

ATOMIC ENERGY ACT OF 1946

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LAB-J-475

July 27, 1948

OPERATION SANDSTONE RADIATION INJURIES

403016

I. HISTORY

During the radiochemical operations at Eniwetok immediately following the X, Y and Z Day detonations, the radiochemists removed from the drone planes the filter papers containing radioactive samples and packaged them for immediate shipment to the Los Alamos Laboratories. All these operations were directed by Mr. [redacted], and Exhibit A contains a detailed description of the procedures and practices involved. Exhibit B shows photographic enlargements of several frames of a movie sequence made during one of the operations.

It was during the operation at Eniwetok that four of the personnel involved received excessive radiological exposure. The working groups of radiochemists for each test are listed below, and those showing no radiological injury are noted by "0", those with some injury by "\*", and the more severe cases by "\*\*":

X-Ray Test

0  
0  
0  
0  
0

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Yoke Test

0  
0  
0  
\*0

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- Operation Sandstone

Zebra Test

0  
0  
\*  
\*\*  
\*\*

Immediately after Test X, Eniwetok to Los Alamos with the samples; for Test Y, returned; and for Test Z,

returned from returned.

CLASSIFICATION CANCELLED BY AUTHORITY OF DOE/OS

Carl Wilson 6/21/83  
DATE

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[REDACTED]

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The first indication of possible overexposure was noted by [REDACTED], who reported to the Los Alamos Laboratory Health Division for examination (see Exhibits C and D). As noted by Dr. L. Hempelmann (Exhibit E), [REDACTED] received the least serious burns, and early examination of [REDACTED] injuries led to an erroneous diagnosis as being due to a bruise. This unfortunately resulted in the forward area's not being advised, before the Zebra Test, of the excessive dosages possible in the procedures used at Eniwetok.

Development of the film badges of the personnel involved in Zebra Test operations disclosed that [REDACTED] received appreciable doses. The film badges were developed at Eniwetok after the men had already departed for the States, but the information was passed on to the Laboratory by teletype (see Exhibit F).

The injuries received by [REDACTED] were sufficient so that no question was involved in the diagnosis, and altogether [REDACTED] were hospitalized on 16 May 1948. A public press release was made 17 May (see Exhibit G). Also on 17 May, Dr. J. G. Hoffman, a consultant, interviewed these men (see Exhibits H, I, J and K), and on 24 May he submitted reports on dosage estimates and general observations (see Exhibits L and M).

The injuries appeared to be due only to Beta radiation, and no sickness was incurred, although the men will be kept in the hospital until a new skin growth is assured. [REDACTED] was released on 28 May and [REDACTED] are still hospitalized (they are allowed to leave the hospital for exercise periods, but return for meals and sleeping). A medical history of the cases to date is given in Exhibit N.

## II. CONCLUSIONS

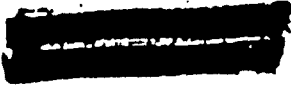
### 1. Radiological:

From the medical report, the injuries received by the men appear to be due only to Beta radiation, and from the estimates made by Dr. Hoffman, the Beta activities per sheet of filter paper were of the order of .5 curie or less; with this source strength a dose of 500 r e p at a depth of 2 to 3 mm could have been produced in 90 minutes (estimated time the men wore gloves), provided .1% of the Beta activity on a sheet was transferred to the glove. The gloves used in the operations were destroyed immediately after use and no measures of radioactivity were made upon them.

### 2. Operational:

For handling the filter sheets tongs were provided, and it is believed that had they been properly used, excess dosages would not have

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resulted. The use of tongs makes handling the filter papers, in the field, an awkward and prolonged operation. That the tongs which were available may not have been consistently used indicates that considerable practice in their use before a test (for familiarization) and rigid enforcement of their use during an operation appear necessary. Or perhaps a more workable substitute procedure can be invented for future operations.

In addition to maintaining a safe distance between worker and source, it is clear that gloves should be provided in sufficient quantities. Clean gloves should be exchanged for used ones several times during an operation, and an assistant should be provided for each worker to ensure that gloves are exchanged.

JCC:djw

John C. Clark

Enclosures:

- Exhibit A - Memo fr 6/10/48,  
subj: "Rad Burns of J-2 Pers"
- Exhibit B - Photographs
- Exhibit C - Statement -
- Exhibit D - Statement -
- Exhibit E - Ltr fr L. Hempelmann to  
Dr. R. Stone, 6/28/48
- Exhibit F - Teletypes
- Exhibit G - Memo LAB-DIB, 5/17/48, subj:  
"Recent Accident in Operation Sandstone"
- Exhibit H - Acct of Interview -
- Exhibit I - Acct of Interview -
- Exhibit J - Acct of Interview -
- Exhibit K - Acct of Interview -
- Exhibit L - Memo fr Hoffman, 5/24/48, subj:  
"Dosage Estimates on Sandstone Pers"
- Exhibit M - Memo fr Hoffman, 5/24/48, subj:  
"Notes on Sandstone Pers Receiving Beta Rad"
- Exhibit N - Memo fr Whipple, 7/23/48, subj:  
"Supplementary Radiation Acc Rpt" & Memo fr  
Hempelmann, 6/7/48, subj: "Rad Acc Rpt"

O } added later  
P }