y

MAY 4 1961

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER HAWORTH
COMMISSIONER OLSON
COMMISSIONER WILSON

THROUGH GENERAL MANAGER

SUBJECT: SUMMARY AND REPORT ENTITLED "MEDICAL SURVEY OF RONGELAP PEOPLE FIVE AND SIX YEARS AFTER EXPOSURE TO FALLOUT"

Forwarded as a matter of interest are copies of a summary and report entitled "Medical Survey of Rongelap People Five and Six Years after Exposure to Fallout." The report was prepared at the Brookhaven National Laboratory based on data obtained by Dr. Robert Conard and associates. The summary was prepared by Dr. William E. Lotz of this Division. The factual make-up of this material is considered non-controversial.

In brief, the Marshallese are not showing clinical signs and symptoms or abnormalities clearly attributable to their 1954 exposure. They continue to show, however, low body burdens of Sr^{90}, Cs^{137} and Zn^{65}, all of which we believe to originate from the contamination in their current food supplies; the Zn^{65} is believed to come from the seafood caught locally.

Attachments:
As stated above

cc: AGM/RID
BMA
GM

CONFIRMED TO BE UNCLASSIFIED
BY AUTHORITY OF DOE/OC
Jose Oda 5/24/91
DATE
REVIEWED BY
Bry. T Fawner 3/25/86

BMA	ADA	ADMHR	Director
RCBrothers:ncg	HAStenwood	Bruner/Lotz	CLDunham
4-28-61	4- -61	4- -61	4- -61

C O P Y

Copy + attachments
filed MR&A-7-1- Proving Grounds

1961-5

JAN-5-3

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

April 4, 1961

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER OLSON
COMMISSIONER WILSON

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

Attached for your information is a report on the final day of the JCAE hearings on "Applications of Radioisotopes and Radiation in the Life Sciences."

Richard X. Donovan
Special Assistant to the
General Manager (Congressional)

Attachment
As stated.

cc: All Staff

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

March 30, 1961

TO : Richard X. Donovan, Special Assistant
to the General Manager (Congressional)

FROM : J. W. Stimpson
Office of Congressional Liaison

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

The final day of JCAE hearings on "Applications of Radioisotopes and Radiation in the Life Sciences" began with testimony from Dr. C. J. Borkowski of the Oak Ridge National Laboratory. Dr. Borkowski delivered a statement on the role of basic instrumentation in scientific research and discussed several new developments in radiation instruments used in biological studies and medical treatment. Dr. Borkowski told the JCAE that the increased complexity of instrumentation has emphasized its importance as a separate scientific discipline and the need for having instrument specialists as vital members of every research team.

The next two witnesses, Dr. Donald Fluke of Duke University and Mr. J. Tyson, Austin High School, Austin, Texas, appeared jointly to testify on the Radiation Biology Summer Institute Program. Dr. Fluke, director of the institute at Duke for three years, described the objectives of the summer institute program and praised the efforts of the AEC in this undertaking. Mr. Tyson, a high school science teacher and former student and staff member of the institute at Duke, described the curriculum of the program and told Committee members that "the program enjoys perhaps the best reputation among all of the institute programs of various sponsorships."

The hearings were concluded with a panel discussion in which the participants briefly summarized the testimony of witnesses heard throughout the week. Members of the panel were Dr. J. Bugher, Puerto Rico Nuclear Center, and Dr. G. Leroy, University of Chicago, who summarized testimony dealing with diagnosis and treatment of diseases and instrumentation used in medical research; Dr. H. Bentley Glass, Johns Hopkins University, who discussed genetic effects and related aspects; Dr. S. Hendricks, U. S. Department of Agriculture, who delivered a summary statement on the use of radiation and

radioisotopes in soils, entomology, and agricultural chemical residue studies; Dr. John Totter, University of Georgia, who commented on the role of atomic energy in biochemistry, biophysics, and plant biology; and Dr. D. L. Ray who discussed the application of radiation and radioisotopes in marine and terrestrial ecology.

At the conclusion of the hearing, Rep. Price expressed the Committee's thanks for the assistance given by Dr. Dunham and the Division of Biology and Medicine, and called particular attention to the help given to the JCAE by Dr. James L. Liverman and Dr. John C. Bonner.

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

March 29, 1961

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER OLSON
COMMISSIONER WILSON

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

Dr. G. D. Novelli, Oak Ridge National Laboratory, was the first witness at today's session and discussed the use of radiation and radioisotopes in biochemical processes. The statement was entirely technical and is available in this office for review. At the conclusion of his statement, Mr. Ramey asked Dr. Novelli whether he thought that biochemical research in the atomic energy program was receiving sufficient support. Novelli replied that the support was very good especially by the National Institute of Health but that more could be done.

Dr. Frank J. Dixon of the University of Pittsburgh School of Medicine discussed the value of radioisotopes and radiation in the study of immunization. Sen. Pastore asked him how U.S. research in this area compared with the work being done abroad. Dixon replied that he thought more was being done in this country due in part to the fact that the U.S. got off to an earlier start in atomic energy. Dixon said that he knows of no worthy research proposal that has failed to get Government support.

Pastore then asked Dixon about the value of Cobalt 60 treatment in cancer and expressed doubt that such treatment did any more than give the patient encouragement without any real benefit. Dr. Dixon replied that Cobalt 60 has done much to prolong useful life in cancer patients and has even effected some cures when combined with surgery. Sen. Pastore appeared to accept this expression of confidence in the Cobalt 60 process.

Dr. J. Herbert Taylor of Columbia University described the use of tritium in the study of processes involved in the genetic and related properties of cells.

Dr. A. A. Benson of Pennsylvania State University discussed the development of new techniques for the study of life processes with radioisotopes.

Richard X. Donovan
Special Assistant to the
General Manager (Congressional)

cc: All Staff

MHS-3

OPTIONAL FORM NO. 10
5010-104

UNITED STATES GOVERNMENT

Memorandum

TO : Those Listed Below DATE: April 3, 1961

FROM : Forrest Western, Deputy Director (4585)
Office of Health and Safety

SUBJECT: FEDERAL RADIATION COUNCIL DRAFT REPORT NO. 2, MARCH 20, 1961

On March 28, 1961 Dr. Woodruff and I discussed with representatives of most of the Divisions and Offices listed below a request (copy attached) from Secretary Ribicoff, Chairman of the Federal Radiation Council, dated March 24, 1961 to Chairman Seaborg, for submission by April 14, 1961 of comments on Draft Federal Radiation Council Report No. 2, copies of which were distributed at the meeting.

The staff of the Council has completed a Draft Report No. 2 dealing with the exposure of population groups to iodine-131, radium-226, strontium-89, and strontium-90. On the basis of the recommendations contained in this report the staff of the Council is preparing for Council approval a Memorandum for the President containing the recommendations developed in this report. A copy of the first draft of the proposed Memorandum for the President is attached.

Later this week we expect to submit to you for concurrence a staff paper prepared for the purpose of establishing the Commission's position on recommendations contained in this report. For our assistance in preparing a staff paper, we request that you submit to us as early as possible any comments on these recommendations which you may have at the present time.

Enclosures: As stated.

Addressees:
Director, Division of Biology and Medicine
Director, Office of Compliance
General Counsel, Office of General Counsel
Director, Office of Health and Safety
Acting Director, Division of Licensing and Regulation
Director, Office of Isotopes Development
Director, Division of Military Application
Director, Division of Production
Director, Office of Public Information
Director, Division of Raw Materials
Director, Division of Research
Director, Division of Reactor Development
Assistant Directors, Division of Reactor Development
cc: Commissioners
Acting Director of Regulation
General Manager
Deputy General Manager
Assistant General Managers
Secretary, Office of the Secretary

See AEC 604/47 for Background

4-3-61

COPY

FEDERAL RADIATION COUNCIL
Executive Office Building
Washington 25, D.C.

March 24, 1961

Dear Mr. Chairman:

The Working Group of the Federal Radiation Council has informed me that they have prepared for action by the Council the second report on radiation protection standards. The report develops guides for use in connection with iodine-131, radium-226, strontium-89, and strontium-90. From the report a memorandum to the President will be developed containing the Council's recommendations for Presidential guidance to the Federal agencies.

I have asked that the report be distributed for consideration in advance of a Council meeting. It would greatly facilitate action at the meeting if the major policy issues, particularly those which have not been completely resolved, could be summarized by the Working Group prior to the meeting. Therefore, I propose the following course of action:

(1) that a Council meeting be held at 2 p.m., Thursday, April 27, 1961,

(2) that comments on the Working Group draft be submitted directly to the Secretary, Dr. Donald R. Chadwick, room 597 Executive Office Building, by Friday, April 14, and

(3) that the Working Group prepare and distribute in advance of the Council meeting a draft memorandum for the President containing the policy recommendations together with a summary of any unresolved questions which may remain.

If I do not hear from you to the contrary, I will assume that this course of action meets with your approval.

Sincerely yours,

(SIGNED) Abraham A. Ribicoff

Abraham A. Ribicoff
Chairman

The Honorable Glenn T. Seaborg
Chairman, Atomic Energy Commission
Washington 25, D. C.

COPY

DRAFT: For Consideration
at Working Group Meeting 4/3/61

FOR OFFICIAL USE ONLY

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Radiation Protection Guidance for Federal Agencies

Pursuant to Executive Order 10831 and Public Law 86-373, the Federal Radiation Council transmits herewith its second report to you concerning findings and recommendations for the guidance for Federal agencies in the conduct of their radiation protection activities.

Background

On May 13, 1960, the first recommendations of the Council were approved by the President and the memorandum containing these recommendations was published in the Federal Register on May 18, 1960. There was also released at the same time Staff Report No. 1 of the Federal Radiation Council, entitled, "Background Material for the Development of Radiation Protection Standards", dated May 13, 1960.

The first report of the Council provided a general philosophy of radiation protection to be used by Federal agencies in the conduct of their specific programs and responsibilities. It introduced and defined the terms "Radiation Protection Guide" (RPG) and "Radioactivity Concentration Guide" (RCG). It provided numerical values for Radiation Protection Guides for the whole body and certain organs of radiation workers and for the whole body of individuals in the general population, as well as an average population gonadal dose.

This memorandum contains recommendations for guidance to Federal agencies in connection with radiation protection activities pertaining to the control of human exposure to radiation from radioactive materials deposited in the body as a result of their occurrence in the environment. It is the intention of the Council to release the background material leading to these recommendations as Staff Report No. 2.

In the studies leading to the recommendations in this memorandum, specific attention was directed to those radioisotopes currently considered to be of greatest concern in connection with exposures of population groups. These are iodine-131, radium-226, strontium-89, and strontium-90. At the same time, however, general principles have been developed which are equally applicable to other radionuclides occurring in the environment. Recommendations concerning these principles are discussed below.

Recommendations as to General Principles

Control of population exposure from radionuclides occurring in the environment is accomplished in general either by restrictions on the entry of such materials into the environment or through measures designed to limit the intake of these radioactive materials by members of the population. Both approaches are based on estimates of concentrations of radioactive material in air, water, or food expected to result in radiation doses specified in radiation exposure guides. Controls should be based upon an evaluation of population exposure with respect to the RPG. For this purpose, the total daily intake of such materials constitutes a more appropriate criterion.

It is recommended that:

1. The term Radioactivity Intake Guide (RIG) be adopted for Federal use. This term is defined as the daily intake of radioactive material which is determined to result, under specified conditions, in whole body or organ doses equal to the Radiation Protection Guide (RPG).

The control of the intake of radioactive materials from the environment can appropriately involve many different kinds of actions. The character and import of these actions may vary widely, from those which entail little interference with the usual activities, such as monitoring and surveillance, to those which involve a major disruption, such as condemnation of food supplies. Some control actions would require prolonged lead times before becoming effective, e.g., major changes in water supplies. The magnitude of control measures should be related to the degree of likelihood that the RPG may be exceeded. The use of a single numerical value as a guide, which has been the practice until now, does not in many instances provide the proper basis for taking actions appropriate to the risk involved. For planning purposes, it is desirable that insofar as possible control actions to meet possible contingencies be known in advance.

It is recommended that:

2. The radiological health activities of Federal agencies in connection with environmental contamination with radioactive materials be based, within the limits of the agency's statutory responsibilities, on a graded series of appropriate actions taken at different levels of intake of radioactive materials by exposed population groups.

In order to provide guidance to the agencies in adapting the graded approach to their own programs, the recommendations pertaining to specific radionuclides in this memorandum include in each case three classes of RIG's. A discussion of the suggested application of these three classes will be found in Staff Report No. 2 of the Federal Radiation Council.

Numerical Recommendations

The Federal Radiation Council has previously emphasized that establishment of radiation protection standards involves a balancing of the benefits to be derived from the controlled use of radiation and atomic energy against the risk of radiation exposure. In the development of the numerical recommendations contained herein, the Council has made extensive efforts to give careful consideration to both sides of this balance. The Council has reviewed available knowledge and consulted with scientists within and outside the government concerning effects on man of the presence within the environment of iodine-131, radium-226, strontium-89, and strontium-90. The Council has also reviewed past and current activities resulting in the release of these radionuclides to the environment and given consideration to future developments. The Radiation Protection Guides and associated Radioactivity Intake Guides recommended below are considered by the Council to represent an appropriate balance between the requirements of health protection and of the beneficial uses of radiation and atomic energy.

It is recommended that:

3. The following Radiation Protection Guides and associated Radioactivity Intake Guides be adopted for normal peacetime operations to be applied to the average of suitable samples of an exposed population group:

Radionuclide	Critical Organ	RPG	RIG's (μμc/day) Class I	Class II	Class III
I-131	Thyroid gland	0.5 rem/yr	0 - 8	8 - 80	80 - 800
Ra-226	Bone	0.001 μgms in the adult skeleton	0 - 1	1 - 10	10 - 100
Sr-89	Bone marrow	0.05 rem/yr	0 - 200	200 - 2,000	2,000 - 20,000
Sr-90	Bone marrow	0.05 rem/yr	0 - 20	20 - 200	20 - 2,000

It is recommended that:

4. For radionuclides not considered in this report, agencies continue to follow the recommendations in Report No. 1 that "Federal agencies, as an interim measure, use Radioactivity Concentration Guides which are consistent with the recommended Radiation Protection Guides. Where no Radiation Protection Guides are provided, Federal agencies continue present practices."

In the future, the Council will direct attention to the development of appropriate radiation protection guidance for those radionuclides for which such consideration appears appropriate or necessary. In particular, the Council will study any radionuclides for which useful applications of radiation or nuclear energy require release to the environment of significant amounts of these nuclides. Federal agencies are urged to inform the Council of such situations.

Chairman, FRC

M 463-2

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

March 31, 1961

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER OLSON
COMMISSIONER WILSON

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

Attached for your information is a report on the second day of the JCAE hearings on "Applications of Radioisotopes and Radiation in the Life Sciences."

R. X. Donovan/ROV

Richard X. Donovan
Special Assistant to the
General Manager (Congressional)

Attachment:
As stated above

3.31.61

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

March 28, 1961

TO : Richard X. Donovan, Special Assistant
to the General Manager (Congressional)

FROM : J. W. Stimpson
Office of Congressional Liaison

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

The JCAE opened the second day of hearings today on "Applications of Radioisotopes and Radiation in the Life Sciences" with testimony from Dr. H. L. Haller of the Agricultural Research Service, U. S. Department of Agriculture. Dr. Haller's statement discussed the use of radioisotopes in obtaining information on residues of agricultural chemicals. He pointed out that many radioactive-labeled pesticides have been synthesized and used to obtain residue data needed for the establishment of safe limits or tolerances for pesticides.

The second witness of the day, Dr. S. R. Olsen of the U. S. Department of Agriculture, Beltsville, Maryland, discussed the use of radioisotopes in finding answers to problems in soil chemistry and plant nutrition. Dr. Olsen told the JCAE that significant advances have been made through radioisotope techniques in the solution of such problems as the movement of nutrients in soil, their subsequent uptake by roots, the functions they serve in the plant, and the relationship of soil water to these processes.

Dr. L. D. Christenson of the U. S. Department of Agriculture, Beltsville, Maryland, discussed the control of insect pests by radiation sterilization techniques. As in previous years, JCAE members expressed considerable interest in the screw worm eradication program which Christenson said was saving Florida and southeastern livestock growers as much as $20,800,000 a year. Representative Price suggested that programs similar to the screw worm eradication program be made part of the atoms for peace program in foreign countries.

The final witness of the morning session was Dr. Frederick N. Andrews of Purdue University who delivered a statement on the applications of radiations and radioisotopes in farm animals. Representatives Price and Holifield raised a number of questions about the cost and future use of the Liquid Scintillation Detector now in the final stages of construction at Purdue. The counter, financed by a $54,000 grant from the AEC, will be used, said Dr. Andrews, for a variety of studies in agriculture, public health, and biological research. Such studies would include research on the genetic improvement of swine, evaluation of the effectiveness of nutritional experiments, and chemical residue research. Both Price and Holifield expressed interest in the development of a larger scintillation counter and commented that perhaps more money should be channeled to efforts such as those described by Dr. Andrews.

The JCAE resumed hearings at 2:30 p.m. with testimony from Dr. Seymour Shapiro of the Brookhaven National Laboratory on the role of radiation in the production of new plant varieties. Dr. Shapiro described the work being done at Brookhaven in the development of new varieties of economically important plants through the use of radiation and discussed a number of new variety plants which have been released to farmers as a direct consequence of radiation-induced mutations. In response to a question from Mr. Ramey on commercial operations, Dr. Shapiro noted that the Nuclear Science and Engineering Corporation in Pittsburgh, Pennsylvania, has begun to irradiate plants and that Brookhaven is now referring new inquiries to this company.

Mr. Ramey also asked whether Shapiro felt that the financial support being given the program was adequate. Shapiro did not give a direct answer to the question but left the impression that a more thorough job could be done with increased support. Representative Hosmer told Shapiro that he has "a good deal of trouble reconciling the expenditure of public funds on producing nicer flowers."

The next three witnesses discussed applications of radioisotopes in studies of water problems. Dr. Vaughan T. Bowen of the Woods Hole Oceanographic Institution described the use of radioisotope tracers in determining the diffusion, dispersion, and circulation of ocean waters. He told the Committee that results from their studies thus far indicated that there is a vertical movement of water in the oceans which may have some effect on standards used in radioactive waste disposal.

Dr. L. L. Thatcher of the U. S. Geological Survey discussed the use of tritium in ground water tracing and described a number of field projects set up by the Geological Survey. The final witness, Dr. Allyn Seymour of the Laboratory of Radiation Biology, University of Washington, delivered a statement on the use of

radioisotopes and radiation to study plant and animal life in fresh and marine waters. A few questions regarding the accumulation of isotopes in the Columbia River fish were raised by Representative Price. Dr. Seymour responded that the Hanford people have documented the levels of radioactivity that would occur in the water and noted that the Laboratory of Radiation Biology (University of Washington) is making radiological analyses of biological samples being collected at the mouth of the Columbia River. Seymour concluded his presentation by expressing his conviction that much greater attention should be paid to marine and fisheries research.

FORM AEC-254
(9.47)

DATE:

INDEX: MH&S-3-Radiation

[redacted]

TO:

FROM:

SUMMARY: AEC 859/6: STUDY ON EFFECTS OF FALLOUT. This report has been prepared in response to a memo dtd. 11-7-60 from Lt. General Thomas F. Hickey, Director, Net Evaluation Subcommittee of the NSC, to the Chairman, AEC, requesting assessment of the long-term effects of radioactive fallout resulting from each of three hypothetical nuclear exchanges between the US and the Sino-Soviet Bloc.

FILED:

INDEXER: MH&S-3-Radioactive Fallout

REMARKS: date of paper: 3-31-61

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

3-31-61

☆ U. S. GOVERNMENT PRINTING OFFICE—1955—962606

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

March 27, 1961

MEMORANDUM FOR CHAIRMAN SEABORG
COMMISSIONER GRAHAM
COMMISSIONER OLSON
COMMISSIONER WILSON

SUBJECT: JCAE HEARINGS - RADIATION USES IN THE LIFE SCIENCES

The JCAE this afternoon opened a four day series of hearings on "Applications of Radioisotopes and Radiation in the Life Sciences." Since much of the testimony was and will continue to be quite technical, no attempt will be made to report it in detail, and memoranda on the hearings will be very summary.

The introductory statement was made by Dr. Charles L. Dunham, and reviewed progress since the JCAE's last hearings on the same subject in 1956. Representative Price queried Dunham about recent curtailments in the isotopes support program and the effect of this curtailment on the smaller institutions. Dunham replied that the cost of the isotopes is not the significant cost in the research involved, and that while some hardship might occur, this would not generally be the case.

Price also inquired about the relatively small enrollments in the AEC's summer institutes for small colleges; Dunham replied that the enrollment is about "what the traffic will bear."

There were several questions from Representatives Price and Van Zandt on the utilization of the AEC's medical treatment facilities, and Dunham's replies indicated that all such facilities were only partially used, mainly because of lack of funds. In response to a specific question by Representative Price, Dunham stated that for FY 62 the biology and medicine program had requested $54.5 million and had received $60 million.

Dr. W. D. Armstrong of the University of Minnesota Medical School was the next witness, and described the important advances being made in dental research through the use of radioisotopes. JCAE questions were confined to the matter of water fluoridation and the reasons for widespread public opposition to it.

X Dunham

Dr. Clarence Lushbaugh of the Los Alamos Scientific Laboratory, described the use of radiation in the diagnosis of disease and particularly techniques in whole-body counting. In concluding, he said that increased use of measuring devices in clinical medicine and diagnosis seems assured, "because of the simplicity and facility of their operation and because of their great radiosensitivity and counting precision."

Dr. Cornelius A. Tobias, Professor of Medical Physics discussed high energy radiations in biological research and therapeutic investigation. Representative Price showed considerable interest in Tobias' statement that "there is a great gap where no accelerator is available" for biomedical research.

The day's final witness was Dr. Robert J. Hasterlik of the Argonne Cancer Research Hospital, who discussed advances in treatment of malignancies with radiation. Committee members showed interest in the new availability of iodine^{125} and its advantages over conventional iodine^{131}.

Hasterlik summarized: "Certain trends in the use of radiations from isotopes and high energy producing machines have been outlined which may result in the possibility of increased cure rates or enhanced length of survival, in comfort, for those persons who could not be cured of their malignant tumors or adequately treated by older, conventional methods."

Richard X. Donovan
Special Assistant to the
General Manager (Congressional)

cc: All Staff

M H & S - Radiation

UNCLASSIFIED

March 8, 1961

AEC 604/49

COPY NO. 58

ATOMIC ENERGY COMMISSION

RADIATION RESOLUTION ADOPTED BY 14TH WORLD HEALTH ASSEMBLY

AEC 604/49

Note by the Secretary

The General Manager has requested that the attached memorandum from the Assistant General Manager for International Activities be circulated for the information of the Commission.

W. B. McCool
Secretary

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3.8.61

UNCLASSIFIED

UNITED STATES GOVERNMENT

Memorandum

TO : A.R. Luedecke, General Manager

DATE: February 28, 1961

FROM : John A. Hall, Assistant General Manager for International Activities

SUBJECT: RADIATION RESOLUTION ADOPTED BY 14TH WORLD HEALTH ASSEMBLY

The 14th World Health Assembly of the World Health Organization adopted at its final session on February 24, a resolution on "radiation health, including protection of mankind from ionizing radiation hazards whatever their source."

The Monaco delegation pressed for the adoption of a paragraph in the resolution calling for the prohibition of "all discharge of radioactive waste into water courses or the sea, to the extent that safety of such discharge has not been proved."

The United States delegation strongly opposed the inclusion of this paragraph and sought the adoption of an alternative one. The paragraph proposed by Monaco was adopted by a vote of 29 for, 15 against (U.S.) with 26 abstentions. In view of the adoption of this paragraph, the U.S. was among the 25 abstaining on the vote on the resolution as a whole.

A report from the U.S. delegation has not been received that would help to explain the Monaco action. As soon as the delegation returns to the U.S., I shall be in communication with the Department of State concerning action that might be taken on this matter. The text of the two pertinent paragraphs follows:

> "Requests Director General participate, in consultation with IAEA and other competent and interested international agencies, in sponsoring and stimulating research and studies aimed at establishment of acceptable standards and regulations to prevent pollution of sea and other international waterways by radioactive materials in amounts which adversely affect man; (paragraph 5)
>
> "Request urgently all members of WHO to prohibit all discharge of radioactive waste into water courses or sea, to extent that safety of such discharge has not been proved and to promote research as referred to in (5) above;" (paragraph 6)

While the AEC was not represented on the delegation, it was anticipated that waste disposal problems might be discussed at the WHO assembly. The position papers and instructions to the delegation were discussed and cleared with the AEC.

[redacted] MH 5-3

[redacted]

March 1, 1961

AEC 604/48

COPY NO. 61

AEC 604/48

ATOMIC ENERGY COMMISSION

RECENT REPORTED INCREASES OF I-131 IN THYROIDS OF SHEEP, CATTLE, SWINE AND MAN

Note by the Secretary

The General Manager has requested that the attached memorandum from the Director of Health and Safety be circulated for the information of the Commission.

W. B. McCool
Secretary

DISTRIBUTION	COPY NO.	DISTRIBUTION	COPY NO.
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[redacted]

3-1-61

[redacted]

[redacted]

UNITED STATES GOVERNMENT

Memorandum

TO : William F. Finan, Assistant General Manager for Regulations and Safety, GM

DATE: February 21, 1961

FROM : Nathan H. Woodruff, Director
Office of Health and Safety

N.H.W.

SUBJECT: RECENT REPORTED INCREASES OF I-131 IN THYROIDS OF SHEEP, CATTLE, SWINE AND MAN

HS:HP:JVN

Dr. Lester Van Middlesworth, at the University of Tennessee, has been monitoring the thyroids of sheep, cattle, swine and man and sending the data to the Division of Biology and Medicine, since about 1956. He has had samples shipped to him for I-131 analysis from points throughout the United States and the rest of the world.

On several occasions since the cessation of bomb-testing in the fall of 1958, Dr. Van Middlesworth has reported peak concentrations of I-131 in thyroids from the Nashville-Memphis and Seattle areas. Since it was felt that this material probably could not have originated as bomb debris, other potential sources of I-131 were investigated. In comparisons of Van Middlesworth's maxima with periods of increased rates of emission from Hanford and other AEC facilities, a high degree of correlation was observed.

Similar periods of peak iodine concentrations were observed at points in Europe and Asia. Most such iodine concentration peaks observed in Europe could be correlated with peak rates of emission from British facilities. However, some of the peaks observed in Europe and Asia may have been connected with periods of increased release rates at Atomic Energy Commission facilities in the United States. The possibility that these observed increases in thyroid content of I-131 at widely separated points around the world were indicative of general, low-level contamination, originating in AEC facilities, cannot be discounted. The concentrations of I-131 involved are low, orders of magnitude below maximum permissible body burdens, as defined by ICRP.

[redacted]

[redacted]

[redacted]

Information about Van Middlesworth's data was received from the Division of Biology and Medicine in November 1960. Since that time, conferences have been held with the staff of the Divsion of Production. A comprehensive report has been requested from HAPO, through Hanford Operations Office, describing existing I-131 removal systems at Purex and Redox and possible means of reducing amounts discharged.

Although the concentrations being reported are definitely not an undue hazard to public health and safety, they are easily measurable. It is conceivable that, if these world-wide levels were to be attributed in the world press to U. S. peace-time production, an incident with international ramifications could result. We will keep current with the problem, checking Van Middlesworth's data as it comes in, and reviewing the Hanford report when it is received.

[redacted]

DEC 28 1960

Mr. James T. Ramey
Executive Director
Joint Committee on Atomic Energy
Congress of the United States

Dear Mr. Ramey:

This will acknowledge receipt of your letter of December 16, 1960, advising us of your current plan to hold a hearing in March 1961 on the subject "Radiation and Radioisotopes Used in Biology, Medicine and Agriculture."

You may be assured that Drs. Charles L. Dunham, James L. Liverman and John Bonner of the Division of Biology and Medicine will assist you and your staff to the fullest towards meeting the objectives of this hearing.

Sincerely yours,

(Signed) Dwight A. Ink, AGM

Assistant General Manager

cc: BMA
OGM (2)
CONG. REL (3)
Secretariat (For Info Paper)

See memo dtd 3-27-61

A-48-60

MH. S - 3

UNITED STATES GOVERNMENT

Memorandum

~~OFFICIAL USE ONLY~~

Reference Section

TO : Don S. Burrows, Controller

DATE: DEC 16 1960

FROM : W. B. McCool, Secretary

SUBJECT: AEC BUDGET FOR THE ATOMIC BOMB CASUALTY COMMISSION

SYMBOL: SECY:AHE

In a revision to the minutes of the Financial Report on FY 1960 and First Quarter FY 1961 presented at Meeting 1675, Commissioner Graham has requested steps be taken to limit future funds in support of the Atomic Bomb Casualty Commission to the amounts budgeted for that purpose.

cc: General Manager
Deputy General Manager
Asst. General Manager
Asst. Gen. Mgr. for R&ID
General Counsel
Director, Research

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Copy filed: Budget-8

12-6-60

UNITED STATES GOVERNMENT

Memorandum

~~OFFICIAL USE ONLY~~

TO : File

DATE: December 16, 1960

FROM : W. B. McCool, Secretary

SUBJECT: AEC BUDGET FOR THE ATOMIC BOMB CASUALTY COMMISSION

SYMBOL: SECY:AHE

1. This will confirm that Mr. James Miller, Special Assistant to Commissioner Graham informed Mr. Ewing, Secretariat, on December 7, 1960 of a revision to the Commissioner's remarks as reported on page 8 of the minutes of Meeting 1675 as follow:

> "Discussing the Atomic Bomb Casualty Commission, Mr. Graham said particularly in view of the recent developments in the international monetary situation it would seem appropriate to control AEC's expenditures in support of the ABCC and requested that the staff take steps to limit future costs to amounts budgeted for this purpose."

2. I have informed Mr. Burrows of Commissioner Graham's request by memorandum this date.

cc: Mr. Graham

copies filed:
Budget-8
Budget-62

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12-16-60

AEC

MNeS-3

UNITED STATES
ATOMIC ENERGY COMMISSION
Washington 25, D. C.

DATE ISSUED DEC 12 1960 12

No. C-249
Tel. HAzelwood 7-7831
Ext. 3446

FOR IMMEDIATE RELEASE
(Monday, December 12, 1960)

AEC AWARDS CONTRACT TO CONSUMERS UNION FOR DIETARY RADIOACTIVITY STUDY

The U. S. Atomic Energy Commission has awarded a research contract to Consumers Union, Mount Vernon, New York, for partial support of studies of radioactivity in sample diets prepared in 25 cities in 22 states. The AEC will provide $20,000 for the 1961 cooperative study which is a continuation of a 1959 survey made by Consumers Union independent of Government support. It will be directly related to dietary studies carried out by the AEC's Health and Safety Laboratory at New York.

The purpose of the study is to obtain further information on radioactivity in the total diet in the United States. In all of the cities, total diet samples will be analyzed for strontium-90 and naturally occurring calcium and radium-226. Among the 25 cities where total diets will be sampled will be New York City, Chicago and San Francisco where the Health and Safety Laboratory is currently analyzing individual food items for radioactivity. The Consumers Union study will also include, in these and possibly several other cities, analyses for man-made radioisotopes cesium-137, cerium-144, plutonium-239 and zinc-65 as well as the naturally occurring radioisotope lead-210. Chemical analyses will be made also for natural isotopes of potassium.

The AEC's program is one of research rather than monitoring foods and diets throughout the United States, and the results obtained from this research project may be useful in estimating regional dietary levels of radioactivity.

(more)

Copy filed: Materials-12-Food Processing

12-1260

The diet samples will consist of three prepared meals per day for a two-week period or a total of 42 meals and snacks of teenagers. In the three metropolitan areas (San Francisco, Chicago and New York), the study will also include diets of several age groups and economic levels. In all 25 cities, food will be purchased from local retail markets and prepared locally as for consumption. Then the meals will be packaged in special plastic containers and shipped to Consumers Union's consultant radiochemistry laboratories. In some areas separate samples of milk and whole-wheat products included in the total diet samples will be analyzed in order to estimate their contribution to the radioactivity of the diet.

The principal investigators for the contract will be Mr. Irving Michelson, Director of Public Service Projects of Consumers Union, and Dr. Cyril L. Comar, Director of the Laboratory of Radiation Biology of Cornell University and head of Cornell's Department of Physical Biology. The AEC's Health and Safety Laboratory in New York will assist in some technical phases of the study. The New York Operations Office will administer the contract.

The 25 cities included in the AEC-CU project are: Los Angeles and San Francisco, California; Boulder, Colorado; Washington, D.C.; Coral Gables, Florida; Atlanta, Georgia; Nampa, Idaho; Chicago, Illinois; Des Moines, Iowa; Louisville, Kentucky; New Orleans, Louisiana; Boston, Massachusetts; Duluth and St. Paul, Minnesota; St. Louis, Missouri; Bozeman, Montana; Albuquerque, New Mexico; New York, New York; Grand Forks, North Dakota; Stillwater, Oklahoma; Pittsburgh, Pennsylvania; Memphis, Tennessee; Austin, Texas; Hampton, Virginia; and Seattle, Washington.

- 30 -

121260

FORM AEC-324
(6-47)

DATE:

[redacted]

INDEX: MH&S 3 Radiation

[redacted]

TO:

FROM:

SUMMARY: AEC 544/11 - HEALTH HAZARDS IN URANIUM MINING
Exchange of letters with Flemming, HEW, re an early meeting with the Governors of the principal uranium mining states to discuss with them the problem of radiation hazard in the uranium mines.

FILED: MH&S 11

INDEXER: date of paper: 12-6-60

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

09-9-61

☆ U. S. GOVERNMENT PRINTING OFFICE: 1961 - 940407

FORM AEC 204
(9 47)

DATE.

[redacted]

11 11

INDEX: MH&S 3 Radiation

[redacted]

TO:

FROM:

SUMMARY: Memo for the Commissioners frm. the Secy attaching reports covering Dr. Dunham's attendance at the meeting of the UN Scientific Cmtee. on Effects of Radiation, in Geneva and his visit to the Atomic Bomb Casualty Commission in Japan.

FILED: Security 4-5 Visits to Foreign Countries

INDEXER: date of memo: 11-14-60

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

11-14-60

☆ U. S. GOVERNMENT PRINTING OFFICE—1955—362606

FEDERAL RADIATION COUNCIL
EXECUTIVE OFFICE BUILDING
WASHINGTON 25, D.C.

OCT 31 1960

Dear Senator Humphrey:

Your letter of August 16, 1960 refers to the establishment of the Federal Radiation Council by Executive Order 10831, August 14, 1959. This action was recommended to the President as the result of a special study of radiological health activities in the Federal agencies conducted at Presidential request by the Director of the Bureau of the Budget, the Secretary of Health, Education, and Welfare, and the Chairman of the Atomic Energy Commission. This study indicated that the provision of guidance on radiation protection standards was the problem area for which special consideration was necessary.

While adequate data to provide a firm basis for evaluating radiation effects are lacking, current scientific evidence suggests that there may be no threshold for radiation effects on man. If this is true, and it is prudent to adopt this assumption at the present time, it is not possible to establish radiation protection standards of exposure which will entail no risk to the population so exposed. The establishment of radiation protection standards, therefore, involves considerations other than scientific data on radiation effects. It involves a balancing of the risks from radiation exposure against the benefits from the many useful applications of radiation.

The development of general guidance on radiation protection standards involves a generalized, nonspecific [illegible] benefits from the many applications of radiation [illegible] the over-all biological risk. When applying the results of [illegible] balance to any specific application of radiation, it is [illegible]

10-31-60

determine whether either side of the risk-benefit balance is markedly different in a specific case. This is the basis for recommendation 7 in the Federal Radiation Council Memorandum for the President, Radiation Protection Guidance for Federal Agencies, quoted in your letter of August 16, 1960.

The above Memorandum for the President also states: "The Council will follow the activities of the Federal agencies in this area and will promote the necessary coordination to achieve an effective Federal program." The measures which the Council is taking to achieve this end are outlined in a Memorandum for the President, dated September 2, 1960. A copy of this memorandum is attached for your information.

The role of the Federal Radiation Council with respect to the operating agencies was discussed at the recent Joint Committee on Atomic Energy hearings. On June 2, 1960, Mr. Elmer Staats, Deputy Director of the Bureau of the Budget, described basic radiation protection guidance as:

> "... a manifestation of Presidential leadership and direction over the affairs of the executive branch. Like most directives of this nature and at this level, it provides for the exercise of judgment on the part of the participants. These agencies with direct statutory obligations for safety standards will continue to fulfill them. The Presidential guidance embodies sufficient flexibility to accommodate such obligations.
>
> "I would assume that any agency head intending to promulgate operating standards distinctly at variance with the Radiation Protection Guides approved by the President would discuss the matter in advance with the Council. There is always the possibility that the Council might wish to reconsider its recommendations if new evidence of sufficient import were involved. I would also assume that if the intended variation was of significant importance, the agency head would discuss his proposed action with the President.

"In the final analysis the responsibility for operating standards lies with the particular agency involved."

The above testimony also reflects the Council's views. The Council is firmly of the opinion that it should not attempt to prejudge the activities of individual departments and agencies, and believes that the mechanism described in the attached Memorandum to the President will provide adequate assistance to him in achieving the desired goal of protecting man from the undesirable effects of radiation.

If I can be of any further assistance to you in clarifying the role of the Federal Radiation Council, please do not hesitate to get in touch with me.

Sincerely yours,

/s/

Arthur S. Flemming
Chairman

The Honorable Hubert H. Humphrey
Committee on Foreign Relations
United States Senate
Washington 25, D. C.

M H & S 3-Radiation

AEC 604/47

UNCLASSIFIED

October 24, 1960

COPY NO. 57

ATOMIC ENERGY COMMISSION

ANNUAL REPORT TO THE FEDERAL RADIATION COUNCIL ON AEC RADIATION PROTECTION ACTIVITIES UNDER RADIATION PROTECTION GUIDANCE FOR FEDERAL AGENCIES

Note by the Secretary

The following enclosures, submitted by the Director, Office of Health and Safety, are circulated for the information of the Commission:

Enclosure I - Memorandum of October 13, 1960, from Arthur S. Flemming, Chairman of the Federal Radiation Council, to the President on the subject of Radiation Protection Activities of Federal Agencies under Radiation Protection Guidance for Federal Agencies Promulgated by the President

Enclosure II - Letter of July 8, 1960, to Chairman McCone from Chairman, Federal Radiation Council

Enclosure III - Response of July 19, 1960, to the Federal Radiation Council by the General Manager

W. B. McCool

Secretary

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X. Gen. M - Federal Radiation Protection

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ENCLOSURE I

IMMEDIATE RELEASE OCTOBER 13, 1960

James C. Hagerty, Press Secretary to the President

- -

THE WHITE HOUSE

THE WHITE HOUSE TODAY MADE PUBLIC THE FOLLOWING MEMORANDUM TO THE PRESIDENT FROM ARTHUR S. FLEMMING, SECRETARY OF HEALTH, EDUCATION, AND WELFARE, AND CHAIRMAN OF THE FEDERAL RADIATION COUNCIL

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Radiation Protection Activities of Federal Agencies under Radiation Protection Guidance for Federal Agencies Promulgated by the President

Pursuant to a decision of the Federal Radiation Council on July 5, 1960, a letter* was sent from the Chairman of the Council to all Federal agencies considered as having radiation protection responsibilities which might fall under the Radiation Protection Guidance for Federal Agencies** promulgated by the President, May 13, 1960. The purpose of the letter was to determine the degree to which the radiation protection activities of the Federal agencies were being conducted in conformance with this guidance. The letter also requested information on any deviations from the Guides which were planned under the provisions of Recommendation 7, which states:

> "The Guides may be exceeded only after the Federal agency having jurisdiction over the matter has carefully considered the reason for doing so in light of the recommendations in this paper."

The following is a list of the agencies to which the letter was sent:

Department of Agriculture	Post Office Department
Department of Commerce	Department of the Treasury
Department of Defense	Atomic Energy Commission
Department of Health, Education, and Welfare	Federal Aviation Agency
Department of the Interior	Interstate Commerce Commission
Department of Justice	Office of Civil & Defense Mobilization
Department of Labor	Veterans Administration

* Enclosure II, hereto.
** Draft circulated in AEC 604/46; copy as published on file in the Office of Health and Safety and the Office of the Secretary

The replies indicate that the Federal agencies are conducting their radiation protection activities in accordance with the Presidential guidance. Furthermore, the agencies indicated that as of the date of their report no deviations from the Guides were in effect or being planned.

In order to meet its statutory responsibility, "to advise the President on radiation matters directly and indirectly affecting health, including guidance to Federal agencies on radiation standards," the Council felt that a regular mechanism for receiving reports from the agencies should be developed. The following mechanism has been established:

1. A regular annual report by each agency on August 1 as to any operating criteria or regulations revised, adopted, or promulgated during the previous year under the Radiation Protection Guidance for Federal Agencies promulgated by the President.

2. Prompt notification of the Council of the adoption or promulgation of any new or revised operating criteria or regulations in areas covered by approved Radiation Protection Guides. Cases involving levels in excess of such Guides are to be noted.

Consistent with Recommendation 7, the Council will continue to follow the practices of the Federal agencies as set forth in these reports and will bring to your attention such matters as seem appropriate.

/s/ ARTHUR S. FLEMMING
Chairman

# # # # #

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ENCLOSURE II

FEDERAL RADIATION COUNCIL
EXECUTIVE OFFICE BUILDING
WASHINGTON 25, D.C.

July 8, 1960

Dear Mr. McCone:

In the May 18, 1960 issue of the Federal Register there was published a Memorandum for the President from the Chairman of the Federal Radiation Council containing seven recommendations which were approved by the President for the guidance of Federal agencies on radiation protection standards.* This action was pursuant to Executive Order 10831 and Public Law 86-373 which established the Federal Radiation Council to "advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards.

The Memorandum for the President* and the Staff Report to the Federal Radiation Council, "Background Material for the Development of Radiation Protection Standards," copies of which are enclosed for your convenience, discuss in detail the method by which the recommendations of the Federal Radiation Council were developed. It was pointed out that the formulation of radiation protection standards involves a balancing of the risks to man of exposure to ionizing radiation against the benefits to be derived from the many important usages to which radiation is applied. The staff of the Council, in addition to conducting a careful review of the current information on the hazards of ionizing radiation, consulted with staff members of many of the Federal agencies concerned with radiation protection in order to define the problem areas to be provided for in recommended protection standards.

In order to provide continuing advice to the President on radiation protection standards, the Federal Radiation Council must have information from which it can determine the extent to which its recommendations represent an appropriate balance between the requirements of health protection and the beneficial uses of radiation and atomic energy. To this end, your assistance is requested.

* Copies on file in the Office of Health and Safety and in the Office of the Secretary. filed in Safety Package

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Specifically, the Federal Radiation Council would like a report on radiation protection activities to be conducted by the Atomic Energy Commission under the Radiation Protection Guidance for Federal Agencies promulgated by the President. In particular, the Council would like to be informed on the operating standards developed by your agency and if any deviations from the Guides are planned under the provisions of Recommendation 7 which states:

> "The Guides may be exceeded only after the Federal agency having jurisdiction over the matter has carefully considered the reason for doing so in light of the recommendations in this paper."

On the basis of the reports received from the agencies, it is the plan of the Council to develop a regular mechanism for receiving such reports and we would welcome your suggestions on this matter. In order to expedite the development of a routine pattern, the Council would appreciate receiving the report from your agency by August 1. 1960. Any questions you may have about this report may be directed to the Secretary of the Federal Radiation Council, Dr. Donald R. Chadwick, code 113 - extention 2505.

Sincerely yours,

Arthur S. Flemming
Chairman

The Honorable John A. McCone
Chairman, Atomic Energy Commission
Washington 25, D. C.

Enclosure II

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ENCLOSURE III

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D. C.

July 19, 1960

The Honorable Arthur S. Flemming
Chairman, Federal Radiation Council
Executive Office Building
Washington 25, D. C.

Dear Mr. Flemming:

This is in reply to your letter of July 8, 1960 addressed to Mr. McCone requesting a report from the Atomic Energy Commission with respect to its radiation protection activities and their relationship to the guidance offered by the Federal Radiation Council to Federal agencies.

The radiation protection standards currently used by the Atomic Energy Commission are in substantial agreement with the guides formulated by the Council. We know of no cases where we are exceeding these standards and we have no plans for doing so. If at some future time it should appear appropriate to plan activities expected to result in exposures to radiation higher than those specified in the Federal Radiation Council guides, the situation will be discussed with the Council.

We are in the process of revising both the instructions governing exposures to radiation in connection with the operation of our own installations and the regulations prescribing standards of radiation protection for activities licensed by the Atomic Energy Commission. Copies of these will be furnished to the Council when completed.

Sincerely yours,

/s/ A. R. Luedecke

General Manager

DATE:

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[redacted]

TO:

FROM:

SUMMARY: AEC 957/14 - MEETING WITH COMMISSIONER OLSON AND MEMBERS OF THE AFL-CIO SUBCOMMITTEE ON RADIATION STANDARDS AND LEGISLATION - Memo to the Gen. Mgr. frm. Finan attaching Commissioner Olson's memo re the above Mtg. & the complaints about the manner in which the Staff had been working with them recently in connection with Part 20 of the Federal-State relationship matters.

FILED: Legal 4 Amend. to the AE Act

INDEXER: date of paper: 9-16-60
date of Olson memo: 8-12-60

REMARKS:

U. S. ATOMIC ENERGY COMMISSION

CORRESPONDENCE REFERENCE FORM

9-16-60

FORM AEC-204

★ U. S. GOVERNMENT PRINTING OFFICE: 1949 - 838163

United States Senate

COMMITTEE ON FOREIGN RELATIONS

August 16, 1960

The Honorable
Arthur S. Flemming
Secretary, Department of Health
  Education and Welfare
Washington 25, D. C.

Dear Mr. Secretary:

One of the recommendations of the first report of the Federal Radiation Council was recently brought to my attention. I would very much appreciate your help in clarifying my understanding of it.

The recommendation, number 7 as published on page 4 of the July 1960 Quarterly Report on "Radiological Health Data" of the Department of Health, Education and Welfare, reads as follows:

> "The Federal agencies apply these Radiation Protection Guides with judgment and discretion, to assure that reasonable probability is achieved in the attainment of the desired goal of protecting man from the undesirable effects of radiation. The Guides may be exceeded only after the Federal agency having jurisdiction over the matter has carefully considered the reason for doing so in light of the recommendations of this paper."

Is it correct to interpret these sentences as giving the individual agencies the power to be judges in their own cases? Does the Atomic Energy Commission or the Department of Defense, in other words, have the right to exceed the guides laid down by the Council without reference to the Council or to any other Federal agency?

As I understood the intent of the amendments to the Atomic Energy Act, passed by the Congress last fall, the Federal Radiation Council was established to determine basic standards of radiation protection for approval by the President and adoption by other Federal agencies in the form of operating standards.

8-16-60

If my understanding of the intent of the law is correct, it then seems to me that recommendation 7, as quoted above, may provide a loophole which gives the agencies as free a hand in setting their own standards as they had before the enactment of the 1959 amendments.

I would be most grateful for your comments on the questions I have raised and for some clarifying statement from you on the nature and real powers of the Federal Radiation Council as it is now established under Executive Order 10831 and Public Law 86-373. Specifically, what procedures are followed in the case of a Federal agency wishing to exceed the guides recommended by the Radiation Council?

Sincerely,

Hubert H. Humphrey