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Dec. 16, 1954
R. W. Hudson A. Tonce
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MINUTES

Forty-second Meeting of the General Advisory Committee
to the U. S. Atomic Energy Commission

November 3 and 4, 1954
Washington, D. C.

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DELETED VERSION ONLY

CLASSIFICATION CANCELLED
BY AUTHORITY OF Topic 1.52 CG WT 4
BY Jose Diaz DATE 12/18/80
BY Wilbur A. Strauser DATE 12-18-80

NON-CCRP

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FIRST SESSION
(November 3, 1954)

The meeting began at 9:10 a.m. All members, the Secretary, and

Executive Session

Mr. Tomei were present.

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Mr. Nichols raised the question of the release of information

Fall-out on fall-out, which, he said, was a serious problem, with international aspects. How such information would affect our relations with allies was very important. Dr. Rabi asked whether we are actually guarding any information -- how much is already known by our allies? Dr. Libby said that the British have constructed a good and accurate map of a

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fall-out ellipse from a hypothetical burst by scaling up data from the Jangle test. He also referred to an article in the Bulletin of Atomic Scientists, in which fall-out estimates too low by a factor of five to ten were given. Apparently the information is not completely in the public domain; whether it is worthwhile to restrict it is another question.

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SECOND SESSION
(November 3, 1954)

At 1:30 p.m. the Committee met with Gen. K. E. Fields, Dr. P. C.

Weapon Matters

Fine, and Dr. von Neumann. All members and the Secretary were present. Mr. Tomei was not present.

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At 2:10 p.m. Dr. Herbert Scoville, of AFSWP, joined the meeting to discuss weapon effects.

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Dr. Scoville next discussed the delayed radiation effects due

Fall-out to fall-out. He showed a map of isodose contours as inferred from the CASTLE tests. The highest contour shown was 50 r/hr at D + 1 day. He indicated that the highest contamination of Bikini was about the same as that at Rongelap. Induced activity is not important; it all

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goes up. The integrated local fall-out accounted for 50-60% of the fission products. Induced sodium activity was only a few percent of the total.

At 2:45 p.m. Gen. Fields and Col. Huston left the meeting.

Dr. Scoville emphasized the lack of very high contamination close in with the big shots. However, there are large uncertainties, since the Eniwetok shots are not truly representative of dry land shots. [redacted] Dr. McMillan said that it would be very important to fire a high yield shot on dry land. Dr. Scoville agreed. He said the central question is how to evaluate near misses on runways. It is not known how the contamination scales close to the crater.

There was some discussion of the protection afforded by foxholes. One measurement indicated that a man in a foxhole would get 10% of the dose he would have received without this protection.

Integrated doses to H + 50 hours, based on CASTLE data, were given as follows.

2500 r	over	1400	square	miles (largest dose you get anywhere)
1000 r	"	3400	"	"
500 r	"	5400	"	"
250 r	"	8500	"	"
100 r	"	13000	"	"

These results lead to two conclusions which are very important from the standpoint of civil defense: (1) one should take cover during

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this period, and (2) at no place is the dose so high that it cannot be protected against. A frame house affords a protection factor of about two, a basement about ten.

Dr. Scoville presented a table of estimated areas for various doses in different types of terrain. The extreme entries were as follows for the integrated dose from a 15 MT shot at H + 2 days.

	in rural areas	in open in city	in average shelter in city
205 r	8800 sq. mi.	7500 sq. mi.	2100 sq. mi.
630 r	4600	3500	320

The next effects item was atomic weapons for air defense. For a 2 KT burst at 40,000 ft the 2000 and 5000 rem radii are greater than the maximum lethal gust radius. The 2000 rem radius is about 1500 yd. The relative contribution of nuclear radiation effects changes markedly with altitude. The preliminary estimates of effects on ballistic missiles are discouragingly small.

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THIRD SESSION
(November 4, 1954)

This session began at 9:30 a.m. All members, the Secretary, and Gabriel-Sunshine Mr. Tomei were present. Dr. J. C. Bugher, Dr. R. A. Dudley, Gen. Fields, and Dr. Libby were present for a discussion of Project Gabriel-Sunshine.

Dr. Bugher reported that the fall-out picture had become firmer, Fall-out although more complicated, in the last year or so. Local fall-out can be predicted over a wide range of yields as to amount, area and pattern. With large yield weapons much of the debris goes up into the stratosphere; as a result the world-wide contamination becomes more uniform with larger weapons.

After one of the big shots iodine-131 can be picked up anywhere I-131 in the world. Fall-out on plant leaves and direct animal consumption

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thereof provides an ingestion mechanism which by-passes the root route. I-131 can be detected in thyroids all over the U.S., and it maps out the fall-out pattern. It is estimated that everyone in the U.S. received a dose of 1 rep in the thyroid as a result of CASTLE. The Rongelap islanders got 170 r to the thyroid from I-131. A classification problem arises in that many people are detecting I-131 from the Russian shots in sheep and cattle thyroids. Dr. Bugher cautioned against the use of milk from heavily contaminated areas.

Sr-90

The strontium-90 surveys are showing a consistent pattern; increasing study is being required. The body appears to discriminate against strontium in favor of calcium; "we are living in a non-equilibrium situation." Sr-90 in the New York milk supply has increased. There is some evidence from balloon samples for Sr fractionation.

Some overlay maps showing world-wide fall-out (extrapolated to January 1, 1955 by a $t^{-1.2}$ law) were displayed. The numbers ranged from 1 to 60 mc mixed f.p./mi^2. (This unit is approximately the same as dpm Sr-90/ft^2.) The accumulation in the southern hemisphere, Dr. Fisk observed, seems to give evidence for prompt atmospheric mixing between the northern and southern hemispheres. The fall-out in the U.S. during March 1 - May 1, 1954 ranged up to 100 mc/mi^2.

Pu

Dr. Rabi asked about plutonium fall-out. Dr. Bugher said that it had been detected in land samples after the March 1 shot and in the

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excreta of the Rongelap islanders. It was too diluted in the sea-water to be detectable. Dr. Dudley mentioned that it has not been looked for in the U.S., but since there is not much fractionation a proportionate amount has probably fallen out here.

Japanese Fishermen

According to Dr. Bugher, the Japanese fishermen had about the same radioactivity ingestion as the Rongelap islanders, or a little less. The accumulation on their skin was about the same, but since there was a longer contact time (ca. two weeks) more skin lesions developed. The death of one of the fishermen is believed to have been due to infectious hepatitis resulting from the large number of small blood transfusions.

Dr. Wigner asked if there was any new information on the radiological hazard of airborne radioactive particles accumulating in the lung. Dr. Bugher said that this seemed to be a lesser hazard (by ca. 1/1000) than whole body exposure to gamma radiation. It has not been substantiated that such particles cause lung cancer. In answer to a question from Dr. Johnson, he said that strontium accumulates in the bones and turns over very slowly unless there is extensive demineralization.

At 10:10 a.m. this part of the session was concluded, and the visitors left.

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FOURTH SESSION
(November 4, 1954)

Executive Session

The Committee met in executive session at 1:20 p.m. All members, the Secretary, and Mr. Tomei were present.

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At 2:45 p.m. Dr. Beams left the meeting.

Mr. Whitman mentioned that Dr. Libby had asked the Committee to

Fall-out comment on fall-out. Mr. Whitman said he felt the program was very important and should be strongly pursued. The GAC might well commend

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the work to date, as well as Dr. Bugher's presentation. He further commented on the "South Woodley article." He suggested that the fact that some fall-out information has come out in the public domain be noted and further suggested that a recommendation be made that the AEC increase the flow of information to the public in order to facilitate measures of Civil Defense. He said the policy of not telling the facts until complete information is at hand is not a good one. Dr. Rabi asked if these were the sentiments of the Committee, and it was so indicated. (Appendix B, item 6.)

This final session of the 42nd Meeting was adjourned at 2:50 p.m.

Richard W. Dodson
Secretary

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GENERAL ADVISORY COMMITTEE
to the
U. S. ATOMIC ENERGY COMMISSION
Washington 25, D. C.

November 23, 1954

Mr. Lewis L. Strauss, Chairman
U.S. Atomic Energy Commission
Washington 25, D.C.

Dear Mr. Strauss:

Herewith is the report of the 42nd meeting of the General Advisory Committee held in Washington on November 3 and 4. All the members were present. Owing to the fact that three new members had recently been appointed, the meeting was shorter than our usual three-day session. We regret that owing to circumstances beyond control most of the members of the Commission and the General Manager were unable to attend, which unfortunately greatly detracted from the value of this meeting.

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6) Fall-out

The Committee heard from Dr. Bugher a report of the status of Project Gabriel-Sunshine, and from Dr. Herbert Scoville of AFSWP a discussion of weapon effects which included the subject of radioactive fall-out. We continue to be impressed by the great importance, both short range and long range, of this subject. In the course of the discussions, which included reference to material appearing in the press with respect to civil defense, we reached the view that more information than is currently available to the public is urgently needed for purposes of civil defense. We recommend that the flow of such information to the public domain be accelerated.

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