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The University of Rochester
School of Medicine and Dentistry

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Rochester 7, N. Y.

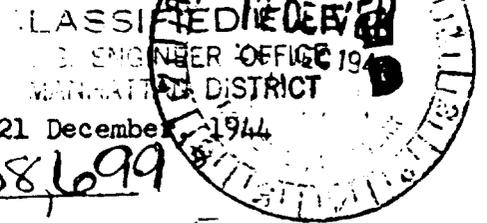
Classification Changed to OUO

By Authority of Admin, DAR-1
Classification Authority

By R. V. Anderson, Analysas Corp.

Date 11-9-90 RB Martin 11-26-90

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RHTG #38699

BOX # ~~955~~ 215 22659

re: Attention: Lt. Bernard Wolf

Colonel Stafford Warren
District Engineers Office
Manhattan District
PO. Box E
Oak Ridge, Tenn.

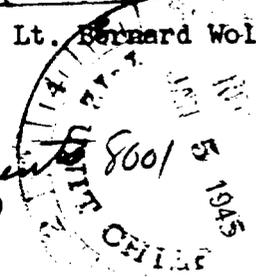
Dear Dr. Warren;

Series of Medical Experiments (U)

I have finally been able to complete a series of experiments on animals and on the pants material from the [redacted] case. A number of tests were made on the cloth alone to determine its breakdown potential. The cloth was placed between 1" electrodes in a standard machine used for making insulation tests. The average of a number of tests shows that this material in an ordinary dry state breaks down at a voltage of 2030 RMS volts. Subsequently the material was exposed in a humidity chamber for a period of one hour at 100% humidity. This reduced the value of the breakdown potential to 1030 RMS volts. Tests were made with a point electrode at a voltage in excess of 500 without any deterioration of the cloth. In one animal experiment 460 RMS volts were used with the cloth dampened to a point where it would pass current (estimated to be in the neighborhood of 50 MA) and the only effect on the cloth due to the current was the production of steam and the drying of the cloth; the effect on the animal in this case was to produce some blistering, probably due to the steam. Because it was not possible to produce any remarkable lesions on the skin through the cloth it was necessary to try direct tests on the exposed skin.

Using an indifferent electrode in very good contact on the other side of the body, contacts were made to the skin with single electrodes having approximately the same area as those involved in the [redacted] case. This resulted in a cutting of the skin and some burning, and as a matter of fact the action appeared to be fairly identical with that made by a diathermy machine used for cutting purposes. The current still remained at a low level, circa 100 MA, with no lesions at all comparable to those in the [redacted] case being produced. Use of an electrode 1 1/2" in diameter resulted in a current of approximately 500 MA but in this case no visible lesions were produced as was to be expected from such intimate contact.

REPOSITORY Oak Ridge Operations
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In all cases contact was for a much longer period than ~~██████████~~ is believed to have had.

The ohmic resistance in human subjects from the right hand to the left leg was found to vary from above 1000 ohms to over 200,000 ohms depending upon the amount of natural moisture on the skin. Under all these circumstances it seems improbable that the low voltage could have been involved in this case.

There are a number of points brought out at the scene which also point very definitely to contact with a high voltage (35 KV). First, the character of the puncture wounds in the leg and trousers, and the singeing of the hair on the fingers. Second, witnesses report the sound of a spark discharge; third, other witnesses were said to have seen a flash.

The lesions on the leg seem to fit the physical contact with a relay which upon manual closure would energize the high voltage transformer without the closure of the panel switch.

All the evidence therefore points to the high voltage - in spite of the fact that grounding hooks are supposed to be used while the apparatus is being worked upon. It seems significant that no one is prepared to state that the grounding hook was in the proper position at the time of the accident. It seems likely that the spark jumped from the clips at the end of the wires which were being pushed up through the apparatus. There would be no marks left on these terminals by the discharge which was probably interrupted by the opening of the door safety switches. Perhaps if the door had been opened a second sooner the accident would not have occurred.

The photographs of the lesions were shown to the physician who handles all of the electrical accident cases for the local utility company. Without having any information as to the nature of the apparatus in question, he stated that his belief was that they were caused by a high voltage discharge and not by voltages below 500. This opinion is concurred with by everyone here who is qualified to judge the effects of the passage of electrical currents through the body.

Very truly yours,

Francis W. Bishop

Francis W. Bishop

FWB:eg

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