DEPARTMENT OF THE ARMY
HEADQUARTERS, US ARMY MEDICAL RESEARCH AND MATERIEL COMMAND
AND FORT DETRICK
810 SCHREIDER STREET
FORT DETRICK, MARYLAND 21702-5000

JUL 18 2016

Freedom of Information/
Privacy Act Office (Case 16-0026)

Mr. John Greenewald
[redacted]

Dear Mr. Greenewald:

This letter responds to your electronic Freedom Of Information Act (FOIA) request dated April 22, 2016 addressed to FOIA@DTIC.mil and referred the US Army Medical Research And Materiel Command USAMRMC on June 15, 2016.

You requested "Release of document AD0252414, entitled, "Relationship Between Times of Arrival of Cloud, Peak Recovery and Cessation for Operation Dew II".

USAMRMC is no longer responsible for the Chem/Bio/Nuc program but still has the responsibility for determining if it's appropriate for public release. Since this document is more about distribution than classification, the requested document is cleared for public release.

Fees associated with processing your request are waived in this instance.

Sincerely,

Sandra Rogers

Sandra J. Rogers
Freedom of Information Act/Privacy Officer
U.S. Army Medical Research and
Materiel Command

DEFENSE TECHNICAL INFORMATION CENTER
8725 JOHN J. KINGMAN ROAD
FORT BELVOIR, VIRGINIA 22060-6218

IN REPLY
REFER TO: DTIC-R (FOIA 2016-95)

MAY 17 2016

MEMORANDUM FOR U.S. ARMY GARRISON (FOIA)

SUBJECT: Freedom of Information Act (FOIA) Request

Reference: Freedom of Information Act (FOIA) request from Mr. John Greenewald, (attachment 1)

Release of document AD0252414, entitled *"Relationship Between Times of Arrival of Cloud, Peak Recovery and Cessation for Operation Dew II"*, can only be released by the appropriate controlling activity. The controlling activity currently identified on the document is Army Chemical Corps, Biological Labs, Ft. Detrick, MD. Therefore, we are forwarding this request to you for processing and direct response back to Mr. Greenewald. We have notified him of this action (attachment 2). A copy of the document is provided at attachment 3.

Should your review of the above document result in a determination to delimit it (make available to the public) or a determination that the distribution statement should be changed, please advise this office in writing so we may mark our records accordingly.

The category of request was "other." To date, Mr. Greenewald has incurred no assessable fees for services from DTIC. Please call me at (703) 767-9204 if you have any questions.

FOR THE ADMINISTRATOR:

Michael Hamilton
FOIA Program Manager

Attachments:
As stated

Hamilton, Michael A CIV DTIC RM (US)

From: John Greenewald <john@greenewald.com>
Sent: Friday, April 22, 2016 1:30 PM
To: foia@dtic.mil
Subject: FOIA REQUEST

To whom it may concern,

This is a non-commercial request made under the provisions of the Freedom of Information Act 5 U.S.C. S 552. My FOIA requester status as a "representative of the news media." I am a freelance television producer often working on documentaries related to my FOIA requests, my work is commonly featured throughout major news organizations, and I freelance writer for news sites as well. Examples can be given, if needed.

I prefer electronic delivery of the requested material either via email to john@greenewald.com or via CD-ROM or DVD via postal mail. Please contact me should this FOIA request should incur a charge.

I respectfully request a copy of records, electronic or otherwise, of the following document:

Title: (U) RELATIONSHIP BETWEEN TIMES OF ARRIVAL OF CLOUD, PEAK RECOVERY AND CESSATION FOR OPERATION DEW II

Accession Number: AD0252414

Personal Author(s): PALMER,VICTOR S

Corporate Author: ARMY BIOLOGICAL LABS FREDERICK MD

Report Date: Aug 1957

Pages:1 Page(s)

Report Number: TM3 1 (TM31)

Att 1

Thank you so much for your time, and I am very much looking forward to your response.

Sincerely,

John Greenewald, Jr.

[redacted]

[redacted]

Sincerely,

John Greenewald, Jr.

The Black Vault
http://www.theblackvault.com <http://www.theblackvault.com/>

Government Secrets
http://www.governmentsecrets.com <http://www.governmentsecrets.com/>

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FORT BELVOIR, VIRGINIA 22060-6218

IN REPLY REFER TO: DTIC-R (FOIA 2016-95)

MAY 17 2016

Mr. John Greenewald, Jr.
[redacted]

Dear Mr. Greenewald:

This is in response to your email dated April 22, 2016, requesting information under the Freedom of Information Act (FOIA) (enclosure 1). Under Department of Defense rules implementing the FOIA, published at 32 CFR 286, your request was categorized as "other."

The document that you requested AD0252414, entitled *"Relationship Between Times of Arrival of Cloud, Peak Recovery and Cessation for Operation Dew II"*, is limited to U.S. Government agencies and their contractors only; therefore we are forwarding document AD0252414 to the organization listed below for processing and direct response back to you. Please direct all future correspondence related to the document AD0252414 to:

Commander
U.S. Army Garrison
ATTN: Freedom of Information Act (FOIA)
810 Schreider Street
Fort Detrick, MD 21702-5020

To date, there are no assessable fees for services from DTIC. Please understand that other members of the public may submit a FOIA request for copies of FOIA requests received by this office or the names of those who have submitted requests. Should such occur, your name and, if asked for, a copy of your request will be released; however, your home address and home telephone number will not be released. Other private citizens who have obtained your name by using such a request may contact you. However, correspondence from the DoD about your request will be on official letterhead. If you have any questions, please call me at (703) 767-9204. Thank you for your interest in obtaining information from DTIC.

Sincerely,

Michael Hamilton
FOIA Program Manager

Enclosure

Atc 2

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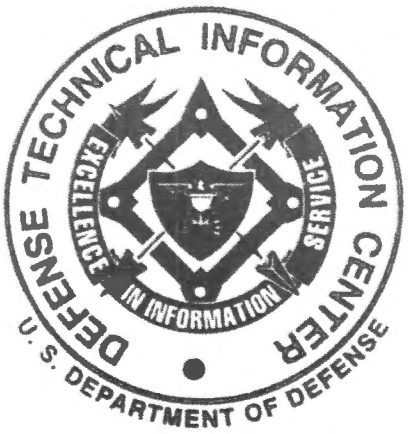

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BWL Technical Memorandum 3-1

RELATIONSHIP BETWEEN TIMES OF ARRIVAL OF CLOUD, PEAK RECOVERY AND CESSATION FOR OPERATION DEW II

Victor S. Palmer

This memorandum is designed primarily for rapid dissemination of current R&D technical information for review and suggestions. It is an internal operating document and distribution is usually limited to the installation and to supporting or cooperating agencies.

August 1957

Assessment Division
Director of Assessment

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FIGURES

TABLE

ABSTRACT

An analysis of the cloud travel data from OPERATION DEW II indicates that relationships similar to those determined for radiological fallout data appear to exist between time of first arrival of the aerosol, time of peak recovery and time of cessation.

RELATIONSHIP BETWEEN TIMES OF ARRIVAL OF CLOUD, PEAK RECOVERY AND CESSATION FOR OPERATION DEW II

I. INTRODUCTION

Recently a study was made of radiological fallout data[1]* to determine the relationship between the time of first arrival of the cloud t_a, time of peak recovery t_p and time of cessation t_c. The following relationships were determined for radiological fallout over a wide range of arrival times:

$$t_p \simeq 2t_a \tag{1}$$

and

$$t_c \simeq 5t_a^{0.7} , \tag{2}$$

where $t_a \leq 13$ hours. These relationships indicate that both t_p and t_c may be represented in terms of t_a, and that as the time of first arrival of the cloud t_a becomes increasingly later, the time of peak recovery t_p shifts from near t_a to near t_c. Figure 1 shows these relationships on a log-log plot. No valid explanation was offered for the above relationships except a purely qualitative one that the longer the time required for a radioactive cloud to arrive at some location the larger and more diffuse were its boundaries.

The data from OPERATION DEW II[2] were examined to determine if similar relationships between cloud arrival times could be determined for this series of long-line elevated releases of fluorescent material.

II. METHOD OF ANALYSIS

In the analysis, data on file in rough form in Meteorology Branch, Assessment Division was utilized, since the sequential sampling data for DEW II is not contained in the published report. A relatively poor time resolution existed in the sampling data, because the samplers were changed only at two-hourly intervals and the dissemination time covered a period of approximately 30-40 minutes. A maximum error approaching two hours is possible as a result of the two-hourly sequential sampling time period alone.

In view of the time resolution factor it was decided to determine t_a, t_p and t_c only to the nearest one-half hour. These times, together the approximate distance of downwind travel (50-mile intervals), are shown in Table I. Since the error in resolution can result in large percentage errors for arrival times of less than about four hours, greater significance probably should be ascribed to the data for longer travel times.

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* See References

Sequential sampling at two-hourly intervals resulted in the data for many stations not being usable. In order to obtain a fair picture of the arrival-peak-cessation time relationships it was decided to consider only those stations with at least four sampling periods. At a considerable number of stations all of the material was received during one, two, or three sampling periods. Therefore, if the cloud passed the station in six hours or less the data could not be used. Other stations were discarded because of breaks in the sequential data. As a result, in Trials 2, 4, 6, 7 and 9 data were used for only 28 stations out of a total of 95 possible stations where recovery occurred.

It was found that all of the usable data was obtained from near the central portion of the cloud as it travelled downwind. This had the effect of minimizing the error resulting from using the mid-point of the dissemination period to determine the travel times.

III. RESULTS

The travel data in Table I were examined and it appeared that a power law model fit the data. A least squares fit resulted in the following equations:

$$t_p = 4t_a^{0.5} \tag{3}$$

and

$$t_c = 9t_a^{0.3} \quad . \tag{4}$$

Figure 2 shows the variation of t_p and t_c with t_a on a log-log plot. The degree of fit of Equations (3) and (4) to the data is shown in Figures 3 and 4.

It is seen that Equations (2) and (4), showing t_c as a function of t_a, are of the same general form. The radiological data was re-examined and it was determined that a somewhat better fit for the t_p-t_a relationship occurred when

$$t_p = 2.5t_a^{0.8} \quad , \tag{5}$$

where $t_p \leq 10$ hours. The degree of fit of both Equations (1) and (5) are shown in Figure 5. A plot of Equation (5) is also shown on Figure (1) as a dotted line for comparison purposes.

It appears that similar relationships exist for the DEW II data as for the radiological fallout data. The fact that both t_p and t_c are somewhat earlier for arrival times greater than a few hours in the DEW II data probably reflects different effective dissemination heights and fallout characteristics for the aerosols.

It appears significant that, similarly as in the radiological study, the time of peak recovery t_p approaches the cessation time t_c as the time of first arrival of the cloud t_a increases. Stated differently, for short distances of travel the time of peak recovery occurs near to the first appearance of material; however, as the downwind distance increases the time of peak recovery becomes increasingly later in relation to the total time period during which material was recovered.

The time of cessation t_c may also be expressed as a function of the arrival time of peak recovery t_p. The relationship determined for the DEW II data is

$$t_c = 2t_p^{0.6}. \qquad (6)$$

It is seen that power laws appear to fit the rather limited cloud travel data from DEW II. Some of the rather wide scatter observed may result from the poor sampling resolution, although the non-uniformity of the DEW II sampling data itself suggests that a considerable scatter of results may be expected.

IV. APPLICATION TO OPERATION LAC

It is recommended that a similar analysis of cloud travel be performed on OPERATION LAC recovery data when they are available. It appears probable that a similar mathematical model will be applicable, although the constants should be different due to greater dissemination heights and scale of downwind travel. The four-hourly sequential sampling period to be used on OPERATION LAC will also cause a resolution problem, partly compensated for by the larger scale of travel. Since the scale of sequential sampling will be increased by a factor of two from OPERATION DEW II, where the greatest downwind distances were about 250 miles, all travel data from OPERATION LAC in excess of 500 miles will be subject to smaller percentage errors from this factor.

If, from the first few trials, satisfactory relationships may be determined between t_a, t_p and t_c, this information could be valuable in estimating the length of sampling periods at various stations and other time-recovery relationships for future tests. A more important consideration is that as more data are accumulated, the establishment of these relationships may supply basic information on cloud diffusion required in the cloud physics program.

TABLE I. COMPARISON OF FIRST ARRIVAL, PEAK AND CESSATION TIMES FOR OPERATION DEW II

Trial No.	Station No.	Dissem. Time (EST)	Distance of Travel (Miles)	Travel Time (Hours) Arrival	Peak	Cessation
2	21	1650	0-49	0	4.0	6.0
	22		50-99	4.0	6.0	10.0
	36		100-149	6.0	8.0	18.0
	37		150-199	10.0	12.0	20.0
	38		150-199	10.0	*	20.0
4	8	1725	0-49	4.0	6.0	17.0
	20		0-49	4.0	6.0	18.0
	26		0-49	0.0	2.0	7.0
	9		50-99	6.0	12.0	16.0
	21		50-99	2.0	7.0	13.0
	15		50-99	4.0	10.5	20.0
	30		150-199	12.0	14.0	18.0
6	42	1700	200-249	13.5	17.5	21.5
7	14	1920	0-49	1.0	7.0	9.0
	8		0-49	3.0	3.0	11.0
	19		0-49	1.0	5.0	9.0
	26		0-49	0	3.0	7.0
	20		0-49	3.0	5.0	11.0
	9		50-99	3.0	5.0	9.0
	21		50-99	5.0	5.0	13.0
	15		50-99	3.0	7.0	15.0
	16		100-149	5.0	**	15.0
	24		150-199	7.0	11.0	15.0
	31		150-199	9.0	11.0	17.0
9	19	1450	0-50	3.5	5.5	9.5
	14		100-150	8.5	11.5	17.5
	10		150-200	11.5	15.5	21.5
	3		150-200	11.5	13.5	17.5

* Poorly Defined Peak.
** Double Peak - Secondary 4 Hours Earlier.

REFERENCES

1. LaRiviere, P. D.: "The Relationship of Time of Peak Activity From Fallout to Time of Arrival," R&D technical Report USNRDL-TR-137, U. S. Naval Radiological Defense Laboratory, 28 February, 1957.

2. Special Report 179, "An Experimental Study of Long-Range Aerosol Cloud Travel Involving Ground Deposition of Biological Spore Travel," F&MR Division, Camp Detrick, Frederick, Maryland, 1 June 1953.

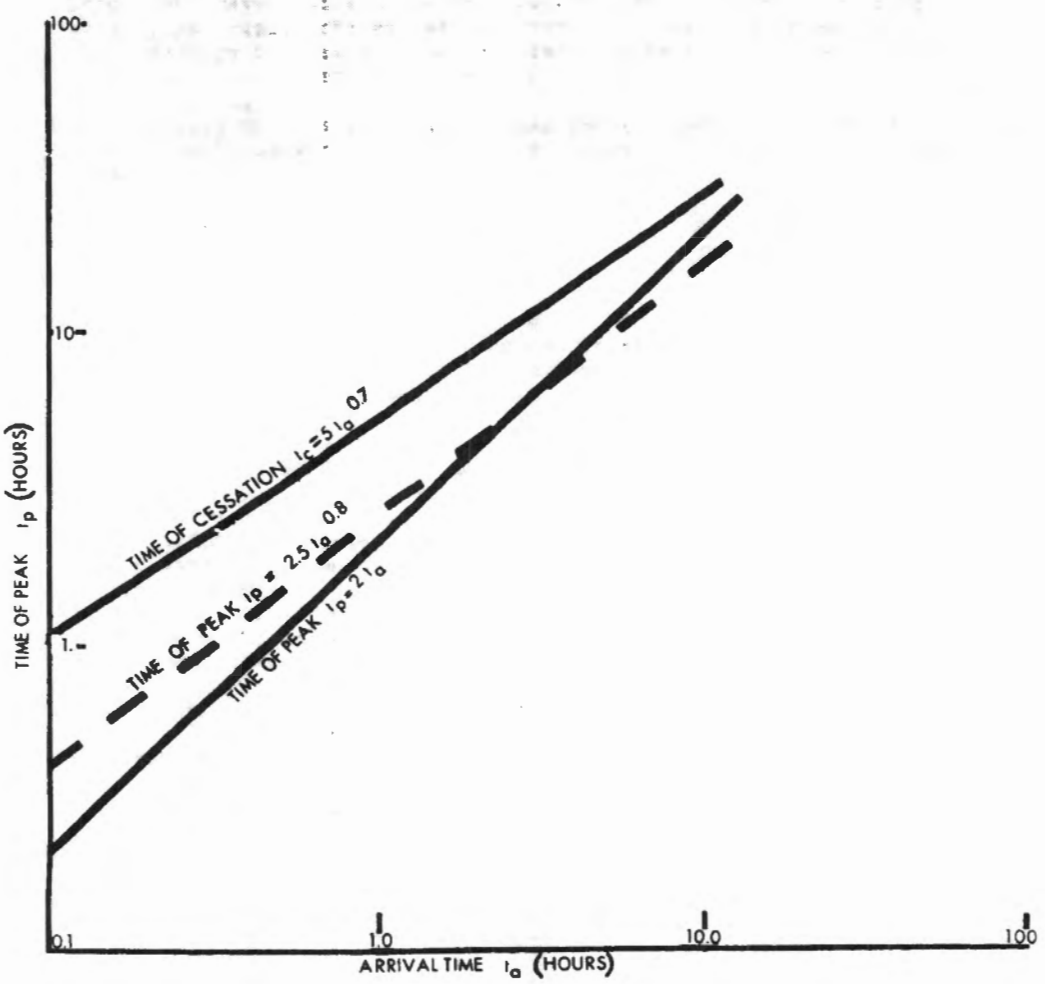

Figure 1. COMPARISON OF TIMES OF PEAK ACTIVITY FROM FALLOUT AND CESSATION WITH TIME OF INITIAL ARRIVAL - RADIOLOGICAL DATA.

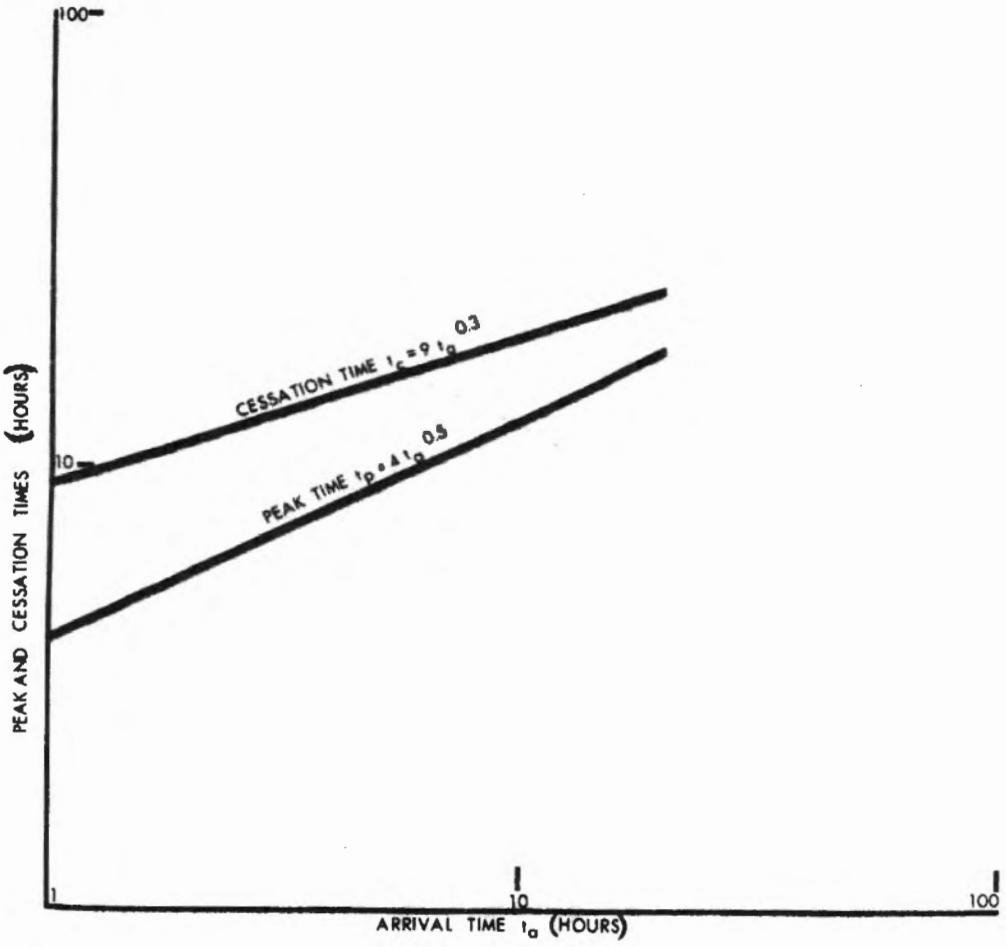

Figure 2. COMPARISON OF TIMES OF ARRIVAL OF PEAK RECOVERY AND CESSATION WITH TIME OF INITIAL ARRIVAL - OPERATION DEW II

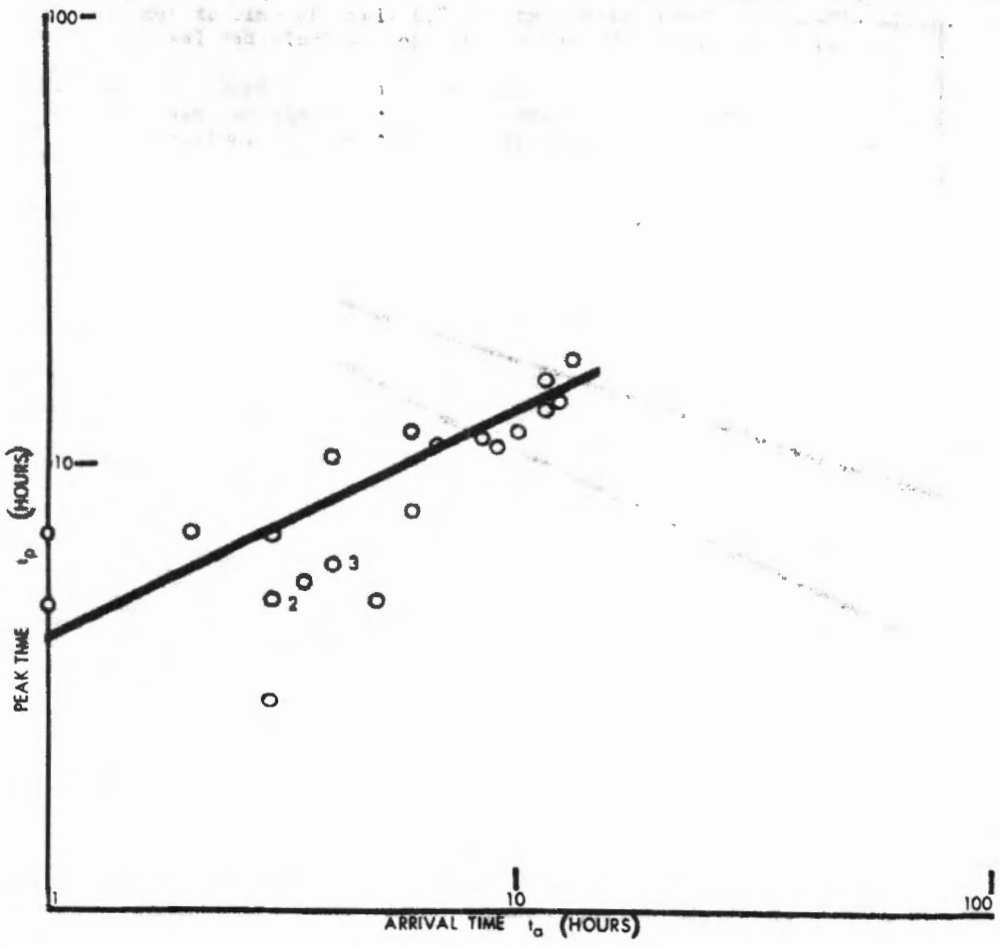

Figure 3. TIME OF ARRIVAL OF PEAK VERSUS TIME OF INITIAL ARRIVAL OF CLOUD OPERATION DEW II

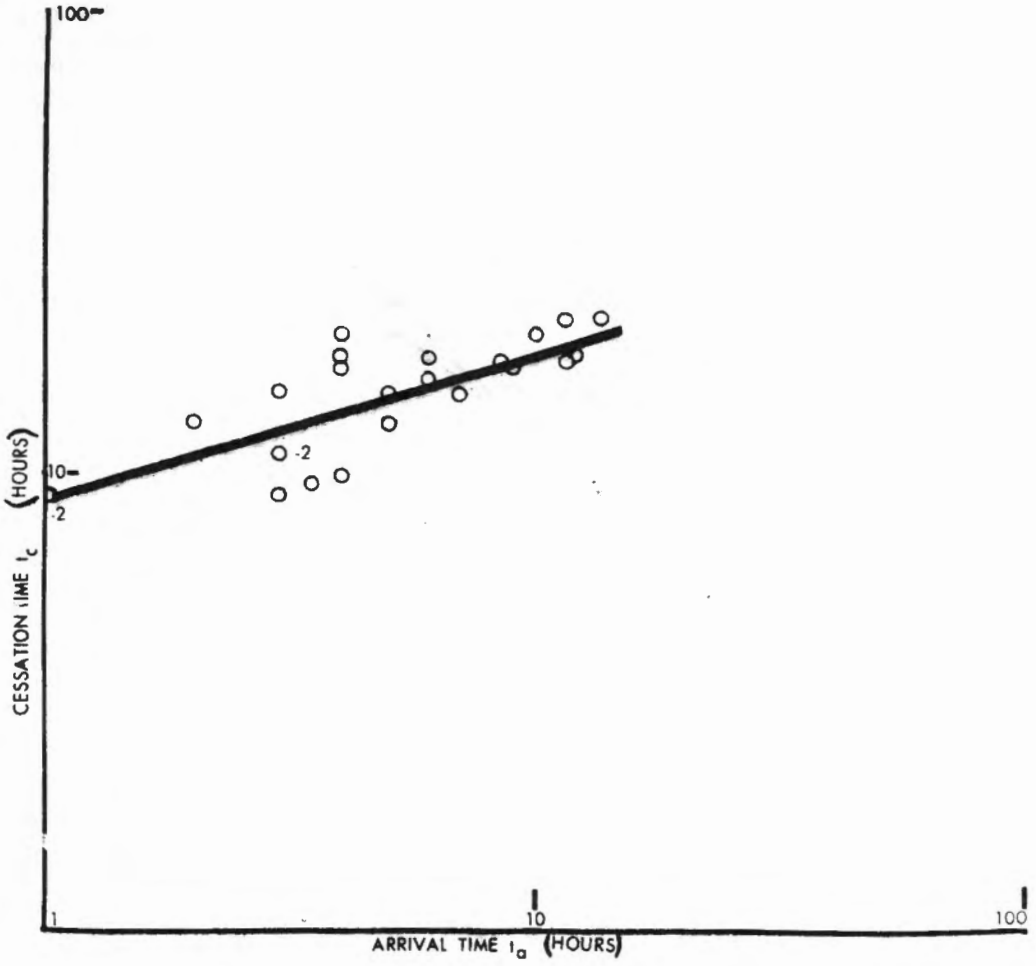

Figure 4. TIME OF CESSATION VERSUS TIME OF INITIAL ARRIVAL OF CLOUD - OPERATION DEW 11 .

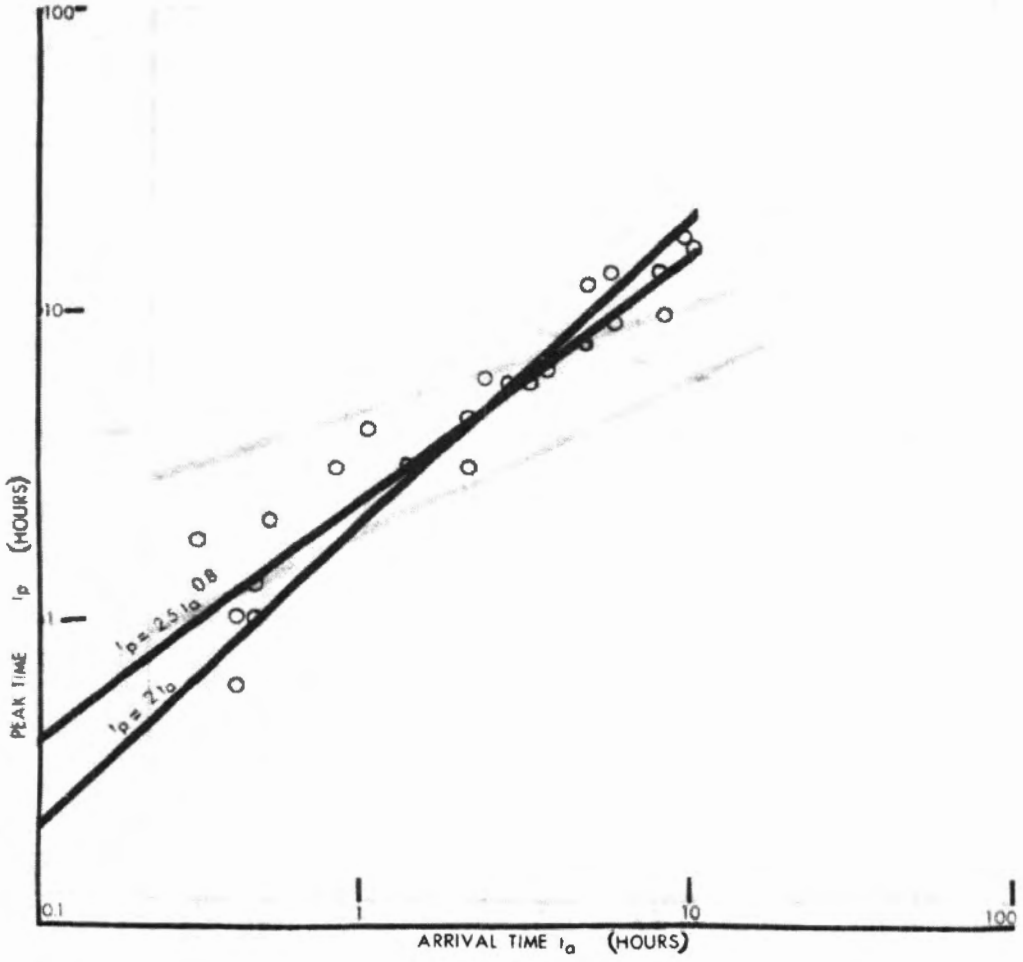

Figure 5 COMPARISON OF TIME OF PEAK ACTIVITY FROM FALLOUT WITH TIME OF INITIAL ARRIVAL RADIOLOGICAL DATA.

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