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ROUTING AND RECORD SHEET

(M)

SUBJECT: (Optional)

FROM: *D*

EXTENSION

NO.

F 1

DATE

TO: (Officer designation, room number, and building)

DATE

RECEIVED

FORWARDED

OFFICER'S INITIALS

COMMENTS (Number each comment to show from whom to whom. Draw a line across column after each comment.)

NO.	DATE		OFFICER'S INITIALS
	RECEIVED	FORWARDED	
1.	<i>4/6</i>	<i>4/6</i>	<i>D</i>
2.			
3.	<i>4/8</i>		
4.			
5.	<i>4/9</i> <i>4/9</i>		<i>D</i>
6.	<i>4/12</i>	<i>4/26</i>	
7.			
8.			
9.			
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Information.

5. Attached is the data on the microwave hazard problem. My recommendation is that adequate measurements be undertaken intermittently in order to prevent unnecessary or hazardous exposure to U.S. personnel. You will note in *D* memorandum that the apparent exposure levels are considerably higher than Soviet standards permit should you wish to use this as a means of shutting off the power through diplomatic channels.

D

5-7 we would like to have a copy of this for our F

Supplied 4/29/65

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RELEASED

SEP 1983

457

(3)

SECRET

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5 April 1965

MEMORANDUM FOR: F

SUBJECT : Meeting with A on the
Moscow Microwave Exposure Hazard
Problem, 3 April 1965.

1. Attached is a memorandum prepared by Dr. A on the Moscow Embassy microwave exposure hazard problem. Graphs of radiation density for each of the wavelengths of interest and other data which formed the basis for this memorandum are also attached.

2. To paraphrase A conclusions and recommendations, personnel exposed to microwave radiations as described would not be harmed. However, the assumed maximum energy densities are less than an order of magnitude away from known harmful power levels. Therefore it is essential that the actual energy density be measured and plotted at building surface and inside and that continuous monitoring be done to detect any increase in energy which may be applied from time to time.

3. Once actual power levels are known, which we need to know from the point of view of past exposures as well as from the point of view of continued exposure, then a decision can be made as to whether or not the Soviets should be asked to shut the generators off.

4. In this connection it is important to take note of Soviet regulations concerning maximum permissible exposure to microwave radiations in the 2 KMC, 5 KMC and 9 KMC frequency regions, 3.3 cm, 6 cm and 15 cm respectively, to which our people are being exposed. The official Soviet maximum permissible exposure, during a full working day, to microwaves in the 1 to 12 cm band, as approved by the Chief State Sanitary Inspector of the USSR, Dr. V. Zhdanov, in Sanitary Regulation No. 273-58, published 26 November 1958, is 10 microwatts/cm². This is one thousand times less than the accepted American standard of 10 milliwatts/cm². Assuming a maximum exposure of our personnel of 21 milliwatts/cm², this would be 2100 times the maximum permissible exposure level acceptable to the Soviets themselves. Even though we consider the Soviet standard to be completely unrealistic, it

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SUBJECT: Meeting with A on the Moscow
Microwave Exposure Hazard Problem, 3 April 1965.

is real to them and should be quoted to them in any
diplomatic note of protest concerning this exposure of
our people. While measurements of the actual power
levels are being made, a search for any amendments or
changes which may have been made in Sanitary Regulation
273-58 can be completed.

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Attachments:

CONCUR:

D
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18. 1/2

Memorandum to Dr. D Project Monitor

The lens of the eye is the most sensitive indicator of microwave injury and this discussion will be limited to a treatment of this organ response. Thus, the lens will serve here as our indicator of radiation exposure hazards. When injured by microwave radiation, the lens forms a cataract.

In accordance with current state-of-the-art knowledge and clinical credibility relating to the parameters of personnel hazard associated with exposure to microwave radiation fields, my best estimate of threshold for cataractogenesis is at a power level of 100 mw/cm². This appears to be in the nature of an all-or-none reaction, and does not appear to be exposure time dependent. Cataracts resulting from microwave exposure usually are not clinically evident until after a latent period of months to years.

The personnel exposure problem presented in this case assumes the following parameters:

1. Three microwave generating sources with following characteristics:

2 KMC	producing	0.1 mw/cm ²	incident to the point of interest.
5 KMC	"	0.5 mw/cm ²	" " " " "
9 KMC	"	1.5 mw/cm ²	" " " " "

2. All three generators could be emitting simultaneously and therefore the total energy density could be 2.1 mw/cm².

3. Personnel inhabit a building at the point of interest.

4. It was assumed by the monitors that the energy densities quoted above could be greater by one order of magnitude; namely, a combined total energy density of 21 mw/cm².

Under the above conditions, it is my opinion that personnel may

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Memorandum to Dr.

D

Project Monitor

be permitted to inhabit the building under existing circumstances. However, in view of the currently accepted standard of 10 mw/cm^2 as the maximum permissible level of continual exposure to r-f fields, it is undesirable to permit this condition to continue indefinitely without more precise knowledge of the exact parameters of exposure.

In this connection, at the present time, U. S. Army, Navy and Air Force as well as the American Standards Association are advocating that the maximum permissible exposure levels be increased above 10 mw/cm^2 when time related. At the level of 20 mw/cm^2 , these authorities would advocate the following safe time limits of exposure:

Army/Air Force	12 minutes per each hour
Navy	48 minutes per each hour
ASA	30 minutes per each hour

The validity of these safe exposure times has not as yet been established but represent best estimates of these groups.

Therefore, I recommend the following:

1. Detailed study to determine the precise nature of the microwave fields including continuous versus pulsed emissions, repetition frequency of pulsed operations, peak and average power densities, standing wave plots, multipath summations including topographical reflections from intervening buildings and ground and return from internal corner reflectors (which may have been incorporated originally or later installed) and requisite continuous monitoring.
2. Selection of suitable copper screening and mandatory coverage of all window openings.
3. Periodic slit-lamp examination of all exposed personnel, specifically looking for thickening and/or opacification of the lens capsul. The

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Memorandum to Dr.

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Project Monitor

frequency of examination, where practicable, should be at one to two year intervals up to a maximum of 15 years following last known exposure date. There is no need to follow personnel exposed to less than 1 mw/cm².

4. A survey be made of all microwave emitting equipment (diathermy, ovens, etc.) in the building to insure adequate screening in order to minimize additional background burden.

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April 3, 1965