WT-825 (EX)
EXTRACTED VERSION

OPERATION UPSHOT-KNOTHOLE

Report to the Test Director
Aircraft Participation

Nevada Proving Grounds
March-June 1953

Air Force Special Weapons Center
Kirtland Air Force Base
Albuquerque, New Mexico

November 1955

NOTICE

This is an extract of OPERATION UPSHOT-KNOTHOLE, Aircraft Participation, which remains classified SECRET/RESTRICTED DATA as of this date.

Extract version prepared for:

Director
DEFENSE NUCLEAR AGENCY
Washington, D.C. 20305

4 JUNE 1982

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
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The purpose of this report is to show the results of sampling; contamination of sampling aircraft and personnel; the problems of operational control of all test aircraft; and the delivery of nuclear weapons with respect to circular errors, timing errors, and difficulties encountered by the delivery aircraft. These data, collected and tabulated, can be used as a reference for future operations. The statistics compiled are those actually recorded and not average or theoretical. Evaluation of these data has not been made.

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FOREWORD

This report has had classified material removed in order to make the information available on an unclassified, open publication basis, to any interested parties. This effort to declassify this report has been accomplished specifically to support the Department of Defense Nuclear Test Personnel Review (NTPR) Program. The objective is to facilitate studies of the low levels of radiation received by some individuals during the atmospheric nuclear test program by making as much information as possible available to all interested parties.

The material which has been deleted is all currently classified as Restricted Data or Formerly Restricted Data under the provision of the Atomic Energy Act of 1954, (as amended), is National Security Information, or is protected by the Privacy Act.

This report has been reproduced directly from available copies of the original material. The locations from which material has been deleted is generally obvious by the spacings and "holes" in the text. Thus the context of the material deleted is identified to assist the reader in the determination of whether the deleted information is germane to his study.

It is the belief of the individuals who have participated in preparing this report by deleting the classified material and of the Defense Nuclear Agency that the report accurately portrays the contents of the original and that the deleted material is of little or no significance to studies into the amounts or types of radiation received by any individuals during the atmospheric nuclear test program.

LIST OF ABBREVIATIONS

IBDA	Indirect Bomb Damage Assessment
TAC	Tactical Air Command
SAC	Strategic Air Command
Z-Time (GMT)	Greenwich Mean Time
AF	Air Force
Rosie	Atomic Cloud
H-Hour	Detonation Time
C. E.	Circular Error

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AIRCRAFT PARTICIPATION

1 PURPOSE

In accordance with the Air Force Special Weapons Center Operations Plan 2-53, dated 13 February 1953, and the 4925th Test Group (Atomic) Operations Plan 2-53, dated 19 February 1953, this operational summary report is submitted on the Test Air Operations for Upshot-Knothole, 1953 spring nuclear tests, conducted at the Atomic Energy Commission's Nevada Proving Grounds. The historical summary of the 4925th Test Group (Atomic) participation in this test series will be published by the Air Force Special Weapons Center.

The mission of the 4925th Test Group (Atomic) was to support the Atomic Energy Commission in the conduct of atomic weapons testing at the Nevada Proving Grounds during Upshot-Knothole by exercising operational control over all test aircraft participating in the operation and by providing delivery, sampling, cloud tracking, and terrain survey aircraft and personnel.

The purpose of this report is to show the results of sampling; contamination of sampling aircraft and personnel; the problems of operational control of all test aircraft; and the delivery of nuclear weapons with respect to circular errors, timing errors, and difficulties encountered by the delivery aircraft. These data, collected and tabulated, can be used as a reference for future operations. The statistics compiled are those actually recorded and not average or theoretical. Evaluation of these data has not been made.

Each detonation is recorded in this report as an annex. The data portion of this report is a consolidation of information for each project having participating aircraft in the test series.

Annex A of this report discusses the sampling requirements, methods, and techniques used in obtaining cloud samples.

Detailed information contained in the 4925th Test Group (Atomic) Operations Order 2-53 gives all the necessary information with respect to test aircraft, participating organizations, supply agencies, and personnel. Organizations receiving this operational summary report have previously received 4925th Operations Order 2-53.

2 CONCLUSIONS

The over-all air operations of this test series were considered very successful. This was due to the cooperation and coordination of all participating organizations and can be credited directly to the airmen, officers, and civilian technicians, who, without regard for personal hardships, performed their respective jobs in an outstanding manner.

Air-to-ground communications encountered some difficulty during the test series (all annexes).

Many helicopter missions for recovery of experimental data, movement of personnel within contaminated areas, photographic experiments, etc., could not be accomplished with the type aircraft assigned for terrain survey. The H-18 helicopter was underpowered for safe operation with more than two persons aboard at the altitude of the Nevada Proving Grounds. The H-5

could carry only two persons and was not satisfactory for most mission requirements. The H-19 (after it arrived) was best able to accomplish the assigned mission.

The control of aircraft flying within the prohibited area at the Nevada Proving Grounds between shots became a major problem. This was due to the Atomic Energy Commission Security personnel being unable to determine the exact position of the aircraft in regard to the prohibited area. Several aircraft, not scheduled with the Air Test Operations Unit, were known to have flown over the prohibited area. The Air Test Operations Unit had no method of identifying these aircraft and was unable to take corrective action.

The over-all sampling results were very satisfactory. This was a result of the intensive training of the pilots, mechanics, and instrument technicians.

The operational results of the participating projects are shown in the annexes by shots.

3 RECOMMENDATIONS

The ground radio station at the Nevada Proving Grounds should be completely checked out and operational at least 10 days prior to the first shot. Also, all aircraft flying over the Nevada Proving Grounds should be modified to use the special classified frequencies prior to their scheduled participation.

At least two H-19 helicopters or comparable aircraft, in addition to the terrain survey aircraft, should be provided for the next operation.

To provide maximum security control over aircraft flying over the prohibited area of the Nevada Proving Grounds, it will be necessary to install a ground radar plot system and interception system.

It is recommended that flying personnel and instrument maintenance personnel with the experience in this and previous tests be utilized in future operations. It is also recommended that the way be left open for the development of new techniques and the use of new aircraft and new instruments to accomplish the mission in a more successful manner.

4 OPERATIONAL DATA

To provide a better understanding of the operational data in all annexes, the following information is presented, by projects, to describe briefly the program of each project having participating aircraft in the test series.

4.1 Project 1.3, Free Air Blast Pressure Measurement

Canisters were deployed from two B-29 type aircraft to obtain pressure measurements above an air-burst atomic device, to measure blast pressure in the Mach stem, and to determine the altitude of the upper end of the Mach stem (triple point) in at least one point.

The canisters were deployed, in a vertical array above Ground Zero, within a 30° angle from the vertical at an altitude of approximately 3500 to 5000 ft above ground level. These measurements were made on the DD-I and Effects detonations.

4.2 Project 4.1, Evaluation of the Hazards of Flying Through the Atomic Cloud

To evaluate the hazards of flying through an atomic cloud, two methods were used: (1) obtaining gamma measurement by employing the use of parachute-borne canisters released from a B-50 and a B-47 type aircraft; and (2) by using two QF-80 drone aircraft, carrying animals and self-recording gamma-measuring instruments, to obtain measurement of gamma radiation and inhalation hazards. These aircraft flew through the atomic cloud at approximately 30,000 and 32,000 ft, respectively.

4.3 Project 5.1, Naval Aircraft Structures

An AD2 drone type aircraft, equipped with telemetering and direct recording instruments for measuring structural load, positioned by ground radar at a predetermined point, near

Ground Zero, was used to verify safe operational limits of this type aircraft as an atomic weapon carrier. Also, this project was to perform a dynamic analysis of effects of gust loading on the aircraft and to investigate effects of dynamic overstressing on the structure of the aircraft.

4.4 Project 5.2, Blast, Thermal, and Gust Effects on Aircraft in Flight

B-50 type aircraft, instrumented with strain gauges, accelerometers, thermocouples, and pressure gauges, and their outputs recorded by two 18-channel oscillographs, were used to measure structural response characteristics of a medium bomber, when exposed to blast, thermal, and gust effects of a 30-kt atomic bomb, at an overpressure range of 1 psi.

This was designed to determine the minimum operational parameters for this type aircraft for delivery of atomic weapons. When consistent with the primary mission, also measured was the response of the aircraft to reflected shock, under conditions of structural resonance; and data on wing and stabilizer stresses, aircraft accelerations, and skin temperatures were obtained.

4.5 Project 6.2 Tests of Radar Techniques for Accomplishing Indirect Bomb Damage Assessment

The objective of this program was to confirm indications that a radar return can be obtained from an atomic explosion, which can be used in determining Ground Zero and to indicate gross errors in height of burst and the yield.

4.6 Project 6.3, Field Test of Indirect Bomb Damage Assessment

Current IBDA capabilities were determined, by test under field conditions, with Strategic Air Command aircraft equipped with the latest available IBDA systems, flying simulated strike and support formations over a target. These aircraft recorded data essential for determination of the three IBDA parameters, yield, burst height, and Ground Zero.

4.7 Project 6.9, Evaluation of Airborne Radiac Equipment

The testing of airborne radiac equipment, which includes aerial and ground survey equipment, automatic recording dosimeters, droppable telemetering and flare units, was accomplished by a P2V2 type Naval aircraft. This equipment will ultimately be used by special carrier-based aircraft to provide assault troops with information on contaminated areas they may be entering. The equipment will be evaluated to determine errors and corrections in data taken at altitude relative to data taken at ground level.

4.8 Project 6.10, Rapid Aerial Radiological Survey

The improvement of procedures in making radiological aerial surveys is the object of this Army project.

4.9 Project 6.11, Operational Training for Tactical Air Command Crews

Seven Tactical Air Command aircraft participated so that aircrews could undergo realistic operational training on the effects of blast, thermal, and nuclear radiation that will be encountered in the delivery of an atomic bomb. These aircraft were positioned to be tail aspect to the point of burst.

Thermal strips, to measure the temperature rise on the aircraft skin, were furnished by Wright Air Development Center and were installed in the aircraft by Tactical Air Command personnel.

4.10 Project 7.5, Calibration Analysis of Atomic-bomb Debris

This project's objective was to obtain calibration data based on the determination of fission products and other nuclear properties of atomic-bomb debris collected by two manned B-29

type aircraft close to the detonation point and also at distant points. These samples were obtained (1)
products and (2) to provide useful information in evaluating the type of atomic bomb tested with respect to composition and in estimating the efficiency of the explosion.

4.11 Delivery Aircraft

Delivery aircraft and crews were furnished to deliver the atomic devices to the Nevada Proving Grounds at a time specified by the Test Director at the Nevada Proving Grounds.

4.12 Manned Sampling

Manned sampling was used to obtain the necessary fission products as required by Los Alamos Scientific Laboratory, Whitney Laboratory, and AFOAT-1 for radiochemical analysis.

4.13 Terrain Survey

This included the survey of large areas, at low altitude and expeditiously, for off-site terrain radiation returns as required by the Rad-Safe Director at the Nevada Proving Grounds.

4.14 Cloud Tracking

To track the progression of the cloud so that civil airways could be expeditiously cleared for civil and military use.

4.15 Schedule of Nuclear Detonations

Aircraft Participation Unit
P. O. Box "L"
Mercury, Nevada

Name	Nickname	Original scheduled date	Actual date	GMT	Area	Air/Tower
	Annie	17 Mar. 53	17 Mar. 53	1320	3	300-ft tower
	Nancy	24 Mar. 53	24 Mar. 53	1310	4	300-ft tower
	Ruth	31 Mar. 53	31 Mar. 53	1300	7-5A	300-ft tower
	Dixie	6 Apr. 53	6 Apr. 53	1530	7-3	6150-ft air
	Ray	18 Apr. 53	11 Apr. 53	1235	4A	50-ft tower
	Badger	11 Apr. 53	18 Apr. 53	1245	2	300-ft tower
	Simon	25 Apr. 53	25 Apr. 53	1230	1	300-ft tower
	Dry (HE only)	4 May 53	4 May 53	1630	F	2420-ft air
	Encore	7 May 53	8 May 53	1630	F	2420-ft air
	Harry	2 May 53	19 May 53	1220	3A	300-ft tower
	Grable	21 May 53	25 May 53	1630	F	500-ft air
	Climax	1 June 53	4 June 53	1115	7-3	1350-ft air

ANNEX A

SAMPLING ACTIVITIES AND TECHNIQUES

Before a discussion of sampling activities and techniques is possible, it is necessary to clarify and explain the nature of the sampling process. The requirements of the Los Alamos Scientific Laboratory and the AF project were such that two types of samples were needed.

One type, called a "snap sample," was collected during flight through the cloud by permitting air to flow through a probe into a pliofilm bag. Thus it was an actual sample, both gaseous and particulate, of the cloud itself. This was the type required by the AF project.

The Los Alamos Scientific Laboratory required a strictly particulate type of sample. This was collected by the use of specially modified wing tip tanks on F-84 aircraft. When the aircraft was ready to collect a sample, valves in the tip tanks were opened, permitting the air stream to impinge against filter paper held in a grid within the tank. After the sampling was completed, these filter papers each carried a calculated fraction of the fissionable matter from the atomic cloud.

The minimum size of the samples required was based on the radiochemical experiments planned; and in calculating the size, the amounts of pilot exposure were also determined. Thus it was determined that, during the first five shots, pilots of the sampler aircraft would accumulate a dosage of 2.9 r.

Similarly, it was calculated that the second five shots would require a total pilot exposure of 2.3 r. With the addition of the eleventh shot, this figure was raised to 3.1 r. The above figures are in-cloud exposures and do not include exposure of the pilots on the return trip or exposures obtained outside the cloud prior to penetration. Since the maximum allowable exposure per person was set by the Chief, Biological-Medical Division, AEC, at 3.9 r for the entire operation, it became obvious that two groups of pilots would be required, that accurate instrumentation within the aircraft must be used, and that a very precise method of recording exposure be maintained.

By forming a ratio of the required in-cloud exposure over the total exposure allowed for the operation, i.e., 2.9/3.9 = 0.75, we obtained a figure of 75%. This is the fraction of the maximum allowable exposure which we could permit pilots to receive within the cloud and left 25% of the maximum obtainable from the various forms of out-of-cloud exposure. These percentages were applicable to any particular mission of the first five shots.

For instance, on the NANCY shot, calculations showed that in-cloud exposure would amount to 1.51 r per pilot while obtaining a sample consisting of a fraction of 2×10^{-9} of the fissionable material of the device. If this amount were to be exceeded by, for instance, 0.5 r, that excess of 0.5 r had to be subtracted from the allowance for subsequent missions. Thus developed the need for absolute airborne control of exposure of the sampler pilots.

For the second series of six shots, the ratio between in-cloud exposure and total allowable exposure, 3.1/3.9 = 0.3, showed that the requirements for control became even more stringent,

inasmuch as out-of-cloud exposure could be only 20% of the total. The above calculations of exposures were based on the following factors:

1. An average cloud entry time of 2 hr after burst.
2. A predicted bomb yield.
3. An average indicated air-speed, while sampling, of 250 mph.
4. Highly polished aircraft (to reduce residual contamination to a minimum).

If any of these factors change, then, correspondingly, the exposure will change. Specifically, if entry into the cloud could be delayed, or if air-speed could be increased, or if residual contamination could be reduced, the result would be a decrease in total pilot exposure while obtaining a sample of specific size or, conversely, an increase in sample size for a given pilot exposure.

Three major steps were taken to increase the ratio of sample size to pilot exposure. During the first operation, ANNIE (see Annex B), it was noted that approximately 50% of the pilot's exposure was obtained during the trip home, indicating that residual contamination deposited on the aircraft was very high. Annex B outlines the steps taken to reduce this factor, and Annex C shows that polishing the aircraft was responsible in part for reducing this 50% to about 17%.

The second step taken was to initiate a program of lining the interior, sides, seat, and back of the pilot's seat with $\frac{1}{32}$-in. sheets of lead. Owing to delay in obtaining this lead, the aircraft were not completely outfitted until the RAY shot. (See Annex F.)

The third increase in protection was effected by development of a lead-glass vest designed to cover the sides and front torso of the pilot. It was estimated that these vests, by reducing effectiveness of gamma radiation, would decrease pilot body exposure by 10 to 15%, depending on the energies of the radiation encountered. Annex C shows that this estimation erred on the side of the conservatism inasmuch as the reduction during the second shot was nearer 17%. Production of the vests was slow because of limitations of personnel and equipment, but by BADGER shot (Annex G) enough had been produced that vests were available for each pilot.

Since allowable exposure per pilot for any one shot was so rigidly limited, it was imperative that instrumentation be such that the pilot could determine at any instant his accumulated dosage for that shot and thus determine when to break away from the cloud. This integrated dosage was measured by the integron, an instrument developed by the Los Alamos Scientific Laboratory. It was calibrated before each mission and was the primary instrument for determining breakaway time.

In order to check on the accuracy and the operation of the integron, a number of film badges were placed at various locations on the aircraft, the integron, and the pilot himself. Through comparison of readings from developed film badges and the integron, it was possible to determine quite accurately individual pilot dosages and also to check on possible malfunctions of the instruments.

The only other radiac instruments used aboard the aircraft were a rate meter for determining the peak intensity of the radiation field at any one time (this instrument was developed by the Evans Signal Laboratory and was called a Jasper) and an ion chamber located in the wing tip with remote reading in the cockpit for determining the radiation at approximately 1 ft from the filter paper containing the radioactive particles collected.

Very little information was available on peak intensities in the center of the cloud vs time after detonation. As the tests progressed, this information was recorded and curves were plotted and are shown in Figs. A.1 to A.3. The line $IT^{3.55}$ (Fig. A.1) represents the average decay and rate for the first three shots, RAY, RUTH, AND DIXIE. Its sharp declivity, as compared to the flatter line $IT^{1.2}$, shows a more rapid rate of decay due to cloud shear, dispersion, and similar natural causes. Line $IT^{1.2}$ shows a theoretical average rate of decay and is included for comparison purpose. Similarly, Fig. A.2 is the average for shots NANCY, HARRY, ENCORE, AND BADGER, and Fig. A.3 is the average for shots CLIMAX, SIMON, ANNIE and Gun. In Fig. A.3 the second theoretical curve, line $IT^{4.04}$, was necessitated by the greater yield of the CLIMAX shot. Figure A.4 illustrates the increased sample (for a given pilot exposure) which could be obtained by delaying cloud entry time.

Aircraft Participation Unit
P. O. Box L
Mercury, Nevada

The following is the total amount of radiation received by the sampler and terrain survey pilots for the operation.

Name	Total, mr	Name	Total, mr
Sampler Pilots			
	1785		2280
	2780		3520
	3015		3075
	2905		3875
	3810		2440
	2930		2525
	3620		4110
	4345		3660
	2720		225
	2415		3010
Terrain Survey Pilots			
	14,540		940
	40		2770

* as a helicopter pilot, was monitored by the on-site test group.

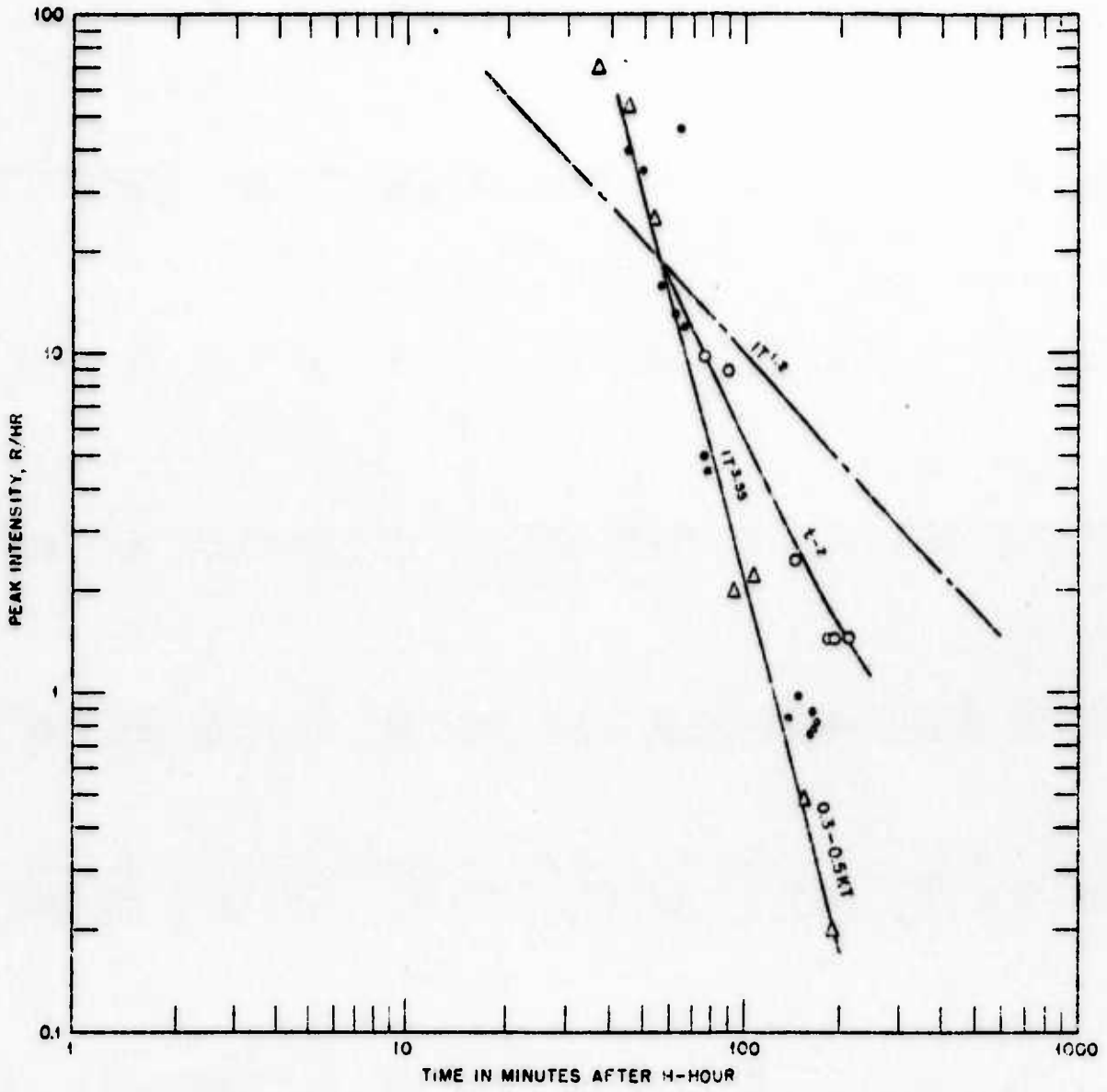

Fig. A.1 — Peak intensity vs time for Shots RAY, RUTH, AND DIXIE. ●, RAY 0.3 kt. Δ, RUTH 0.5 kt. ○, DIXIE 1.0 kt.

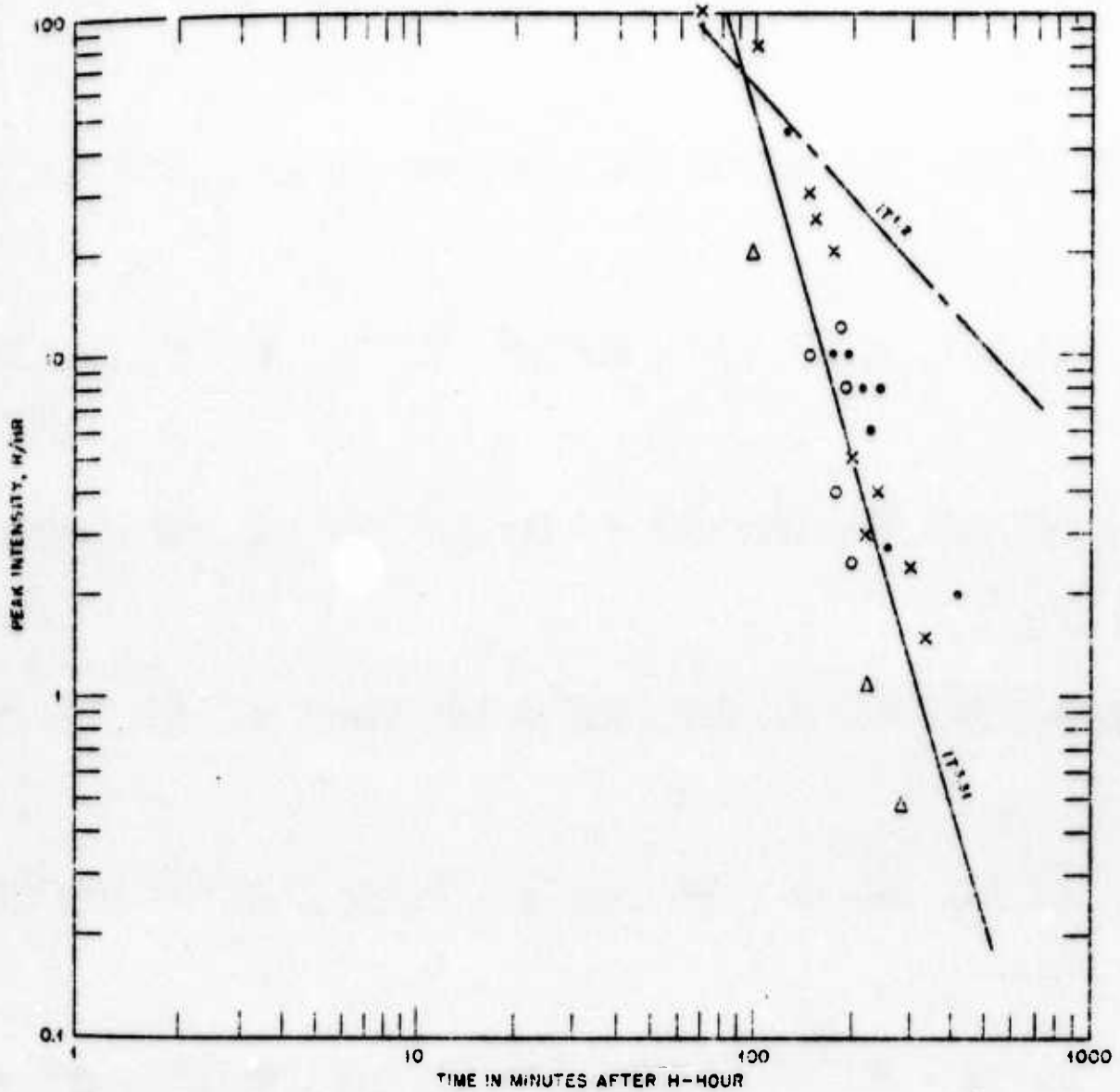

Fig. A.2 — Peak intensity vs time for Shots NANCY, HARRY, Effects, and BADGER ⊙, NANCY 35 kt. □, HARRY 35 kt. ○, Effects, 30 kt. ×, BADGER 29 kt.

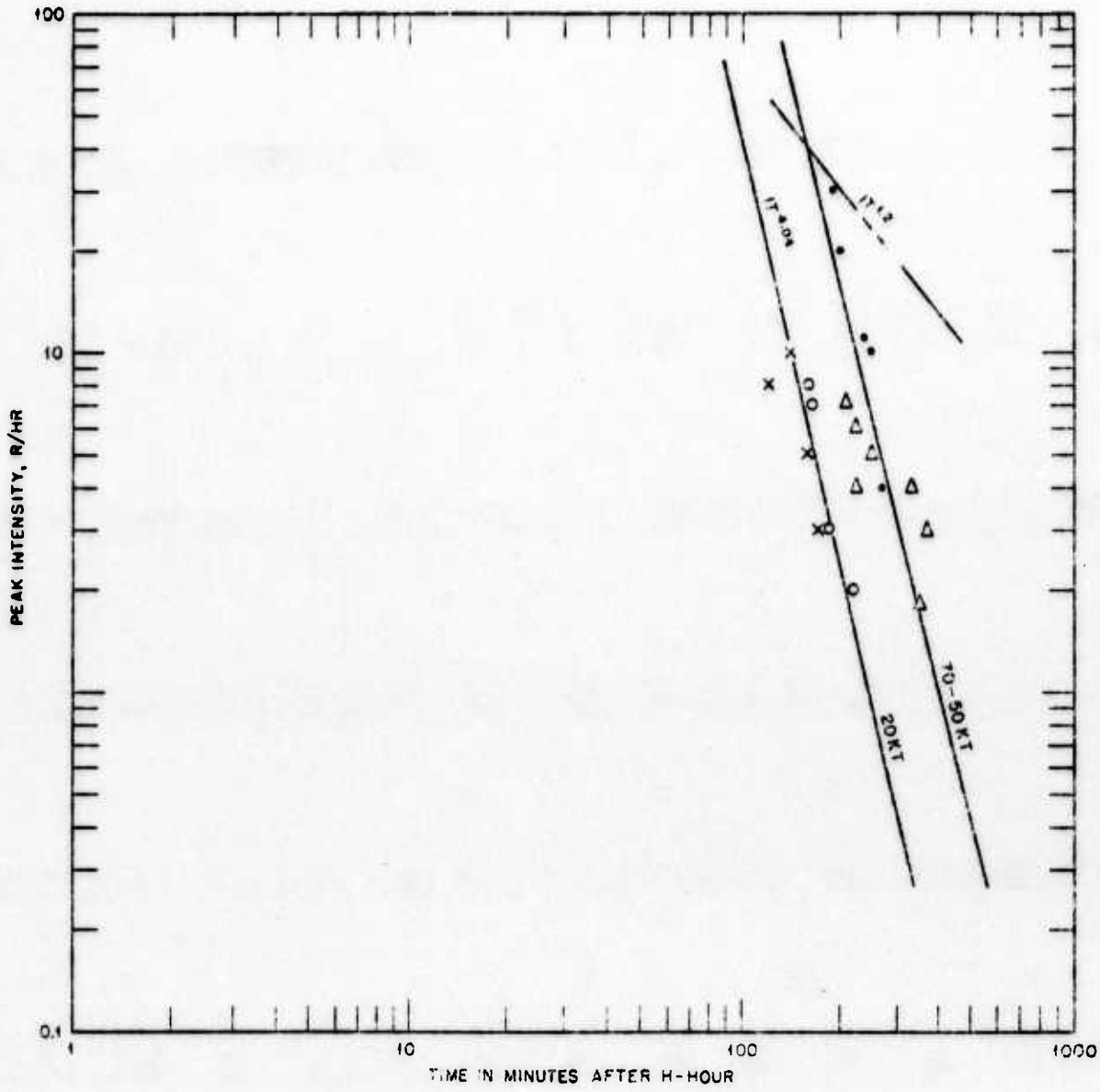

Fig. A.3 — Peak intensity vs time for Shots CLIMAX, SIMON, ANNIE and Gun. ●, CLIMAX 70 kt. Δ, SIMON 50 kt. ▽, ANNIE 20 kt. ×, Gun, 20 kt.

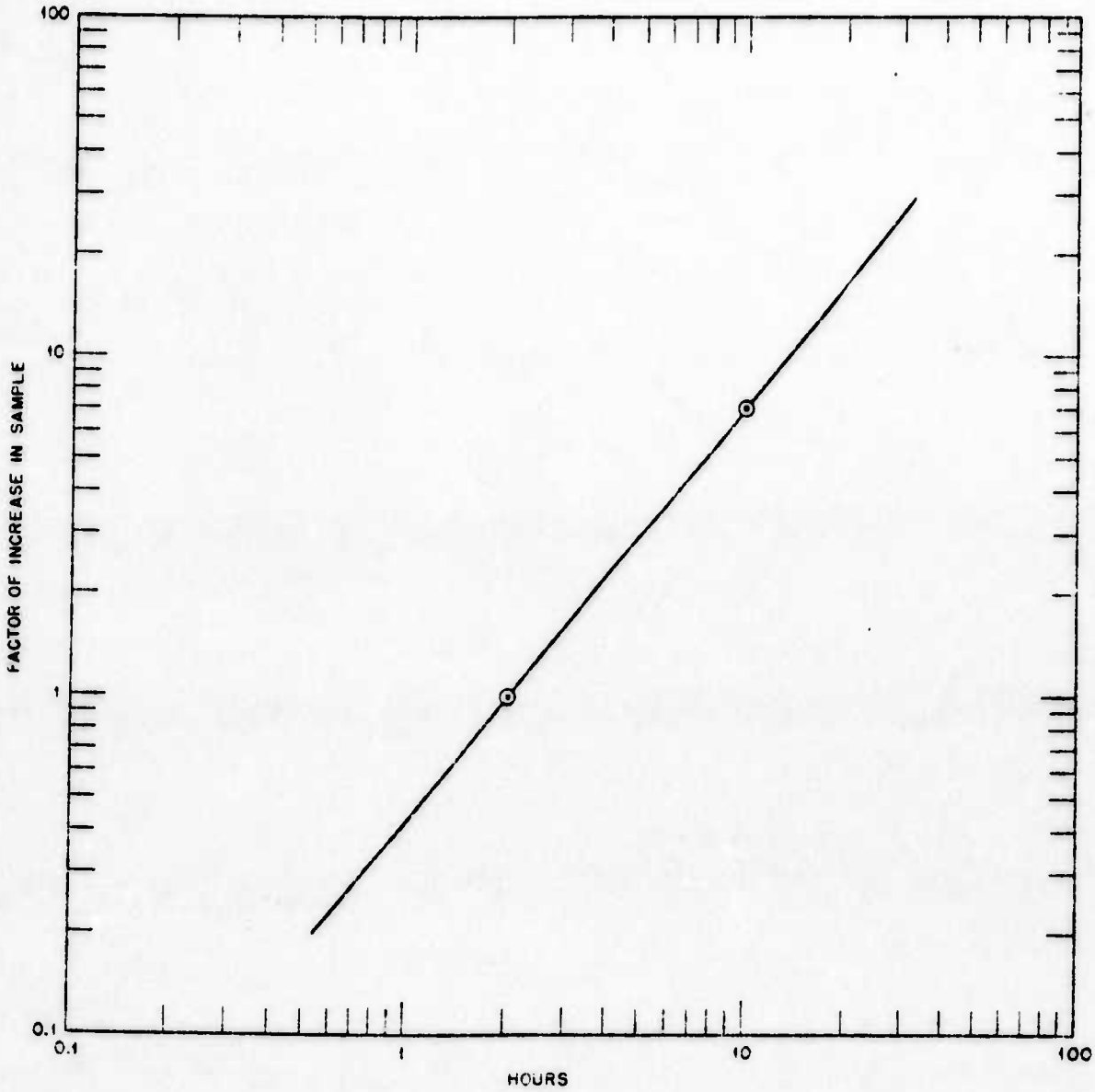

Fig. A.4—Increase in sample by delaying sampling time.

ANNEX B

ANNIE SHOT SUMMARY

Preparations were finalized for the first operation of Upshot-Knothole spring test series at the Nevada Proving Grounds 16 March 1953. A preliminary weather briefing was conducted at the Control Point for the Test Manager's advisory panel and staff at 0830 PST; also briefings for the aircrews and technicians were conducted at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, at 1300 PST for their participation in this operation. The final weather briefing for the Test Manager's advisory panel, staff, and invited participants was conducted at 2130 PST.

The weather was forecast to be satisfactory for the detonation with winds from approximately 270° at a velocity of 40 to 80 knots between 20,000 and 40,000 ft. The actual winds at H-hour were as forecast.

H-hour was at 0520 PST (1320 GMT) 17 March 1953. This shot was the so-called "open shot" with wide coverage by radio, television, and newsmen.

The nuclear device was detonated at the scheduled H-hour, 0520 PST, and the operation was highly successful. The fireball yield was estimated at 17 kt. A total of 42 test aircraft sorties were flown in support of this shot, with participating aircraft as follows:

No.	Type	Project	Code Name
3	B-29	6.2 IBDA	Dish Rag 1, 2, and 3
1	P2V2	6.3 Radiac	Motor Boat
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
13	B-29	6.3 SAC IBDA	Backbone
1	AD2	5.1 Navy drone	Duck Bill Dog
2	F8F	5.1 Drone mother	Duck Bill 1 and 2
2	AD4	5.1 Armed escort	Duck Bill 6 and 7
1	C-47	DWET photo	Tin Type
1	B-50	13.1 Sampler controller	Skull Cap
9	F-84	13.1 Sampling	Tiger Red, White, and Blue 1, 2, 3, and 4
1	L-20	On-site terrain survey	Ever Ready 4
1	C-45	6.10	Cattle Car
1	C-47	Off-site terrain survey	Rag Mop

The Navy Drone (Project 5.1) was flown as a manned aircraft due to technical difficulties which prevented a nullo mission; however, as a manned operation, much valuable information was gained by placing the aircraft at 17,000 ft MSL and 9000 ft beyond Ground Zero at H-hour. This mission provided an excellent check on their calculations of the effect that a drone aircraft flying at 9000 ft MSL and 3600 ft beyond Ground Zero would have received.

The participating aircraft in Project 6.2, Indirect Bomb Damage Assessment, did not obtain all their desired data because of a misunderstanding of the aircrews at briefing on the exact "time count down" to be made prior to H-hour. This deficiency was corrected at the debriefing.

The cloud-sampling operation was directed by the sampler controller (Skull Cap) directing the F-84 samplers with excellent results. The requirement for shot ANNIE was to obtain a fraction of 2×10^{-10} of the fissionable material for a 20-kt device. This is a relatively small sample and required an exposure of only 0.1 r at H + 2 hr.

The cloud height was forecast to be approximately 39,000 ft, and the winds were forecast to be fairly strong. The plan was to delay sampling as long as possible, in this case 2½ hr, thereby increasing the ratio of sample size vs exposure.

The aircraft were alerted to depart at 10-min intervals, and the first sampler penetrated at 0737. Cirrus cloud layers at various altitudes caused some difficulty.

Peak intensities for the first samplers were about 9 r/hr, and sampling proceeded normally.

Seven aircraft sampled and in all cases obtained a sample equal to or better than that required. Four air or "snap" samples were taken for AF

One instrument failure occurred on Tiger Red 2. This was the wing tip ion chamber and was caused by the dynamic condenser.

The ratios of "integron-last pass" over "integron-landing" were checked and in all cases indicated that approximately 50% of the total exposure was received on the return trip home. This being much higher than it should indicated that the aircraft were being contaminated by particles sticking to the airplane surface. This was not serious, however, on this shot due to the low exposure required.

Requisitions were put in immediately for an acid brightener and polishing agent. This was obtained, and a program was initiated to have all aircraft polished as soon as possible. There were only two experienced sampler pilots on this operation, the remainder being uninitiated personnel who had had intensive training by the 4925th Test Group (Atomic). The highly successful results obtained on this operation speak very well of the personnel conducting this training program.

Communications at the Control Point for this operation were very unsatisfactory; however, by making on-the-spot improvisations, radio contact was not lost with any of the aircraft, and all necessary data were obtained from the participating aircraft.

The mission of Air Test Operations for this shot was completed on D + 1 day, 18 March 1953, when the low-level C-47 off-site terrain survey aircraft landed at Indian Springs Air Force Base, Nevada, at approximately 1330 PST.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation One, 1320 GMT, 17 March 1953

Cloud Cover: Six tenths cirrus stratus above 30,000 ft MSL
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4025 ft MSL
Burst Height: 4325 ft MSL

Pressure:	Ground Zero	876 mb
	Burst height	866 mb
Virtual Temperature:	Ground Zero	37.4°F
	Burst height	47.0°F
Actual Temperature:	Ground Zero	36.9°F
	Burst height	46.2°F
Relative Humidity:	Ground Zero	43%
	Burst height	38%
Altimeter Setting:	30.08 at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface, light and variable			16,000	280°	20 knots
6,000	350°	07 knots	18,000	270°	50 knots
8,000	330°	10 knots	20,000	270°	42 knots
10,000	270°	18 knots	25,000	270°	60 knots
12,000	260°	15 knots	30,000	260°	60 knots
14,000	280°	20 knots	35,000	280°	71 knots
15,000	280°	20 knots	40,000	260°	93 knots

Height of Tropopause: 37,000 ft MSL

Table B.1—TEST AIRCRAFT OPERATIONAL DATA FOR SHOT ANNIE 17 MARCH 1953, 1320 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-29	Dish Rag 1	IBDA	KAFB	0845	1139	1348	1555	Desired information was not received because high-speed cameras were not started at the proper time due to misunderstanding in communications procedures.
B-29	Dish Rag 2	IBDA	KAFB	0855	1143	1330	1535	
B-29	Dish Rag 3	IBDA	KAFB	0906	1213	1346	1540	
P2V2	Motor Boat	Radiac	KAFB	0915	1216	1548	1606	Completed mission successfully.
P2V2	Motor Boat	Radiac	ISAFB	0041	0100	0135	0155	Completed mission successfully.
P2V2	Motor Boat	Radiac	ISAFB	1351			1356	Mission was not successful due to loss of an engine on take-off.
B-29	Cook Book 1	Tracking	KAFB	1005	1250	2053	2205	Cook Book 1 and 2 did not start tracking mission until approximately 90 min after H-hour due to misunderstanding between their briefing and Gear Box control.
B-29	Cook Book 2	Tracking	KAFB	1019	1306	2130	2145	
B-29	Cook Book 3	Tracking	ISAFB	1336	1351	1737	1752	Flew a successful mission.
B-29	Back Bone	SAC IBDA	Travis AFB	Unknown	1108	1240	Unknown	Thirteen B-29's participated and were in position at H-hour.
AD-2	Duck Bill Dog	5.1	ISAFB	1220	1229	1323	1343	This was a manned drone operation due to technical difficulties preventing a nullo mission.
F8F	Duck Bill 1	5.1	ISAFB	1207	1214	1326	1316	
F8F	Duck Bill 2	5.1	ISAFB	1213	1219	1350	1350	
AD4	Duck Bill 6	5.1	ISAFB	1214	1221	1335	1355	
AD4	Duck Bill 7	5.1	ISAFB	1216	1223	1339	1359	
C-47	Tin Type	Photo	ISAFB	1220	1240	1335	1348	In position at H-hour. Successful mission.
B-50	Skull Cap	Sampler controller	ISAFB	1308	1325	1819	1830	Performed an excellent mission
F-84	Tiger Blue 3	Sampler	ISAFB	1311	1331	1349	1409	Snooper aircraft. Eleven minutes after H-hour reported cloud was stabilizing with the base at 29,000 ft and the top at 40,000 ft.
F-84	Tiger Blue 3	Sampler	ISAFB	1503	1523	1612	1623	All samples obtained by the F-84 samplers were better than LASL requested by a factor of 2.
F-84	Tiger White 3	Sampler	ISAFB	1510	1530	1617	1637	
F-84	Tiger White 2	Sampler	ISAFB	1520	1541	1612	1632	
F-84	Tiger Blue 1	Sampler	ISAFB	1530	1549	1628	1649	
F-84	Tiger Blue 2	Sampler	ISAFB	1539	1550	1729	1749	
F-84	Tiger Red 1	Sampler	ISAFB	1550	1609	1650	1706	
F-84	Tiger Red 2	Sampler	ISAFB	1622	1640	1750	1808	
L-20	Ever Ready 4	Terrain survey	ISAFB	1322	1350	1430	1503	Completed satisfactory mission for Rad-Safe.
L-20	Ever Ready 4	Terrain survey	ISAFB	1556	1625	1810	1843	
C-45	Cattle Car	Army liaison	ISAFB	1505	1524	1621	1631	
C-47	Rag Mop	Terrain survey	ISAFB	1525	1545	2005	2025	Mission was completed successfully, but radio contact was lost for approximately 3 hr.
C-47	Rag Mop	Terrain survey	ISAFB	1653	1714	2110	2127	This mission was on 18 March. It was very successful with continued radio contact throughout.

Table B.2—MANNED SAMPLING DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1028, Tiger Red 1,	1	1623	3	70	0.1		1.7	36.2	Yes
F-84, 1032,	1	1657	2	32	0.06			36	No
Tiger Red 2,	2	1709	1.5	110	0.2	0.1		35	Yes
F-84, 1043, Tiger White 2,	1	1600	8	35	0.12	0.05	3.4	36	No
F-84, 1045,	1	1550	2	70	0.1	0.05	0.1	32.5	No
Tiger White 3,	2	1601	7	110	0.2	0.15	3.4	34.5	Yes
F-84, 1051,	1	1608	1.1	10	0.05			36.8	No
Tiger Blue 1,	2	1612	3	60	0.2	0.2	5.0	35.8	No
F-84, 1054, Tiger Blue 2,	1	1657	1.4	4	0.17		5.5	36.5	No
F-84, 1055,	1	1537	1.5	80	0.05		1	39	No
Tiger Blue 3,	2	1551	2	40	0.14		2.1	37	Yes

Table B.3—RADIATION RECEIVED BY PERSONNEL ON SHOT ANNIE 17 MARCH 1953, 1320 GMT

Name	Position	Reading, mr
	Terrain Survey	
	Instrument pilot	20
	Samplers	
	Pilot	150
	Pilot	310
	Pilot	150
	Pilot	370
	Pilot	230
	Pilot	150
	Pilot	400

Table B.4 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1028-A

		Contamination, mr/hr		
	Loading	First reading, 17 March, 1715 hr	Second reading, 18 March, 1730 hr	Third reading, 19 March, 1735 hr
Cockpit				
Air intake (6 in. inside)	140	140	14	4
Right bomb rack		180	19	6
Right wing (leading edge)		120	24	10
Right pylon rack				
Right wing tip			16	3
Right wing tip tank	450	150	14	4
Right side turbine	220	220	21	9
Right horizontal stabilizer		120	20	6
Tail pipe (6 in. inside)		140	17	5
Left horizontal stabilizer		120	20	6
Left side turbine	210	210	21	9
Left wing tip tank	400	110	14	5
Left wing tip			18	5
Left pylon rack				
Left wing (leading edge)		110	26	10
Left bomb rack		180	19	8
Dive brake		400	31	12

Note: Decontamination used after first and second readings, natural decay.

Table B.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1043-A

		Contamination, mr/hr		
	Loading	First reading, 17 March, 1640 hr	Second reading, 18 March, 1600 hr	Third reading, 18 March, 2320 hr
Cockpit				
Air intake (6 in. inside)	300	300	17	7
Right bomb rack		350	19	6
Right wing (leading edge)		240	20	8
Right pylon rack				
Right wing tip			17	2
Right wing tip tank	1000	140	16	3
Right side turbine	220	220	18	9
Right horizontal stabilizer		200	20	5
Tail pipe (6 in. inside)		250	14	7
Left horizontal stabilizer		240	18	5
Left side turbine	270	270	21	11
Left wing tip tank	750	160	16	6
Left wing tip			18	6
Left pylon rack				
Left wing (leading edge)		200	24	10
Left bomb rack		270	18	9
Dive brake	1200	1200	32	13

Note: Decontamination used after first reading, natural decay; after second reading, gunk and Tide.

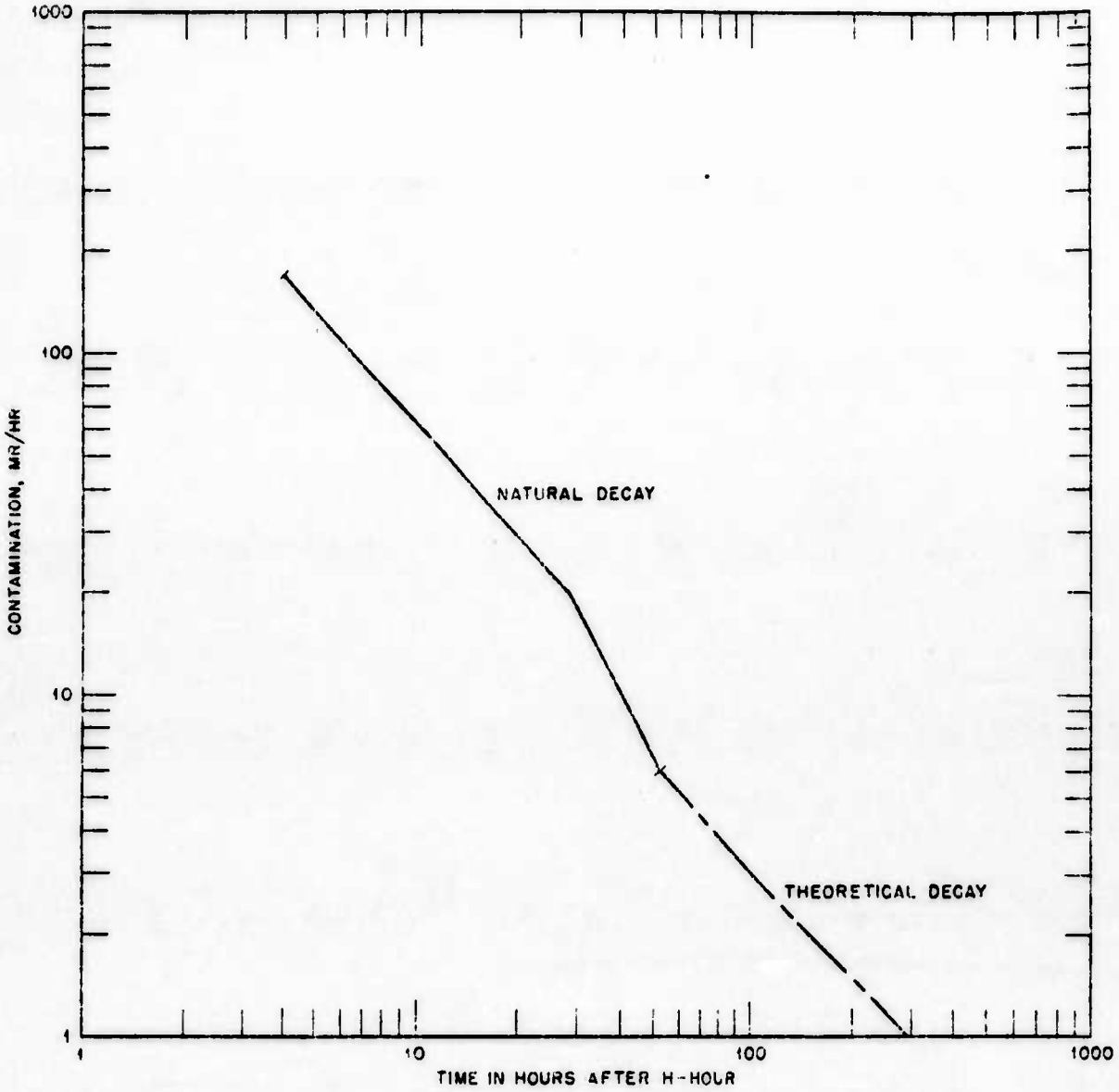

Fig. B.1 — F-84G aircraft contamination; Shot ANNIE, 17 March 1953; aircraft No. 51-1028-A. Time of first survey, 0915 PST (1715 GMT). Values plotted are average over-all aircraft contamination.

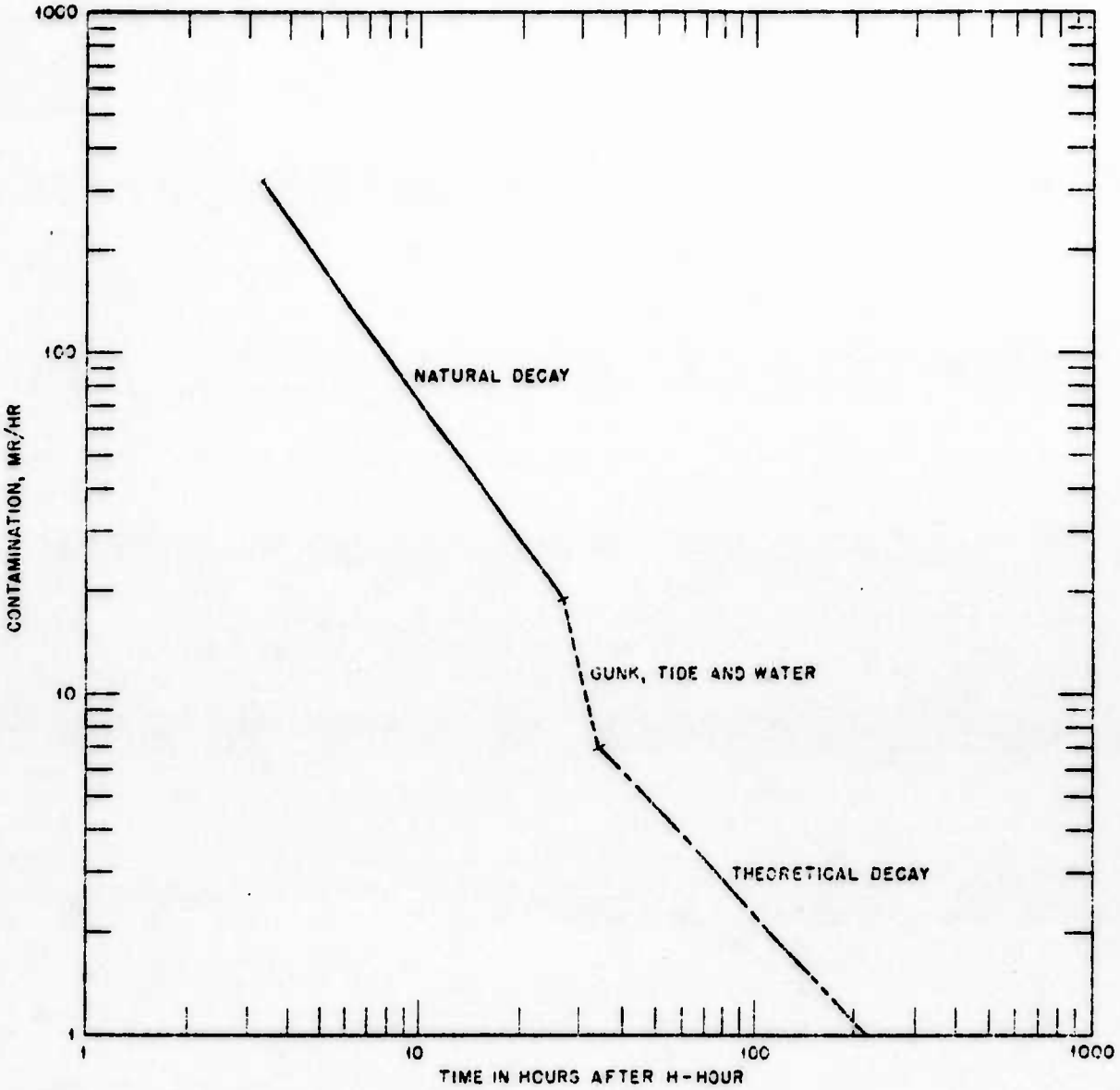

Fig. B.2 — F-84G aircraft contamination; Shot ANNIE 17 March 1953; aircraft No. 51-1043-A. Time of first survey, 0640 PST (1640 GMT). Values plotted are average over-all aircraft contamination.

Table B.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1045-A

	Contamination, mr/hr			
	Loading	First reading, 17 March, 1700 hr	Second reading, 18 March, 1620 hr	Third reading, 18 March, 2140 hr
Cockpit				
Air intake (6 in. inside)	370	370	20	17
Right bomb rack		240	20	12
Right wing (leading edge)		180	30	19
Right pylon rack				
Right wing tip			19	6
Right wing tip tank	2400	300	13	8
Right side turbine	900	390	25	14
Right horizontal stabilizer		320	23	11
Tail pipe (6 in. inside)	600	300	20	14
Left horizontal stabilizer		270	22	11
Left side turbine	900	340	29	16
Left wing tip tank	1700	160	14	9
Left wing tip			18	9
Left pylon rack				
Left wing (leading edge)		170	32	18
Left bomb rack		240	20	14
Dive brake	1100	400	44	23

Note: Decontamination used after first reading, natural decay; after second reading, gunk and Tide.

Table B.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1032-A

	Contamination, mr/hr					
	Loading	First reading, 17 March, 1820 hr	Second reading, 18 March, 1745 hr	Third reading, 19 March, 1540 hr	Fourth reading, 19 March, 1720 hr	Fifth reading, 19 March, 2315 hr
Cockpit						
Air intake (6 in. inside)	900	480	54	32	22	15
Right bomb rack		420	60	26	14	12
Right wing (leading edge)		400	100	45	24	18
Right pylon rack						
Right wing tip			45	25	7	7
Right wing tip tank	2100	340	44	26	6	5
Right side turbine	925	700	60	31	19	11
Right horizontal stabilizer		380	70	31	12	9
Tail pipe (6 in. inside)	400	400	42	23	12	10
Left horizontal stabilizer		480	65	31	8	8
Left side turbine	900	500	60	34	17	12
Left wing tip tank	2300	350	44	22	6	5
Left wing tip			46	28	8	6
Left pylon rack						
Left wing (leading edge)		460	110	44	21	16
Left bomb rack		410	70	29	17	13
Dive brake		1200	125	52	34	18

Note: Decontamination used after first and second readings, natural decay; after third and fourth readings, Tide.

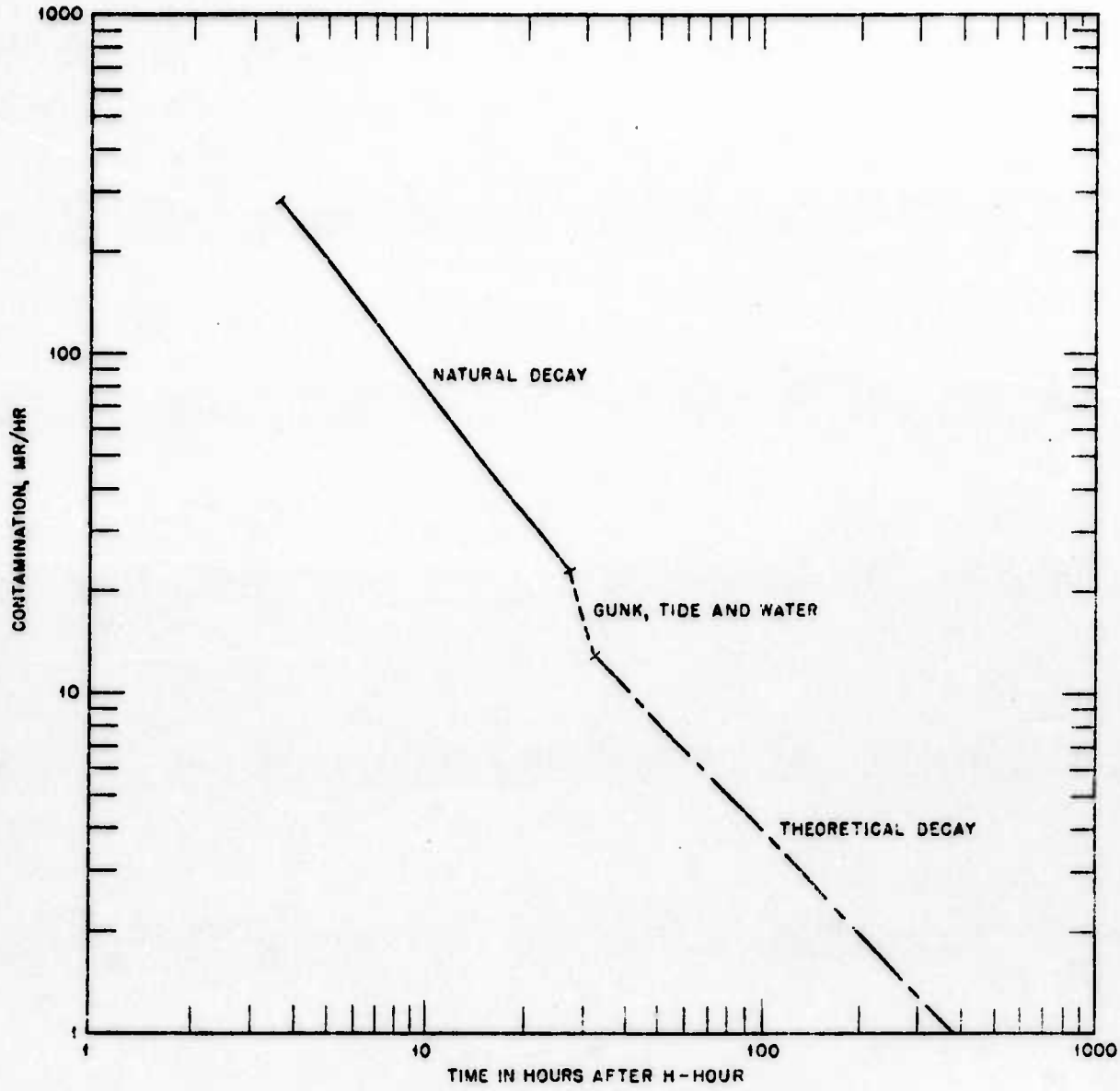

Fig. B.3 — F-84G aircraft contamination; Shot GNOME, 17 March 1953; aircraft No. 51-1045-A. Time of first survey, 0900 PST (1700 GMT). Values plotted are average over-all aircraft contamination.

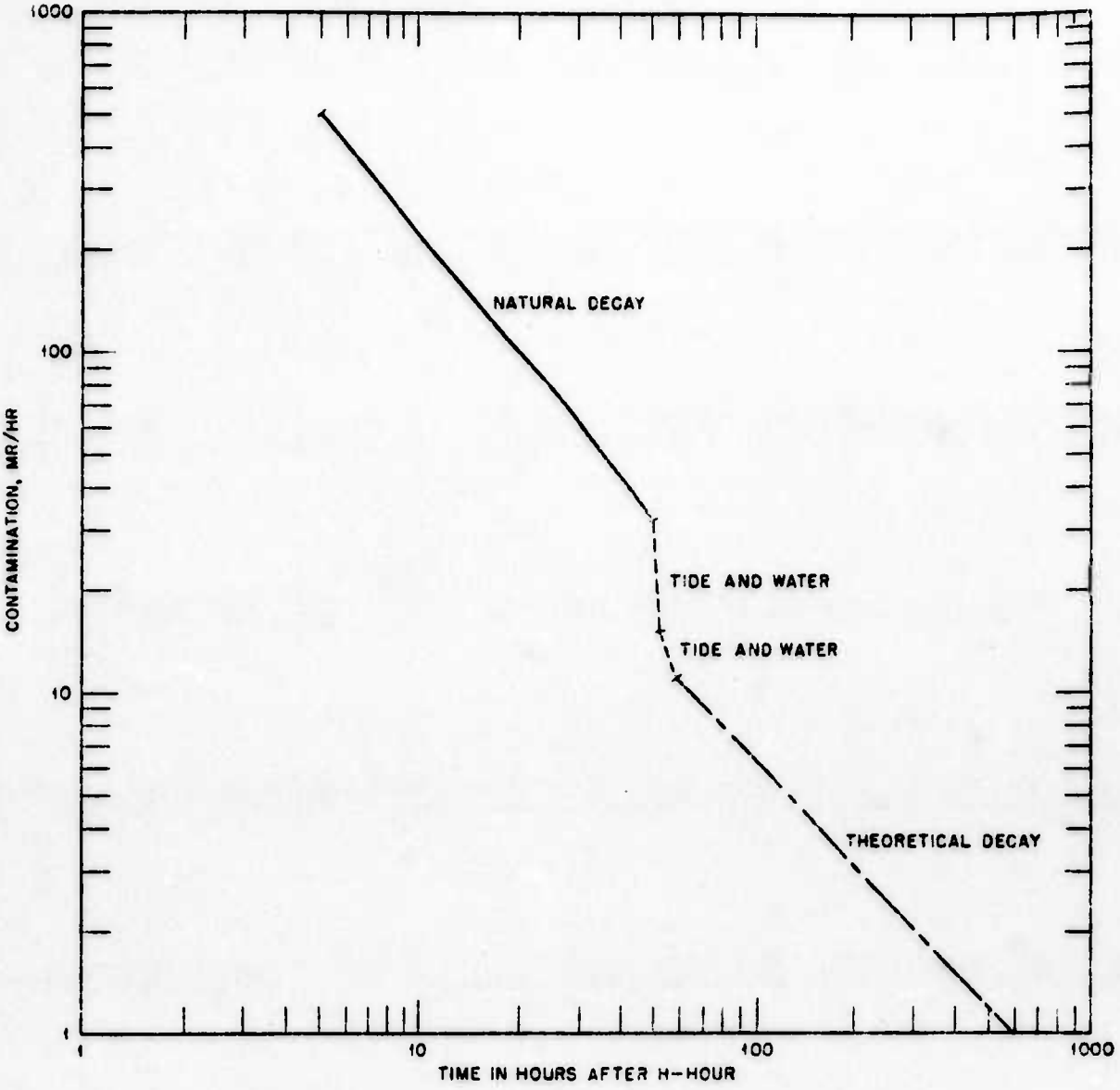

Fig. B.4 — F-84G aircraft contamination; Shot ANNIE, 17 March 1953; aircraft No. 51-1032-A. Time of first survey, 1020 PST (1820 GMT). Values plotted are average over-all aircraft contamination.

Table B.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1051-A

	Contamination, mr/hr				
	Loading	First reading, 17 March, 1805 hr	Second reading, 18 March, 1715 hr	Third reading, 19 March, 1750 hr	Fourth reading, 19 March, 2225 hr
Cockpit					
Air intake (6 in. inside)	460	380	38	14	14
Right bomb rack		450	36	16	10
Right wing (leading edge)		320	110	28	16
Right pylon rack					
Right wing tip	1000	290	39	15	8
Right wing tip tank			39	14	6
Right side turbine	600	480	110	20	11
Right horizontal stabilizer		360	40	16	9
Tail pipe (6 in. inside)	400	360	35	14	9
Left horizontal stabilizer		300	42	17	9
Left side turbine	500	480	110	20	11
Left wing tip tank	600	300	33	14	6
Left wing tip			34	16	9
Left pylon rack					
Left wing (leading edge)		270	110	26	19
Left bomb rack		410	130	17	13
Dive brake		1000	140	35	18

Note: Decontamination used after first and second readings, natural decay; after third reading, Tide.

Table B.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1054-A

	Contamination, mr/hr			
	Loading	First reading, 17 March, 1755 hr	Second reading, 18 March, 1735 hr	Third reading, 19 March, 1545 hr
Cockpit				
Air intake (6 in. inside)	280	280	22	8
Right bomb rack		170	24	7
Right wing (leading edge)		110	44	12
Right pylon rack				
Right wing tip			20	6
Right wing tip tank	600	140	18	4
Right side turbine	200	200	32	10
Right horizontal stabilizer		150	28	8
Tail pipe (6 in. inside)		180	24	7
Left horizontal stabilizer		170	28	6
Left side turbine	220	220	31	12
Left wing tip tank	500	100	18	5
Left wing tip			25	8
Left pylon rack				
Left wing (leading edge)		110	45	12
Left bomb rack		140	23	9
Dive brake	500	500	100	22

Note: Decontamination used after first reading, natural decay; after second reading, natural decay and Tide.

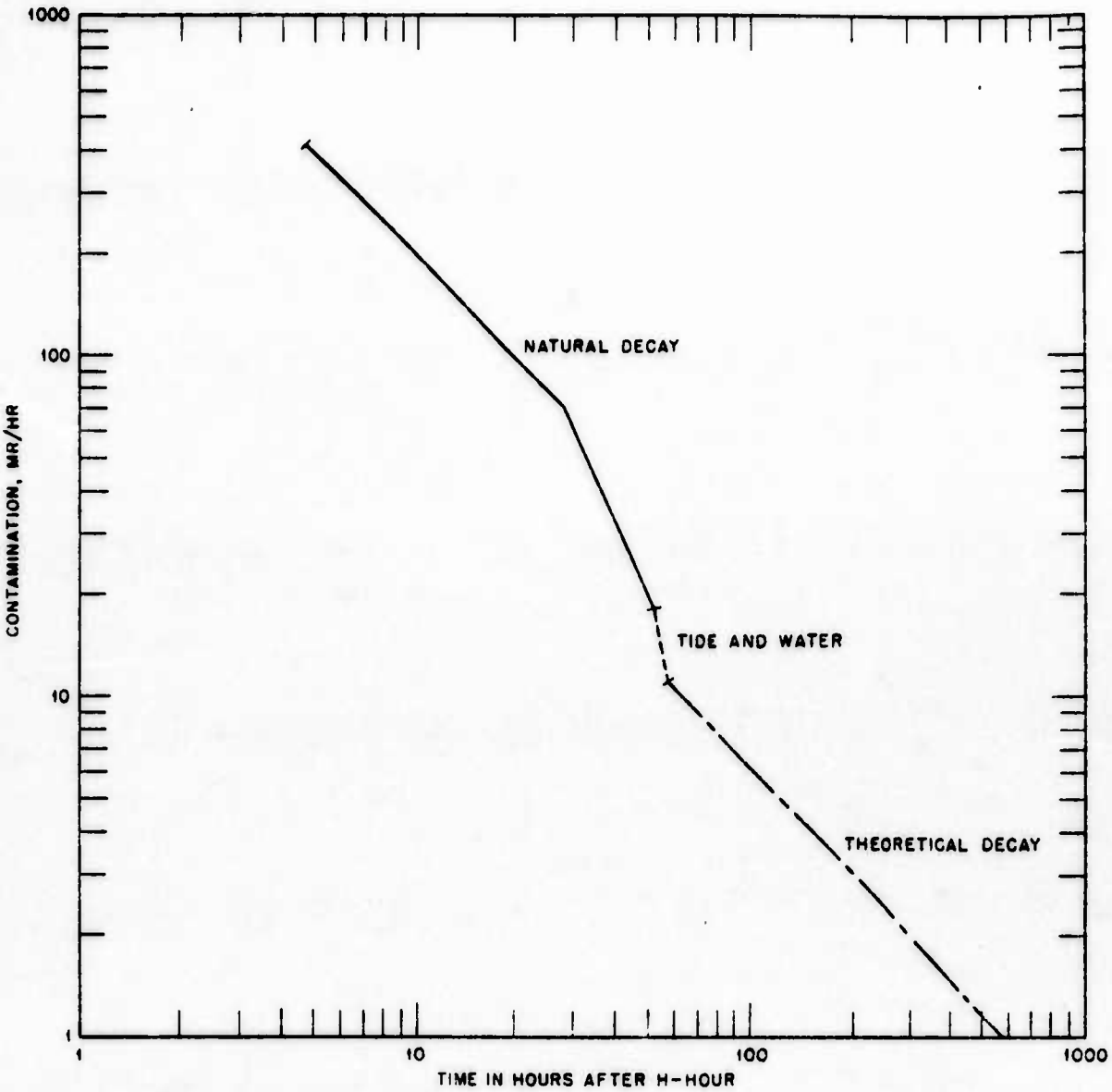

Fig. B.5 — F-84G aircraft contamination; Shot ANNIE, 17 March 1953; aircraft No. 51-1051-A. Time of first survey, 1005 PST. Values plotted are average over-all aircraft contamination.

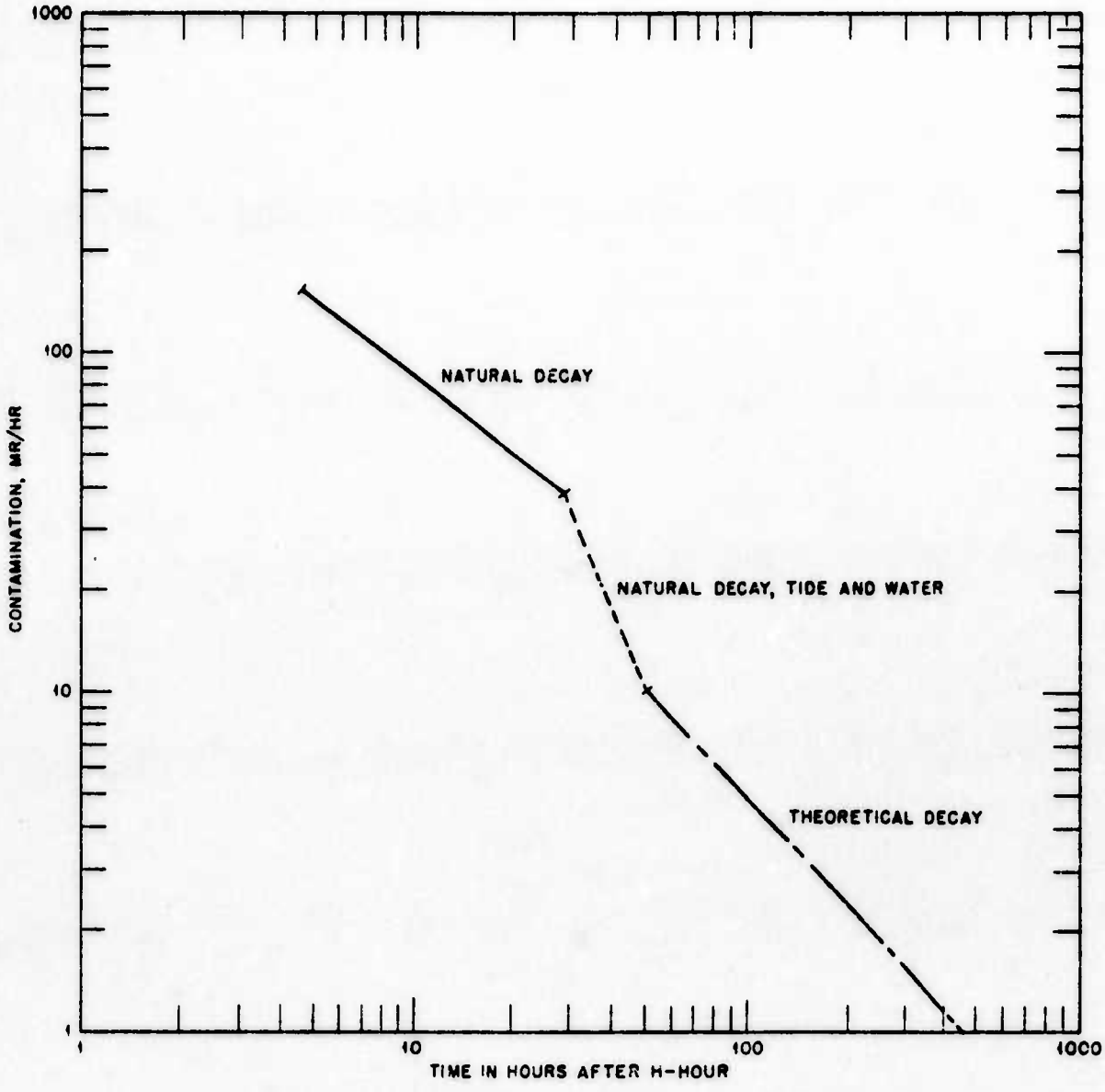

Fig. B.6—F-84G aircraft contamination; Shot ANNIE, 17 March 1953; aircraft No. 51-1054-A. Time of first survey, 0955 PST (1755 GMT). Values plotted are average over-all aircraft contamination.

Table B.10— F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 51-1055-A

	Loading	Contamination, mr/hr		
		First reading, 17 March, 1629 hr	Second reading, 18 March, 1710 hr	Third reading, 18 March, 1550 hr
Cockpit				
Air intake (6 in. inside)	360	360	9	7
Right bomb rack		120	11	6
Right wing (leading edge)		80	18	8
Right pylon rack				
Right wing tip			9	4
Right wing tip tank	750	50	7	7
Right side turbine	150	150	18	9
Right horizontal stabilizer		100	12	5
Tail pipe (6 in. inside)	110	110	10	7
Left horizontal stabilizer		90	12	4
Left side turbine	140	120	16	9
Left wing tip tank	420	80	6	4
Left wing tip			10	5
Left pylon rack				
Left wing (leading edge)		60	16	6
Left bomb rack		140	13	5
Dive brake		360	24	12

Note: Decontamination used after first reading, natural decay; after second reading, Tide.

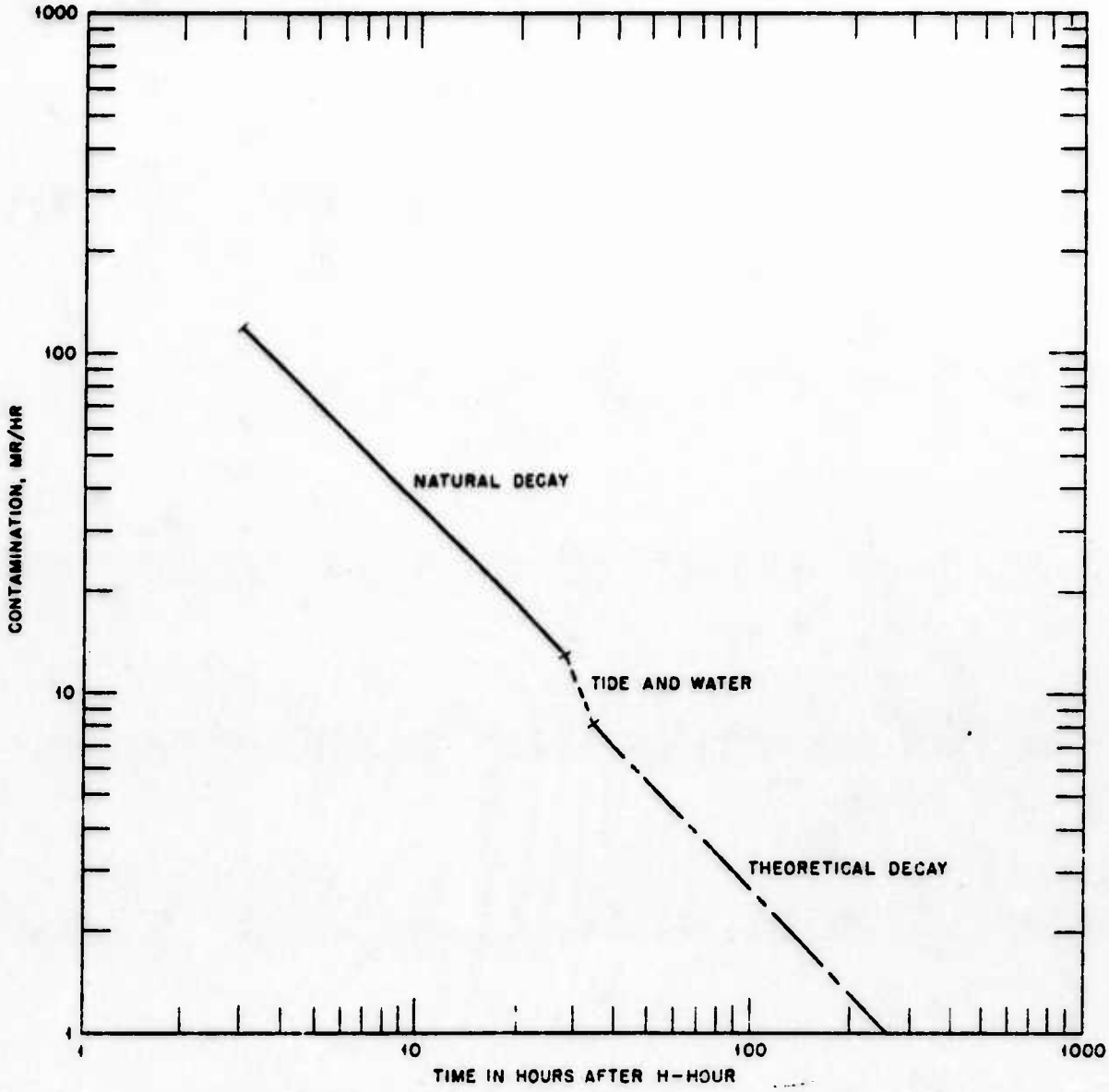

Fig. B.7 — F-84G aircraft contamination; Shot ANNIE. 17 March 1953; aircraft No. 51-1055-A. Time of first survey, 0829 PST (1629 GMT). Values plotted are average over-all aircraft contamination.

Table B.11 — B-50 AIRCRAFT CONTAMINATION DATA FOR SHOT ANNIE, 17 MARCH 1953, 1320 GMT, AIRCRAFT NO. 7166

	Loading	Contamination, mr/hr	
		First reading, 19 March, 1615 hr	Second reading, 19 March, 1900 hr
Nose		2	
Air intake engine 3	6	3	
Left turboengine 3		7	
Right turboengine 3		10	
Air intake engine 4	6	3	
Left turboengine 4		20+	6
Right turboengine 4		20+	11
Right wing (leading edge)		2	
Right scanner blister		2	
Right horizontal stabilizer		2	
Left horizontal stabilizer		2	
Left scanner blister		2	
Left wing (leading edge)		2	
Air intake engine 1	8	2	
Left turboengine 1		20+	2
Right turboengine 1		20+	3
Air intake engine 2	6	5	
Left turboengine 2		6	
Right turboengine 2		9	
Filter box, left wing			
Left wheel well door		6	
Antenna		20+	2
Radar radome		7	
Pitot tube		2	
A-1 filter box			
Right wheel well door		11	
Filter box, right wing			
Cockpit			

Note: Decontamination used after first reading, gunk and Tide.

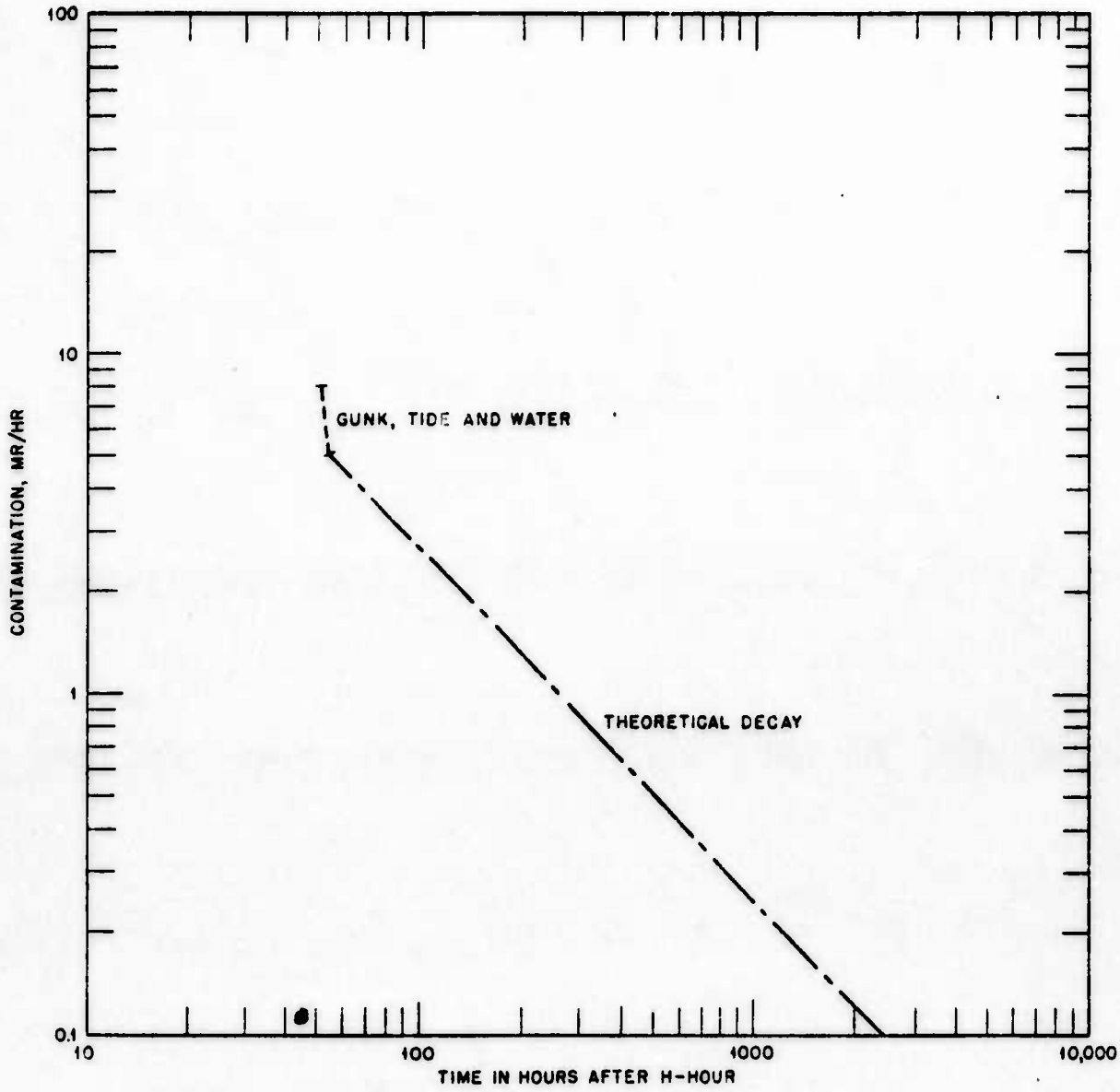

Fig. B.8—B-50 aircraft contamination; Shot ANNIE, 17 March 1953; aircraft No. 7166. Time of first survey, 0815 PST (1615 GMT). Values plotted are average over-all aircraft contamination.

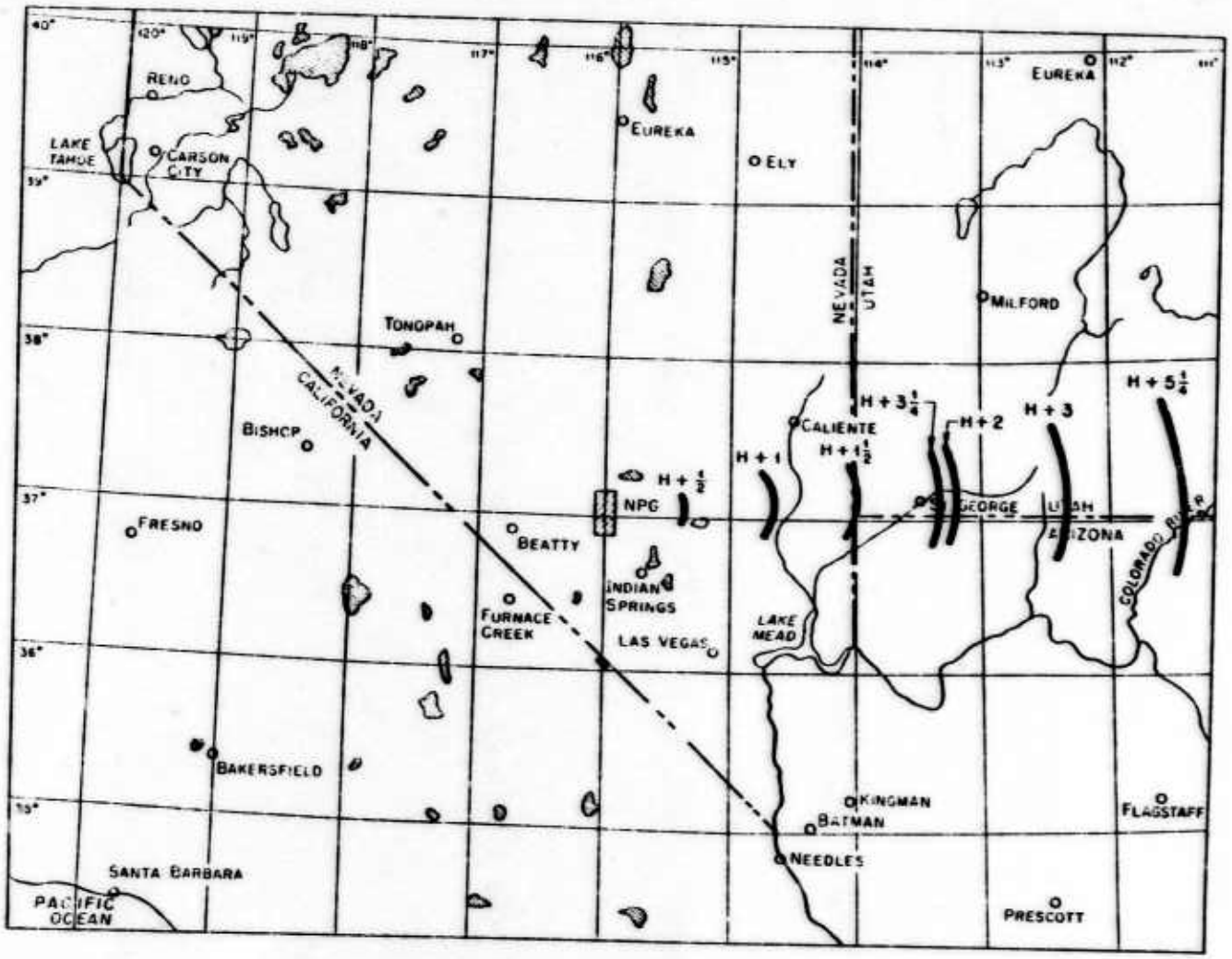

Fig. B.9—Cloud track, Shot ANNIE, 17 March 1953.

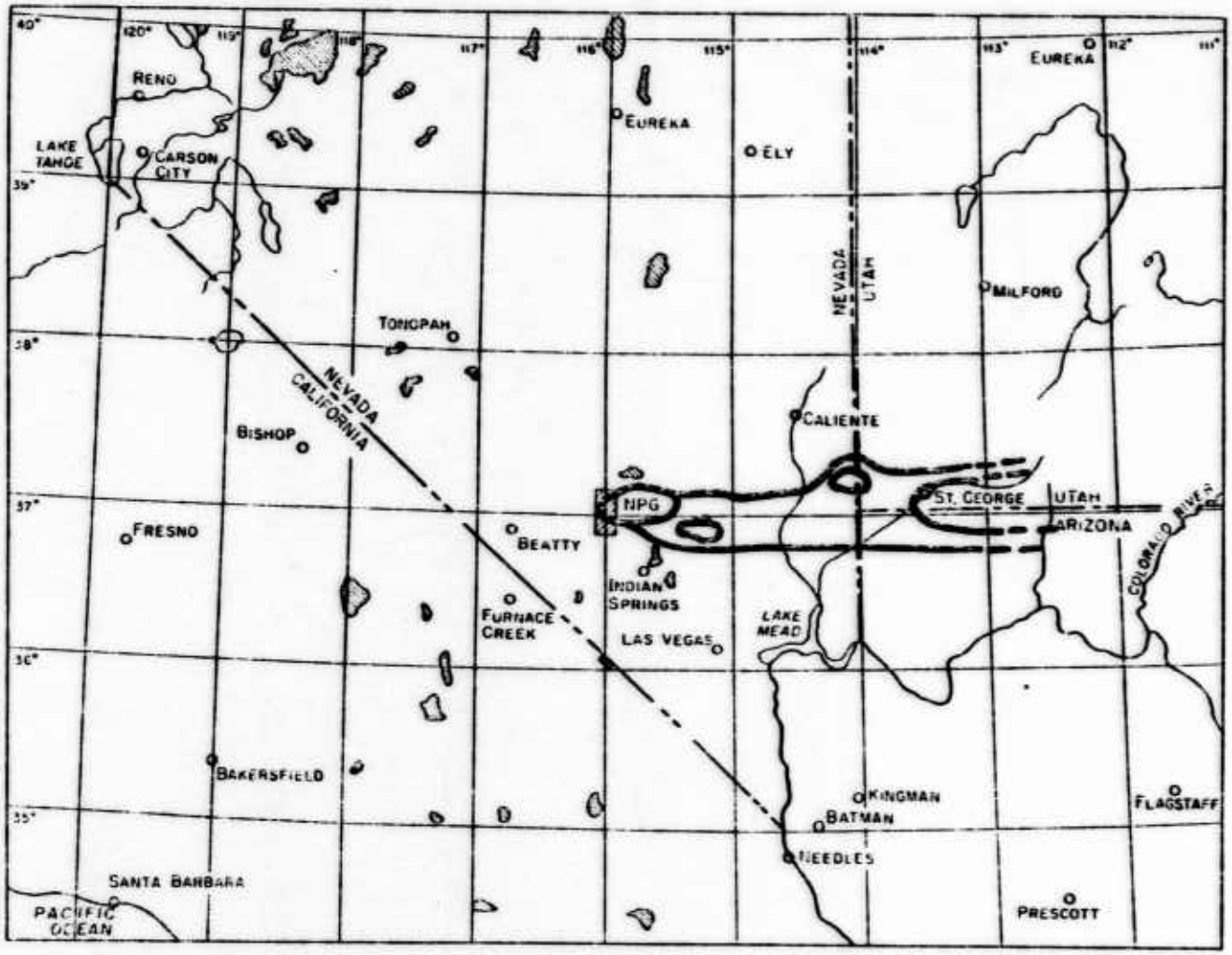

Fig. B.10 — Fall-out data plot, aerial survey, Scintelog survey instrument, Shot ANNIE, 17 March 1953.

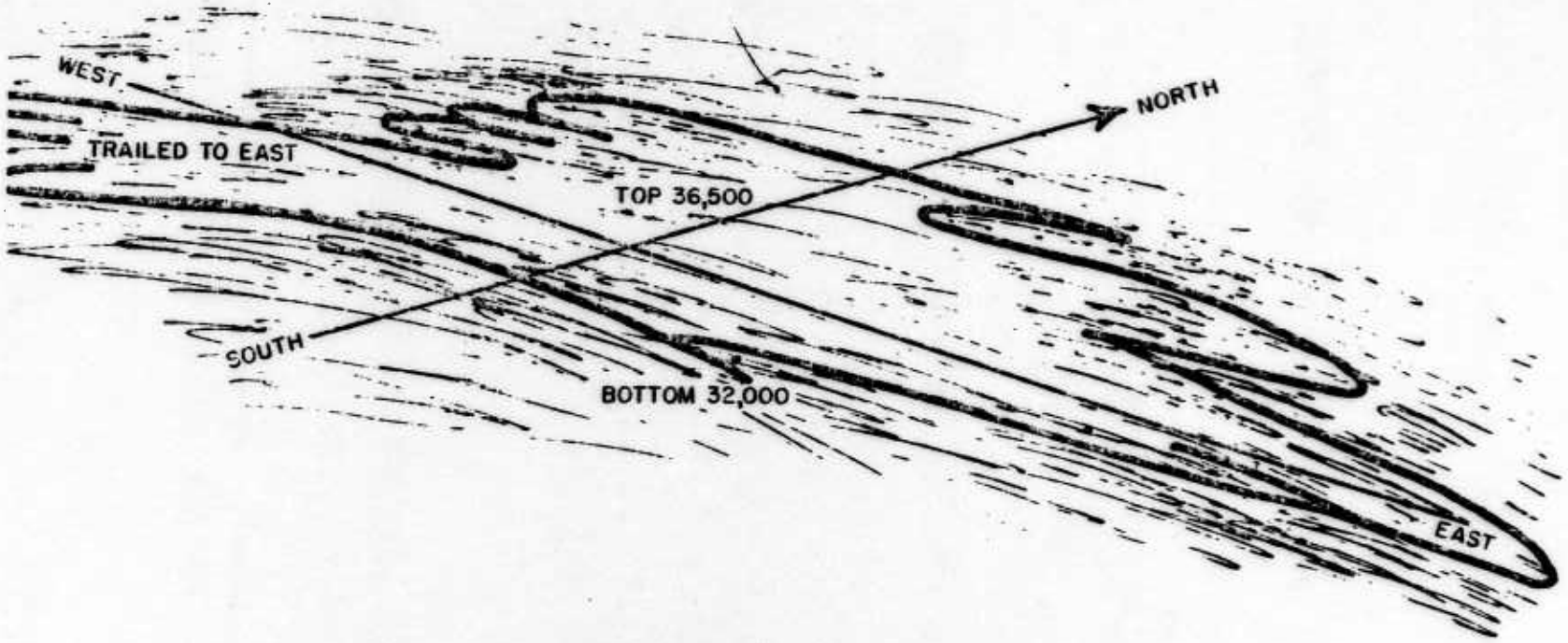

Fig. B.11 — Shot ANNIE, 17 March 1953; time, H + 4 hr.

ANNEX C

NANCY SHOT SUMMARY

Final preparations for the NANCY test were begun at 2100 PST, 23 March 1953, with a weather conference at the Control Point. The weather was clear with winds at 20,000 ft from 210° at 20 knots and at 40,000 ft from 220° at 32 knots. Briefings for this shot were held at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, at 1300 hr.

The Test Manager and the Test Director were advised that Project 5.1 would participate on this shot with an unmanned drone to be at 11,000 ft MSL and 7000 ft horizontal distance beyond Ground Zero at Time Zero. H-hour was set at 0510 PST (1310 GMT).

The shot was successfully detonated at the predetermined time with an estimated yield of 24 kt, and aircraft participation was very successful. There were 51 sorties flown by operational aircraft. Aircraft participating were as follows:

No.	Type	Project	Code Name
9	F-84	13.1 Sampling	Tiger Red, White, and Blue 1, 2, 3, and 4
3	B-29	6.2 IBDA	Dish Rag 1, 2, and 3
1	P2V2	6.9 Radiac	Motor Boat
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
13	B-36	6.3 SAC IBDA	Back Bone
1	AD2	5.1 Navy drone	Duck Bill Dog
2	F8F	5.1 Drone mother	Duck Bill 1 and 2
2	AD4	5.1 Armed escort	Duck Bill 6 and 7
1	C-47	Photo	Tin Type
1	B-50	13.1 Sampler controller	Skull Cap
2	L-20	On-site terrain survey	Ever Ready 4 and 5
1	C-45	Project 6.10	Cattle Car
1	C-47	Off-site terrain survey	Rag Mop
1	B-29	Cloud sampler	Cat Nip
1	H-18	Terrain survey	Fire Fly 2
1	H-5	Terrain survey	Fire Fly 1

The Navy "nullo" drone operation, Project 5.1, was highly successful with the required data being obtained.

This shot was considered an important one from the standpoint of obtaining good samples. The requirement was to fly nine F-84's and one B-29 to obtain 10 particulate samples, nine snap samples, and one gas sample from a B-29.

A minimum fraction of 2×10^{-9} for a 35-kt device was desired. This is 10 times more sample than was required for a larger weapon and necessitated an exposure of 1.51 r at a penetration time of H + 2 hr.

In preparation for this mission all aircraft were cleaned and polished within an area of 8 ft of the pilot. Instruments were checked carefully, and two practice missions were flown in addition to local transition.

By this time six F-84's were equipped with lead lined seats, and four prototype lead glass vests were completed.

It was planned to delay penetration as long as possible after detonation in order to increase sample sizes.

A new method of directing the F-84 sampler to the cloud was used for this mission. The navigator aboard the airborne control B-50 figured time and vectors for the F-84's from Indian Springs to a rendezvous point with the B-50; from there they were directed into the atomic cloud. This procedure worked nicely and was used for the rest of the missions. F-84's were also given a vector home upon completion of sampling mission.

The weather forecast was for clear skies and moderately high winds aloft. This forecast verified for the mission, and the delaying of sampling time past H + 2 hr was feasible.

The first penetration was a tangential one to determine that peak intensities approximated those expected.

The first penetration was made at H + 2 hr 50 min, and a peak intensity of 10 r/hr was noted. This was considered a logical reading, and sampling continued with approximately 20-min intervals between sampling aircraft. Examination of sampling data shows that peaks of from 10 r/hr to 1.5 r/hr were encountered between times of H + 2 hr 50 min to H + 5 hr 53 min.

No attempt is made to determine the quality of the samples obtained; however, quantitatively the worst sample was 4% less than the minimum required.

Ratios of (integron−last pass)/(film badge−pilot) were checked and found to average 0.873. Comparing this to ratios of (integron−last pass)/(integron−landing), which averaged 0.7, we see that only 13% of the total exposure was used for the return trip home and also that the saving in exposure from use of lead seats and lead glass vests averaged 17% for the particular mission. This was very gratifying and indicated an even more positive control than was thought possible.

The entire aircraft participation on this shot appeared to be a routine matter, with the "opening shot jitters," which were apparent on the first operation, being absent.

Radio communications for this test were much improved over the ANNIE shot. However, more work needed to be done to provide complete assurance for the quality of operation required.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Two, 1310 GMT, 24 March 1953

Cloud Cover: Clear
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4308 ft MSL
Burst Height: 4608 ft MSL

Pressure:	Ground Zero	870 mb
	Burst height	860 mb
Virtual Temperature:	Ground Zero	10.4°C
	Burst height	13.9°C
Actual Temperature:	Ground Zero	9.9°C
	Burst height	13.3°C
Relative Humidity:	Ground Zero	39%
	Burst height	31%
Altimeter Setting:	30.09 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	310°	02 knots
6,000	140°	04 knots
8,000	150°	16 knots
10,000	150°	12 knots
15,000	220°	12 knots
20,000	210°	20 knots
25,000	210°	25 knots
30,000	220°	31 knots
35,000	210°	27 knots
40,000	220°	32 knots

Height of Tropopause: 39,300 ft MSL

Table C.1—TEST AIRCRAFT OPERATIONAL DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-29	Dish Rag 1	IBDA	KAFB	0825 Z			1137 Z	1½ hr after take-off, aircraft aborted mission and returned to KAFB; oil leak in No. 3 engine.
B-29	Dish Rag 2	IBDA	KAFB	0835 Z	1049 Z	1328 Z	1555 Z	Very successful mission.
B-29	Dish Rag 3	IBDA	KAFB	0845 Z	1053 Z	1326 Z	1545 Z	Sector scan on APS 23 failed; mission otherwise was successful.
P2V2	Motor Boat	Radiac	KAFB	0855 Z	1120 Z	1425 Z	1429 Z	Mission very successful; desired information obtained.
P2V2	Motor Boat	Radiac	ISAFB	0001 Z	0010 Z	0125 Z	0134 Z	Mission very successful; desired information obtained.
P2V2	Motor Boat	Radiac	ISAFB	1354 Z	1405 Z	1525 Z	1543 Z	Mission very successful; desired information obtained.
B-29	Cook Book 1	Tracking	KAFB	1005 Z	1230 Z	1929 Z	2116 Z	Communications with Gear Box were poor.
B-29	Cook Book 2	Tracking	KAFB	1055 Z	1310 Z	1929 Z	2106 Z	Take-off delayed due to mechanical difficulties on No. 3 engine.
B-25	Cook Book 3	Tracking	ISAFB	1725 Z	1735 Z		1806 Z	
B-36	Back Bone	SAC IBDA	Carswell	Unknown	1236 Z	1320 Z	Unknown	Twelve B-36's in position at H-hour.
AD2	Duck Bill Dog	5.1	ISAFB	1159 Z	1210 Z	1318 Z	1329 Z	First successful nullo drone flight in ZI nuclear tests. Aircraft was at an altitude of 11,000 ft and 7000 ft horizontal from Ground Zero. Take-off and landing of drone was accomplished without difficulties.
F8F	Duck Bill 1	5.1	ISAFB	1124 Z	1210 Z	1318 Z	1332 Z	
F8F	Duck Bill 2	5.1	ISAFB	1125 Z	1210 Z	1318 Z	1331 Z	
AD4	Duck Bill 6	5.1	ISAFB	1125 Z	1210 Z	1318 Z	1333 Z	
AD4	Duck Bill 7	5.1	ISAFB	1126 Z	1210 Z	1318 Z	1334 Z	
F-84	Tiger Red 1	Sampler	ISAFB	1302 Z	1311 Z	1330 Z	1343 Z	Snooper. Nine minutes after H-hour reported top of cloud at 43,000, base at 36,000.
F-84	Tiger Red 1	Sampler	ISAFB	1500 Z	1502 Z	1702 Z	1710 Z	Samples obtained were 1.5 to 3.5 factors better than that requested by LASL.
F-84	Tiger Red 2	Sampler	ISAFB	1510 Z	1512 Z	1643 Z	1649 Z	
F-84	Tiger Red 3	Sampler	ISAFB	1520 Z	1522 Z	1644 Z	1652 Z	
F-84	Tiger White 1	Sampler	ISAFB	1530 Z	1532 Z	1730 Z	1740 Z	

F-84	Tiger White 2	Sampler	ISAFB	1623 Z	1625 Z	1828 Z	1832 Z	
F-84	Tiger White 3	Sampler	ISAFB	1629 Z	1632 Z	1900 Z	1907 Z	
F-84	Tiger Blue 1	Sampler	ISAFB	1641 Z	1643 Z	1908 Z	1915 Z	
F-84	Tiger Blue 2	Sampler	ISAFB	1655 Z	1658 Z	1910 Z	1920 Z	
F-84	Tiger Red 4	Sampler	ISAFB	1705 Z	1709 Z	1915 Z	1930 Z	
C-45	Cattle Car	Army liaison	ISAFB	1516 Z	1520 Z	1635 Z	1659 Z	Successful mission with information required obtained.
H-18	Fire Fly 2	Terrain survey	ISAFB	1532 Z	1558 Z	2008 Z	2037 Z	Stand-by at ISAFB for terrain survey.
L-20	Ever Ready 5	Terrain survey	ISAFB	1557 Z	1620			Stand-by at Yucca strip.
C-47	Rag Mop	Terrain survey	ISAFB	1611 Z	1630 Z	2100 Z	2118 Z	25 March 1953.
B-50	Skull Cap	Sampler controller	ISAFB	1255	1305	1950	2011	Directed samplers by the vector method which proved to be satisfactory.
B-50	Skull Cap 2	Sampler controller	ISAFB	1715			1915	Released by Gear Box to return to KAFB.
B-29	Cat Nip	Cloud sampler	ISAFB	1259	1325	1745	1801	AF sampler obtained satisfactory samples as directed by Skull Cap.
H-5	Fire Fly 1	Terrain survey	ISAFB	1313	1325	2008	2057	Obtained satisfactory terrain survey information for Rad-Safe.
L-20	Ever Ready 4	Terrain survey	ISAFB	1439	1500	1637	1657	Obtained satisfactory terrain survey information for Rad-Safe.
C-47	Rag Mop	Terrain survey	ISAFB	1527	1545	2010	2030	Successful mission; found very little fall-out. Good radio communications throughout.
C-47	Tin Type	Photo	ISAFB	1210	1225	1340	1350	In satisfactory position at H-hour.
HRS	Sand Blower A, B, C, and D	Marine	Desert Rock	1311	1311	1420	1500	60,000 ft from Ground Zero, engines full power with aircraft on the ground at H-hour. Immediately after flash aircraft were airborne and proceeding towards Ground Zero at arrival of shock wave. No damage was suffered by the aircraft and mission was completed successfully.

Table C.2—MANNED SAMPLING DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1028,	1	1601	1.5	12	0.05	0	1	34	No
Tiger Red 1,	2	1610	2.0	35	0.13	0	2.5	35	No
	3	1615	2.2	65	0.22	0.1	4.5	32	No
	4	1620–1643	1.6		0.7	0.2	12	31–35	Yes
F-84, 1032,	1	1600	10	110	0.5	0.3		42.3	Yes
Tiger Red 2	2	1610	7	130	0.8	0.7		40	Yes
	3	1620	10	115	1.1	1		40	Yes
	4	1635	8	95	1.54	1		40	Yes
F-84, 1037,	1	1640	8	85	0.18	0.05	6	39	No
Tiger Red 3,	2	1650	8	120	0.50	0.20	8	40	No
	3	1710	8	175	0.95	0.40	12	40	Yes
	4	1720	6	82	1.3	0.50	18	40	No
	5	1725	6	70	1.5	0.61	20	40	No
F-84, 1042,	1	1636	1.5	20	0.09	0	0	41	No
Tiger White 1,	2	1645	3.1	165	0.25	0.16	3.7	40	Yes
	3	1654	6.0		1.09	1.0	14	40	No
F-84, 1043,	1	1700	3	45	0.15		1.4	41	No
Tiger White 2,	2	1721	1.5	40	0.2		2	41.5	Yes
	3	1729	2.8	80	0.41	0.06	5.6	41	No
	4	1751	1.2	65	0.6	0.06	5	40.5	No
F-84, 1045,	1	1715	0.5		0.17	0.06	2	34	No
Tiger White 3,	2	1725	0.5		0.20	0.06	3	35–37	Yes
	3	1737	0.5		0.30	0.08	3.6	35–37	No
	4	1747	0.6		0.40	0.1	5.2	35–37	No
	5	1757	0.5		0.50	0.1	6.0	35–37	No
	6	1815	0.5		0.60	0.105	7.2	35–37	No
	7	1820	0.5		0.80	0.15	9.3	35–37	No
F-48, 1049,	1	1850	1	19	0.2		0.4	40	No
Tiger Red 4,	2	1903	1.5	20	0.35	0.075	2	40.5	Yes
	3	1954	2	180	1.4	0.7	15	39.5	No
F-84, 1051,	1	1726	0.15		0.12			40	No
Tiger Blue 1,	2	1736	0.60		0.40		0.6	39	Yes
	3	1742	0.75		0.45		1.25	39	No
	4	1751	0.60		0.50		1.5	38.5	No
	5	1809	1.1		0.65	0.75	4.9	40	No
F-84, 1055,	1	1846	1.3	30	0.1	0.05	4	40.5	No
Tiger Blue 3,	2		1.0		0.7	0.2	10.3	40.5	Yes

Table C.3—RADIATION RECEIVED BY PERSONNEL ON SHOT NANCY, , 24 MARCH 1953, 1310 GMT

Name	Position	Reading, mr
	Pilot	1710
	Pilot	1065
	Pilot	665
	Pilot	1150
	Pilot	575
	Pilot	1540
	Pilot	845
	Pilot	1930
	Pilot	1235

Table C.4—B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT. AIRCRAFT NO. 486397

	Loading	Contamination, mr/hr		
		First reading, 24 March, 1800 hr	Second reading, 25 March, 1800 hr	Third reading, 26 March, 1800 hr
Nose	30	30	6	1
Air intake engine 3	220	190	32	18
Left turboengine 3		160	36	18
Right turboengine 3		105	36	18
Air intake engine 4	220	200	38	16
Left turboengine 4		140	44	18
Right turboengine 4		125	44	18
Right wing (leading edge)		40	18	11
Right scanner blister		26	14	6
Right horizontal stabilizer		40	10	5
Left horizontal stabilizer		45	12	7
Left scanner blister		30	16	8
Left wing (leading edge)		25	23	15
Air intake engine 1	220	220	34	21
Left turboengine 1		120	36	20
Right turboengine 1		140	36	20
Air intake engine 2	200	200	36	19
Left turboengine 2		120	42	18
Right turboengine 2		140	42	18
Filter box, left wing		110	30	13
Left wheel well door		140	32	18
Antenna		40		
Radar radome		100	32	18
Pitot		40	22	6
A-1 filter box		120		
Right wheel well door		100	28	8
Filter box, right wing		100	23	19
Cockpit		20		

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

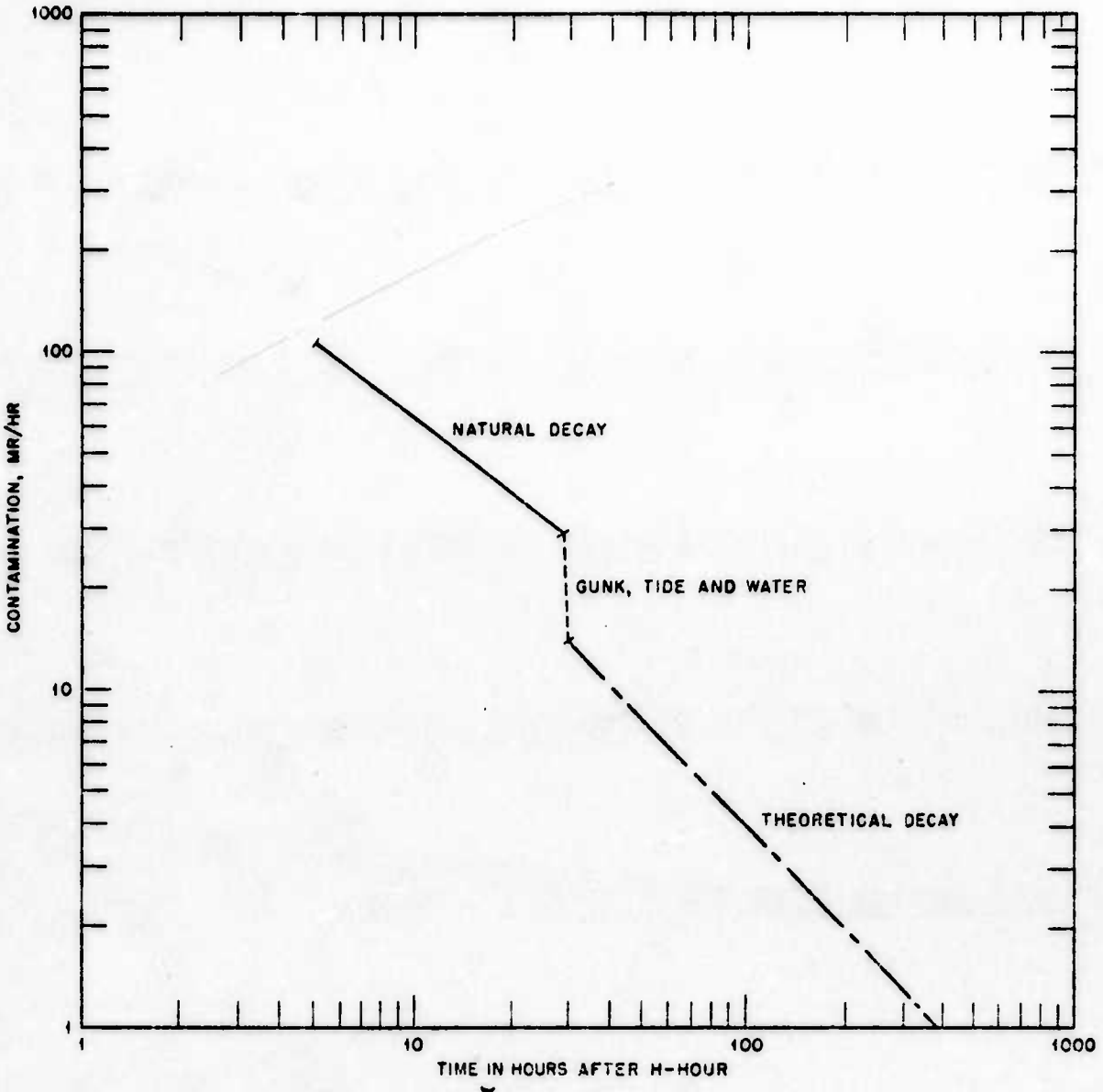

Fig. C.1 — B-29 aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 486397. Time of first survey, 1060 PST (1800 GMT). Values plotted are average over-all aircraft contamination.

Table C.5 — B-25 AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 430404

	Contamination, mr/hr	
Loading	First reading, 24 March, 1815 hr	Second reading, 25 March, 1825 hr
Nose	80	10
Nose wheel well	10	1
Oil cooler engine 2	150	4
Air intake engine 2	130	5
Right wheel well	40	11
Right wing (leading edge)	80	6
Right horizontal stabilizer	40	2
Left horizontal stabilizer	20	1
Left wing (leading edge)	60	4
Left wheel well	20	2
Air intake engine 1	110	16
Oil cooler engine 1	110	6
Forward entrance door	30	1
Pitot tube		
Radio compass dome	20	4
Rear entrance door	30	1
Cockpit		

Note: Decontamination used after first reading, natural decay.

Table C.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1028-A

		Contamination, mr/hr			
	Loading	First reading, 24 March, 1720 hr	Second reading, 26 March, 1625 hr	Third reading, 26 March, 2020 hr	Fourth reading, 27 March, 1515 hr
Cockpit					
Air intake (6 in. inside)	600	360	18	12	12
Right inner landing gear door		360	29	16	14
Right wing (leading edge)	400	310	40	23	20
Right wing tip		300	23	10	9
Right wing tip tank	4000	300	16	6	7
Right side turbine		1100	46	28	23
Right horizontal stabilizer		300	24	9	10
Tail pipe (6 in. inside)		800	30	18	16
Left horizontal stabilizer		300	24	8	10
Left side turbine		1000	46	27	22
Left wing tip tank	4600	260	16	7	8
Left wing tip		260	24	8	8
Left wing (leading edge)	400	360	41	24	19
Left inner landing gear door		340	30	17	14
Dive brake		1600	60	28	22

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay.

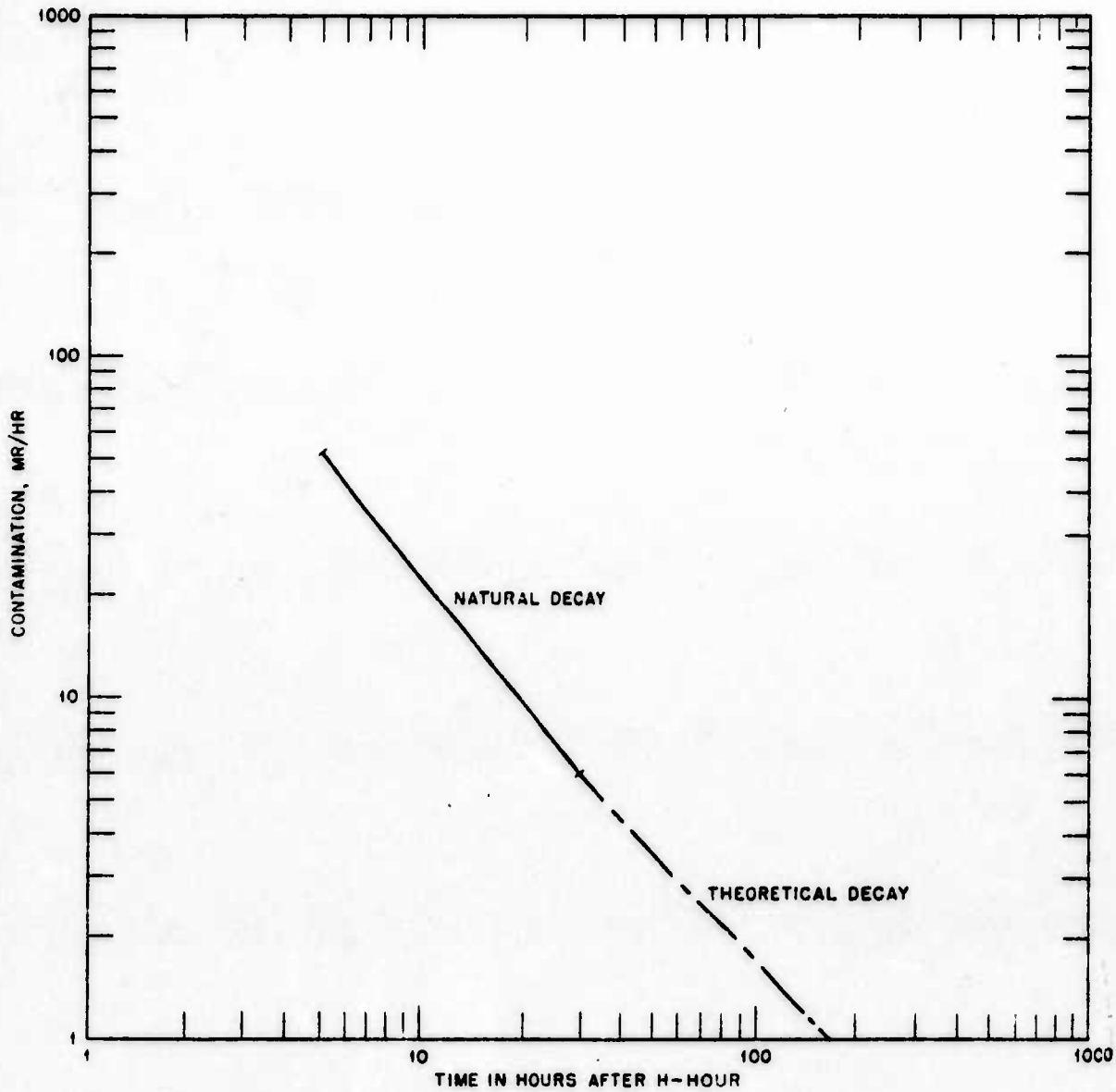

Fig. C.2—B-25 aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 430404. Time of first survey, ~~1015~~ PST (1815 GMT). Values plotted are average over-all aircraft contamination.

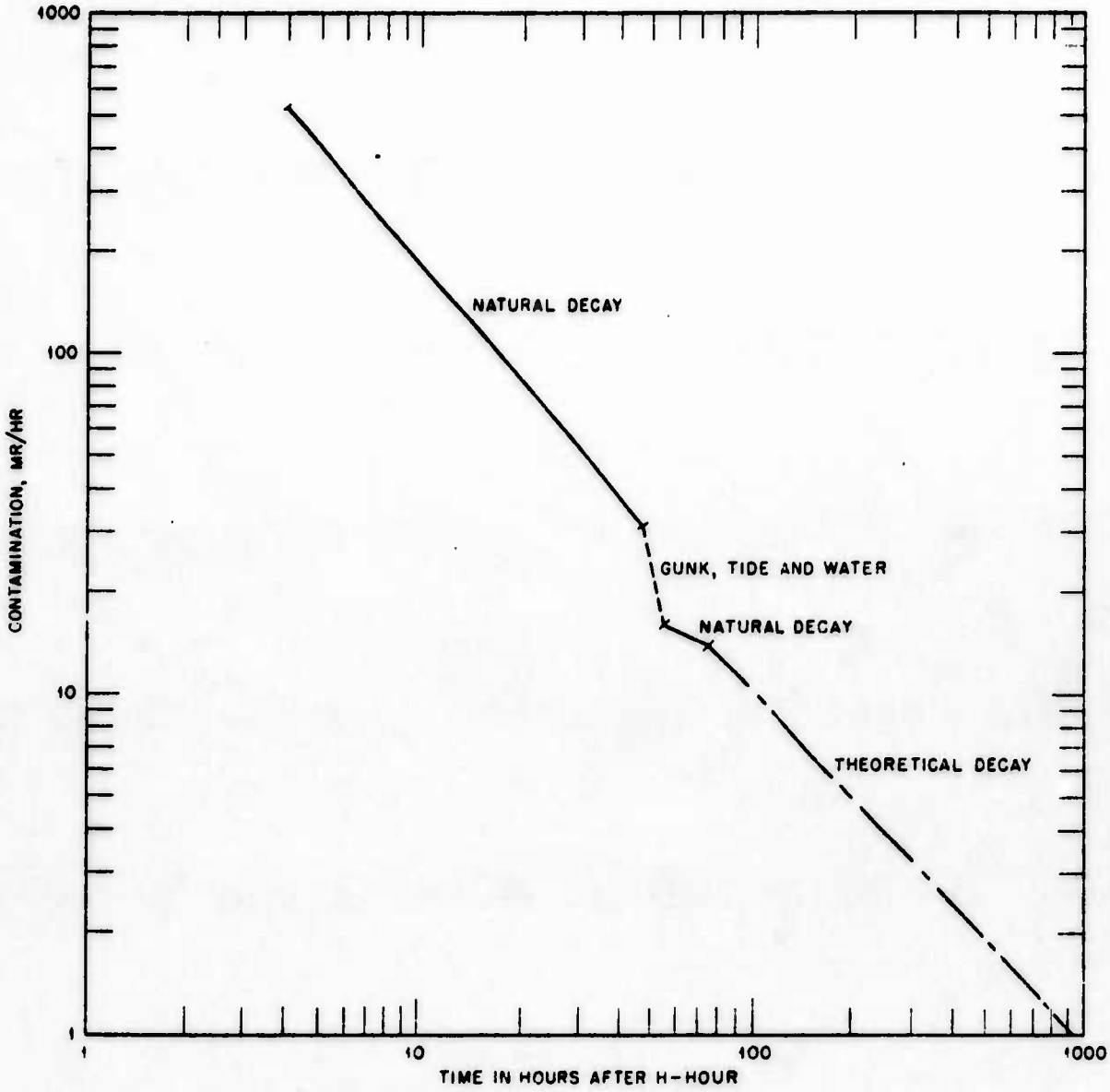

Fig. C.3 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1028-A. Time of first survey, 0920 PST (1720 GMT). Values plotted are average over-all aircraft contamination.

Table C.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1032-A

		Contamination, mr/hr						
	Loading	First reading, 24 March, 1720 hr	Second reading, 26 March, 1535 hr	Third reading, 26 March, 1650 hr	Fourth reading, 27 March, 1535 hr	Fifth reading, 27 March, 2025 hr	Sixth reading, 28 March, 1550 hr	Seventh reading, 30 March, 1515 hr
Cockpit								
Air intake (6 in. inside)	2,000	1,400	80	60	43	37	30	21
Right inner landing gear door		1,200	90	55	40	35	30	20
Right wing (leading edge)	2,600	2,400	145	85	60	49	41	29
Right wing tip		1,000	75	30	26	19	17	12
Right wing tip tank	13,000	1,200	60	19	22	15	14	9
Right side turbine		1,900	105	70	50	44	38	23
Right horizontal stabilizer		1,100	110	40	30	24	21	14
Tail pipe (6 in. inside)		800	85	45	41	35	29	19
Left horizontal stabilizer		1,400	110	35	34	24	22	15
Left side turbine		1,600	110	65	58	43	37	24
Left wing tip tank	14,000	1,100	65	34	32	20	16	11
Left wing tip		1,100	60	24	23	19	17	12
Left wing (leading edge)	2,200	2,000	150	85	65	52	42	30
Left inner landing gear door		1,100	85	60	42	35	29	20
Dive brake		4,200	190	100	70	60	47	33

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, gunk, Tide, and water; after fifth reading, natural decay; after sixth reading, natural decay and aircraft flown during period.

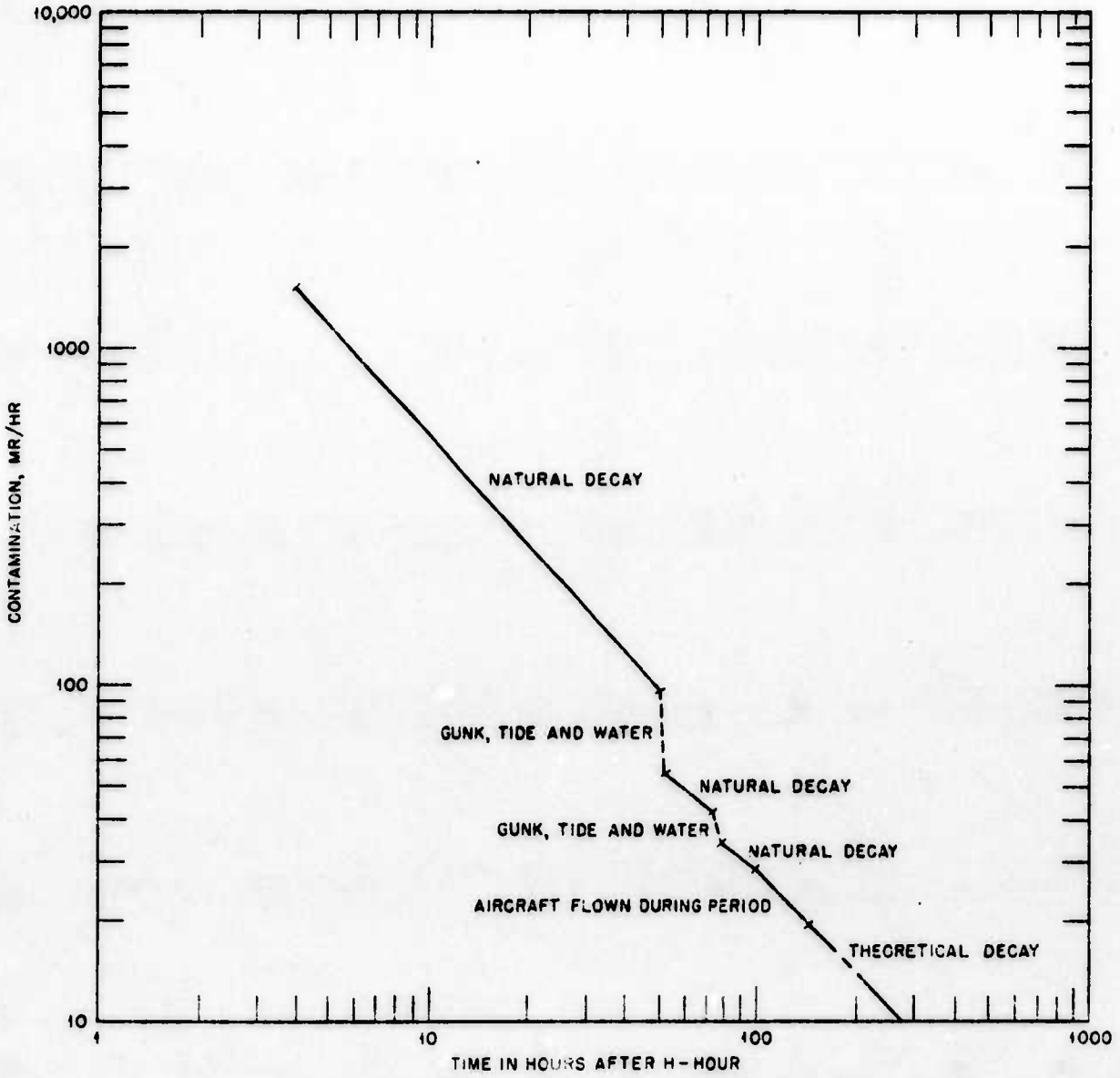

Fig. C.4 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1032-A. Time of first survey, 0920 PST (1720 GMT). Values plotted are average over-all aircraft contamination.

C.8—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY. 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1037-A

		Contamination, mr/hr						
	Loading	First reading, 24 March, 1731 hr	Second reading, 26 March, 1610 hr	Third reading, 26 March, 2130 hr	Fourth reading, 27 March, 1545 hr	Fifth reading, 27 March, 2150 hr	Sixth reading, 28 March, 1555 hr	Seventh reading, 30 March, 1528 hr
Cockpit								
Air intake (6 in. inside)	2000	1200	65	60	40	36	29	19
Right inner landing gear door		3000	80	55	37	29	26	16
Right wing (leading edge)	1500	800	130	65	48	43	34	22
Right wing tip		2000	80	33	25	21	18	12
Right wing tip tank	3000	1000	50	31	22	20	15	10
Right side turbine		2000	100	55	46	36	32	18
Right horizontal stabilizer		1700	185	31	25	20	19	11
Tail pipe (6 in. inside)		1200	80	42	31	28	25	16
Left horizontal stabilizer		1500	120	30	25	19	18	12
Left side turbine		1800	100	60	44	35	34	19
Left wing tip tank	1200	1000	55	32	20	17	14	10
Left wing tip		1600	75	37	27	24	23	13
Left wing (leading edge)	3100	1600	125	65	48	41	34	24
Left inner landing gear door		2000	95	60	45	35	30	20
Dive brake		4000	180	80	60	45	38	25

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, gunk, Tide, and water; after fifth reading, natural decay; after sixth reading, natural decay and aircraft flown during period.

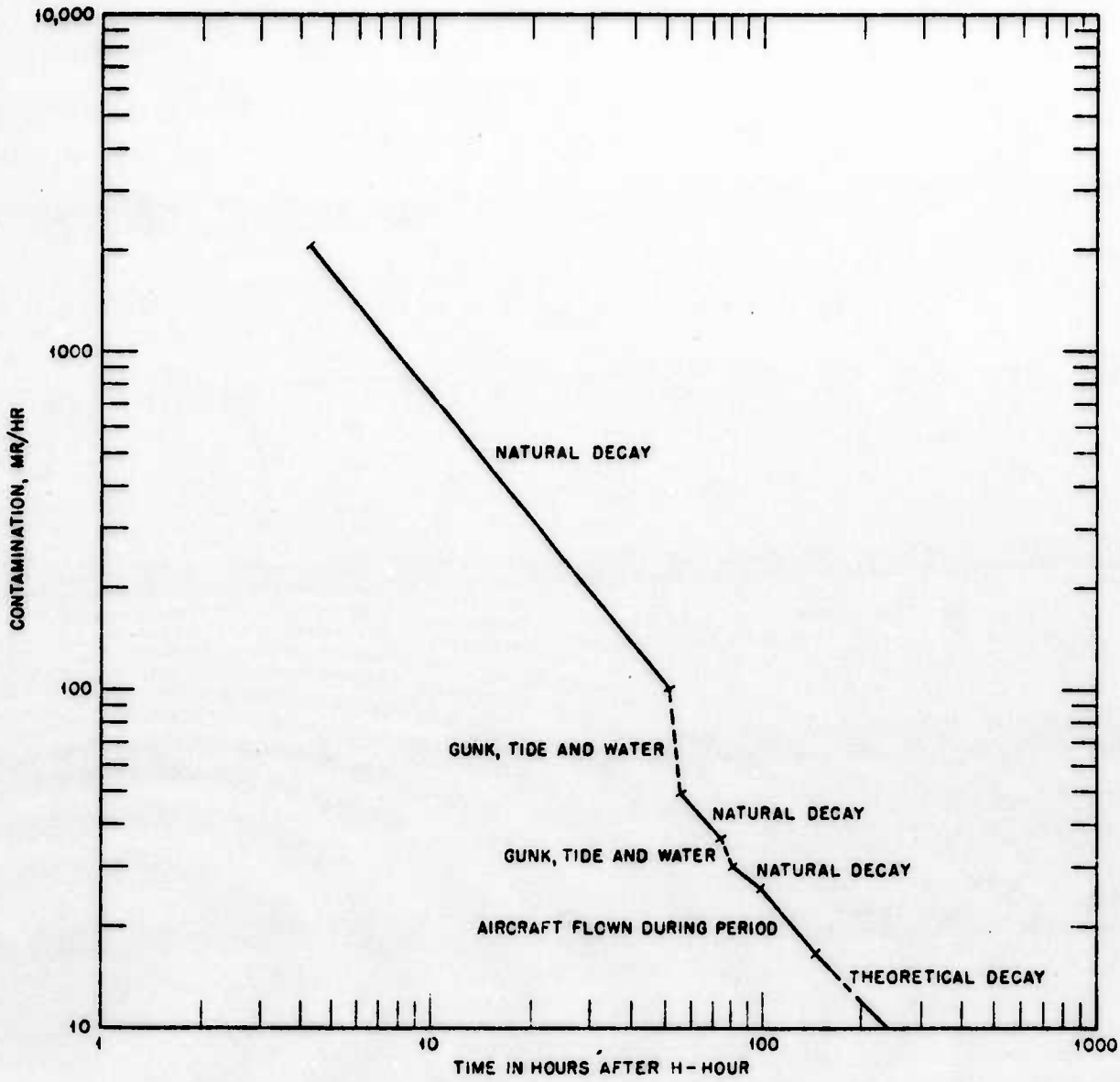

Fig. C.5—F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1037-A. Time of first survey, 0931 PST (1731 GMT). Values plotted are average over-all aircraft contamination.

Table C.9—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, -24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1042-A

		Contamination, mr/hr						
	Loading	First reading, 24 March, 1805 hr	Second reading, 26 March, 1630 hr	Third reading, 26 March, 2305 hr	Fourth reading, 27 March, 1555 hr	Fifth reading, 27 March, 2330 hr	Sixth reading, 28 March, 1600 hr	Seventh reading, 30 March, 1520 hr
Cockpit								
Air intake (6 in. inside)	1100	1000	80	75	46	39	31	18
Right inner landing gear door		1000	90	60	45	36	29	20
Right wing (leading edge)	2400	2100	140	75	60	46	37	25
Right wing tip		1100	75	40	29	25	21	
Right wing tip tank	5000	1000	65	45	35	24	16	10
Right side turbine		1200	135	60	50	42	34	21
Right horizontal stabilizer		1200	110	50	41	26	22	13
Tail pipe (6 in. inside)		1000	80	55	40	32	25	17
Left horizontal stabilizer		2000	115	55	40	23	20	13
Left side turbine		1100	100	70	53	42	36	22
Left wing tip tank	5000	1000	80	40	31	18	13	9
Left wing tip		1000	75	30	30	22	16	12
Left wing (leading edge)	2400	2000	140	75	60	48	39	25
Left inner landing gear door		1000	95	60	44	36	32	20
Dive brake		4000	205	110	90	75	50	32

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, gunk, Tide, and water; after fifth and sixth readings, natural decay.

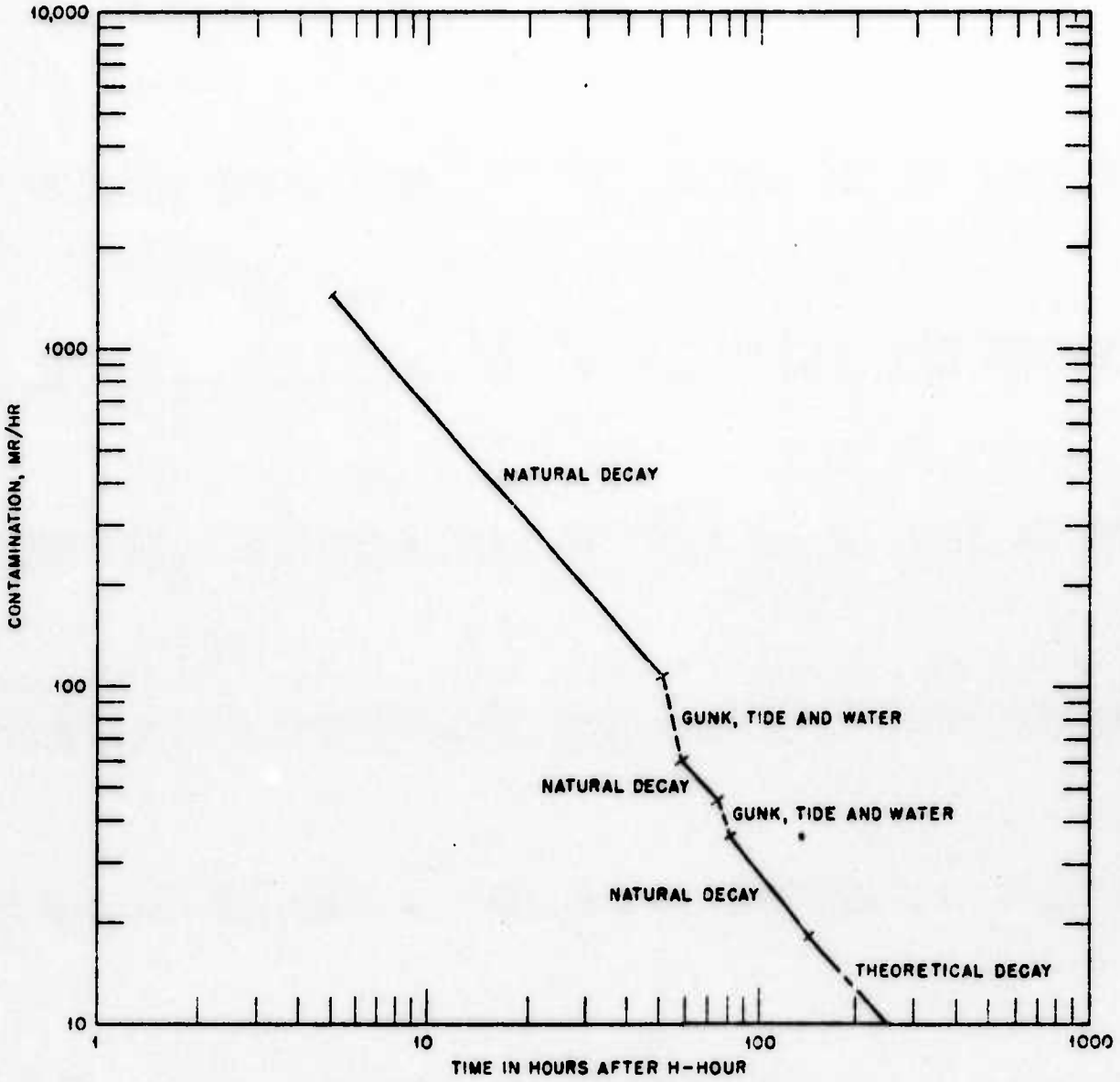

Fig. C.6 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1042-A. Time of first survey, 1005 PST (1805 GMT). Values plotted are average over-all aircraft contamination.

Table C.10— F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY,
24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1043-A

	Loading	Contamination, mr/hr				
		First reading, 24 March, 1855 hr	Second reading, 25 March, 1600 hr	Third reading, 25 March, 2200 hr	Fourth reading, 26 March, 0125 hr	Fifth reading, 27 March, 1510 hr
Cockpit						
Air intake (6 in. inside)	220	220	45	30	22	16
Right inner landing gear door		240	100	22	19	13
Right wing (leading edge)	400	400	110	34	28	19
Right wing tip		250	60	12	12	8
Right wing tip tank	1400	180	70	10	11	8
Right side turbine		330	100	32	30	21
Right horizontal stabilizer		280	100	18	17	12
Tail pipe (6 in. inside)		280	70	23	20	15
Left horizontal stabilizer		280	80	18	16	11
Left side turbine		380	80	40	30	21
Left wing tip tank	1300	140	60	8	8	7
Left wing tip		230	70	9	8	6
Left wing (leading edge)	500	500	130	34	26	18
Left inner landing gear door		310	100	26	28	14
Dive brake		500	110	27	28	20

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third and fourth readings, natural decay.

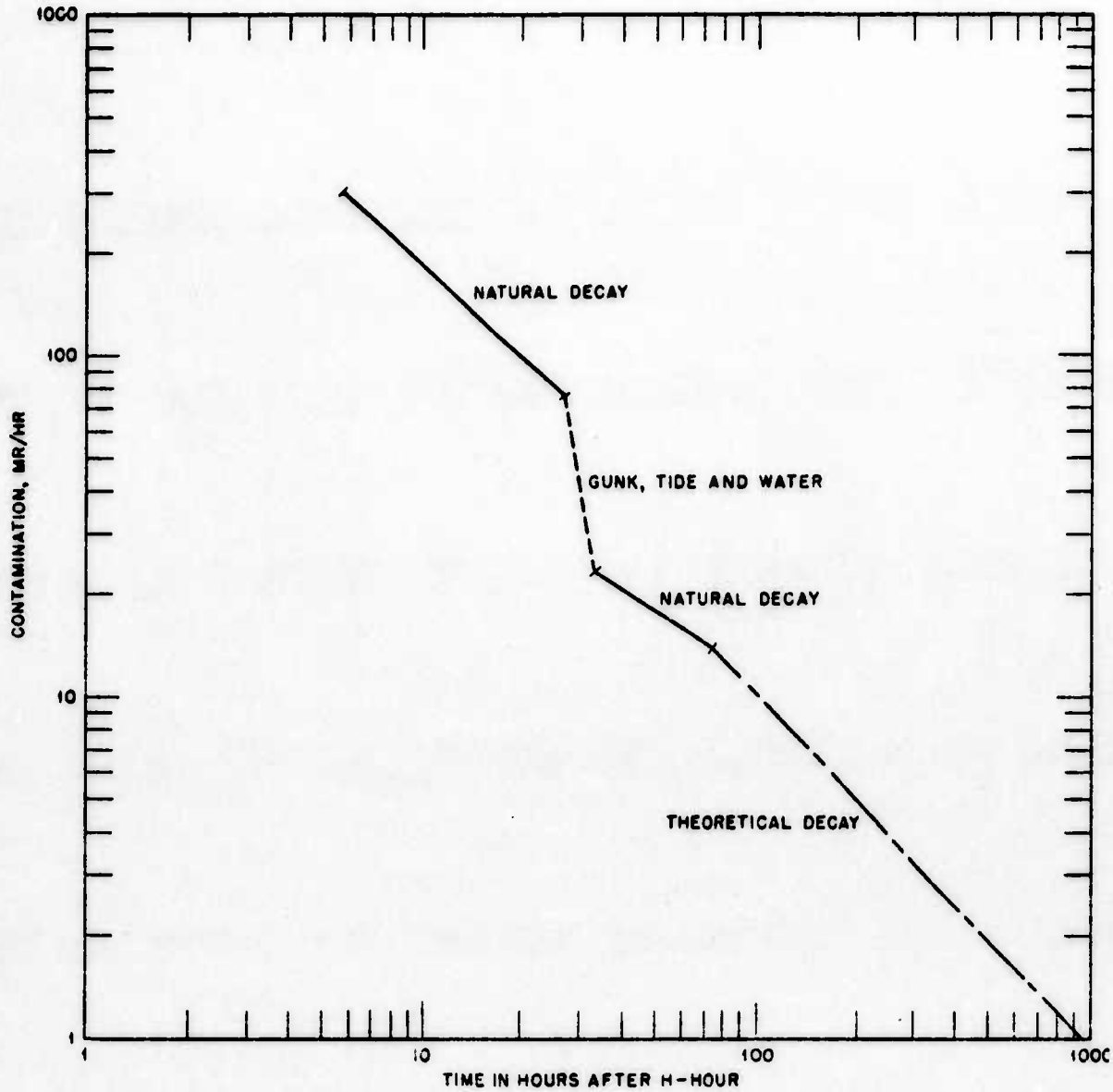

Fig. C.7 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1043-A. Time of first survey, 1055 PST (1855 GMT). Values plotted are average over-all aircraft contamination.

Table C.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1045-A

		Contamination, mr/hr						
	Loading	First reading, 24 March, 1940 hr	Second reading, 26 March, 1545 hr	Third reading, 26 March, 1740 hr	Fourth reading, 27 March, 1540 hr	Fifth reading, 27 March, 1755 hr	Sixth reading, 28 March, 1545 hr	Seventh reading, 29 March, 1630 hr
Cockpit								
Air intake (6 in. inside)	410	350	45	34	28	25	20	16
Right inner landing gear door		440	55	37	28	22	20	15
Right wing (leading edge)	1250	1000	95	55	38	32	26	20
Right wing tip		500	41	21	16	12	11	9
Right wing tip tank	3300	300	43	26	22	15	15	11
Right side turbine		700	75	48	37	30	24	20
Right horizontal stabilizer		500	65	28	23	14	13	11
Tail pipe (6 in. inside)		300	55	30	24	20	18	14
Left horizontal stabilizer		500	60	29	25	14	13	11
Left side turbine		300	80	46	36	30	25	20
Left wing tip tank	2700	360	45	25	20	12	11	10
Left wing tip		400	48	28	22	14	14	10
Left wing (leading edge)	800	700	90	48	36	31	26	21
Left inner landing gear door		300	50	34	28	22	19	15
Dive brake		900	130	60	48	33	27	22

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, gunk, Tide, and water; after fifth and sixth readings, natural decay.

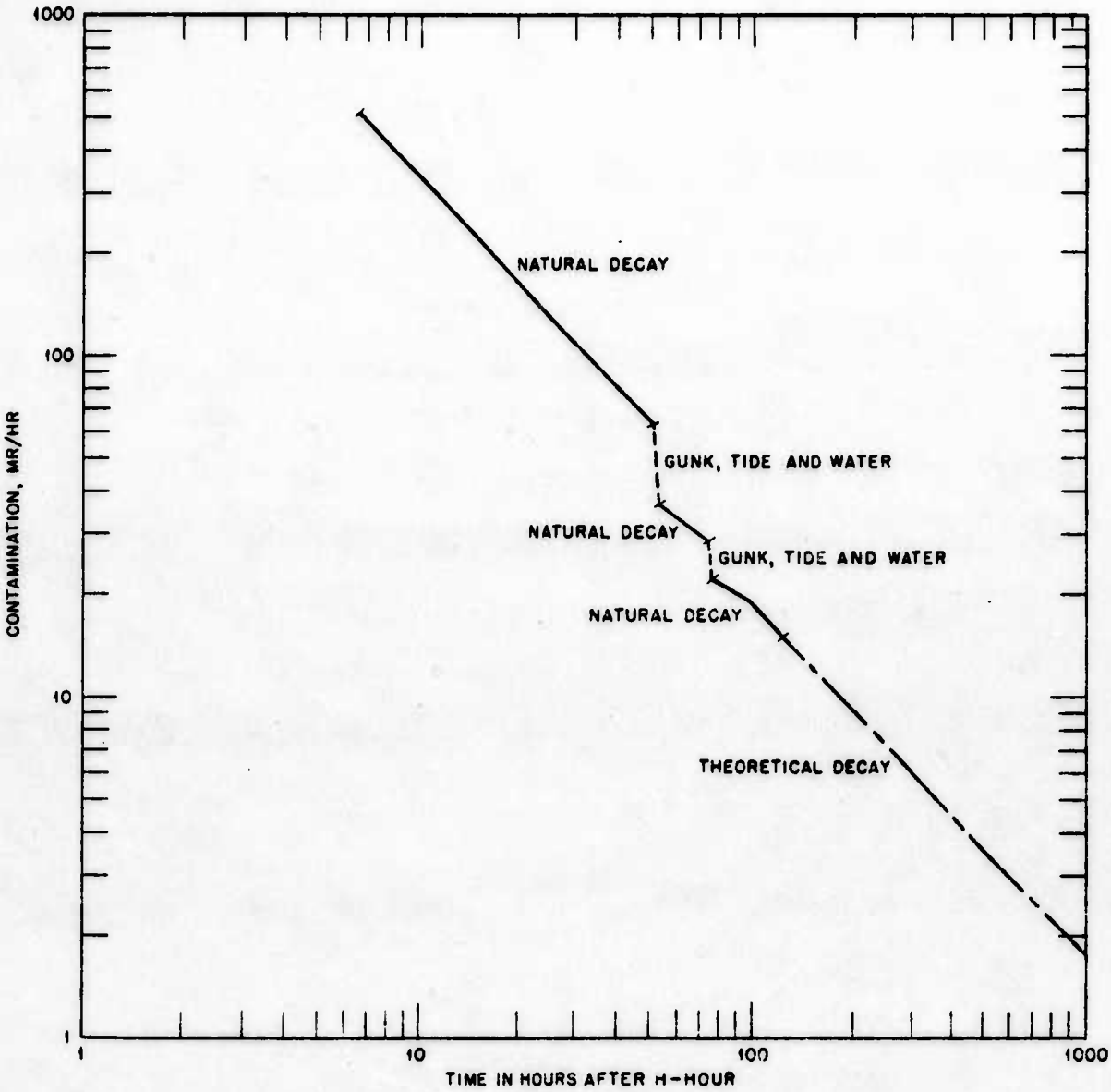

Fig. C.3 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1045-A. Time of first survey, ~~1140~~ PST (1940 GMT). Values plotted are average over-all aircraft contamination.

Table C.12—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1049-A

		Contamination, mr/hr					
	Loading	First reading, 24 March, 1955 hr	Second reading, 26 March, 1640 hr	Third reading, 26 March, 2245 hr	Fourth reading, 27 March, 1550 hr	Fifth reading, 28 March, 1545 hr	Sixth reading, 30 March, 1510 hr
Cockpit							
Air intake (6 in. inside)	800	650	120	95	70	48	25
Right inner landing gear door		400	120	70	50	34	23
Right wing (leading edge)	1900	550	220	115	100	65	36
Right wing tip		500	120	60	45	25	14
Right wing tip tank	5000	500	60	60	40	22	15
Right side turbine		450	165	100	80	50	31
Right horizontal stabilizer		350	135	60	50	32	30
Tail pipe (6 in. inside)		200	120	85	50	41	26
Left horizontal stabilizer		200	125	70	50	31	20
Left side turbine		400	160	110	80	60	33
Left wing tip tank	5000	500	65	60	35	18	12
Left wing tip		500	130	55	40	23	15
Left wing (leading edge)	2000	1600	220	130	95	70	36
Left inner landing gear door		500	120	85	55	50	23
Dive brake		2200	250	125	90	60	37

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third, fourth, and fifth readings, natural decay.

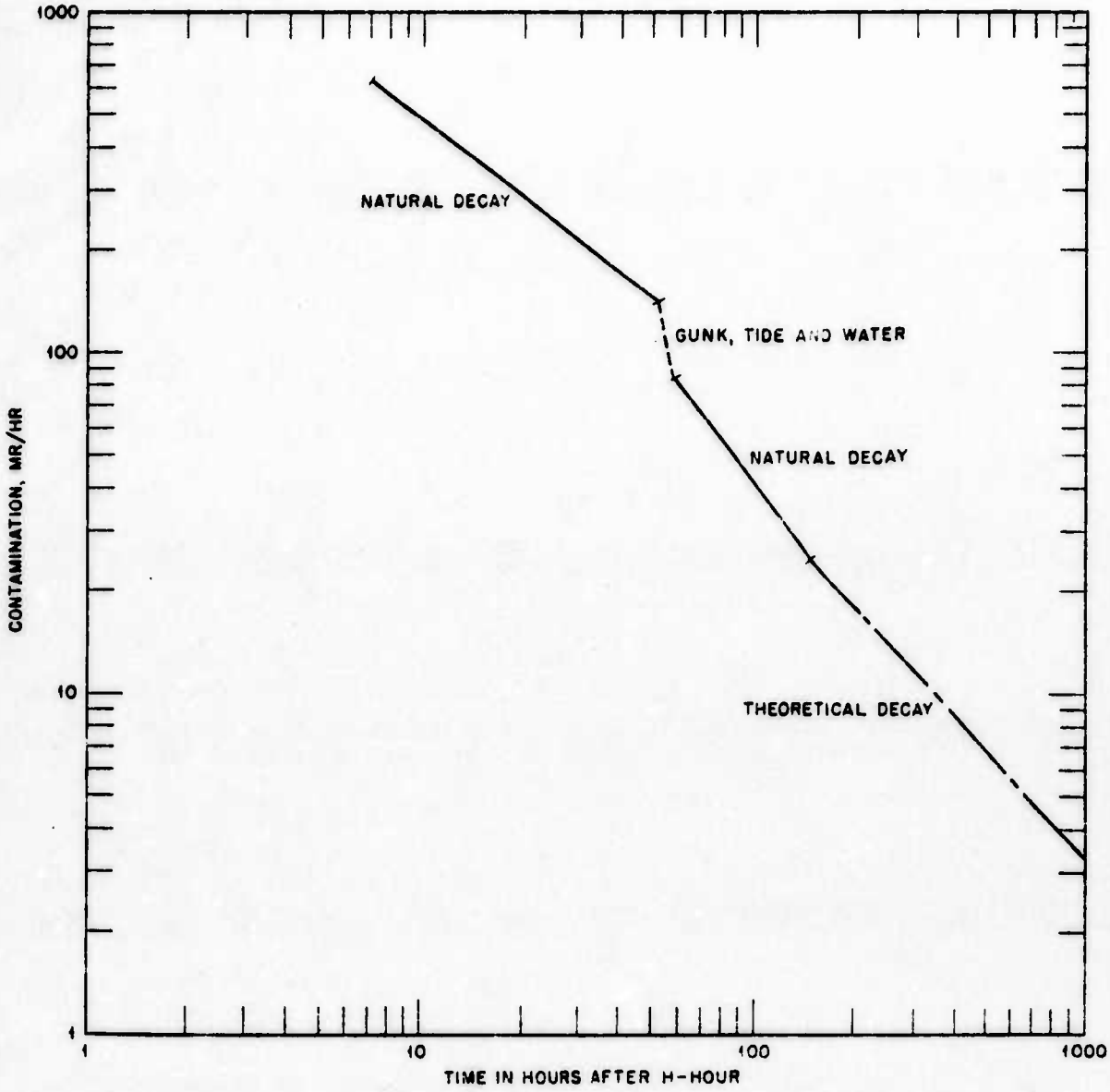

Fig. C.9—F-84G aircraft contamination; Shot NANCY. 24 March 1953; aircraft No. 51-1049-A. Time of first survey, 1155 PST (1955 GMT). Values plotted are average over-all aircraft contamination.

Table C.13—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1051-A

		Contamination, mr/hr						
	Loading	First reading, 24 March, 2000 hr	Second reading, 25 March, 1600 hr	Third reading, 25 March, 2320 hr	Fourth reading, 26 March, 1527 hr	Fifth reading, 27 March, 1600 hr	Sixth reading, 28 March, 1530 hr	Seventh reading, 30 March, 1522 hr
Cockpit								
Air intake (6 in. inside)	900	900	160	80	44	44	32	19
Right inner landing gear door		800	110	50	48	38	28	17
Right wing (leading edge)	1500	1400	275	100	30	58	39	27
Right wing tip		800	120	34	40	20	17	9
Right wing tip tank	3000	600	190	40	40	22	16	8
Right side turbine		900	140	90	42	45	35	22
Right horizontal stabilizer		1000	220	80	55	42	32	15
Tail pipe (6 in. inside)		500	90	80	55	37	28	17
Left horizontal stabilizer		1000	160	80	55	45	29	16
Left side turbine		1200	145	80	40	46	38	24
Left wing tip tank	4500	300	100	50	18	19	15	9
Left wing tip		800	225	33	18	19	15	9
Left wing (leading edge)	1500	1500	220	130	85	52	42	25
Left inner landing gear door		800	130	95	50	42	32	21
Dive brake		2000	360	140	90	60	46	29

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third, fourth, and fifth readings, natural decay; after sixth reading, natural decay and aircraft flown during period.

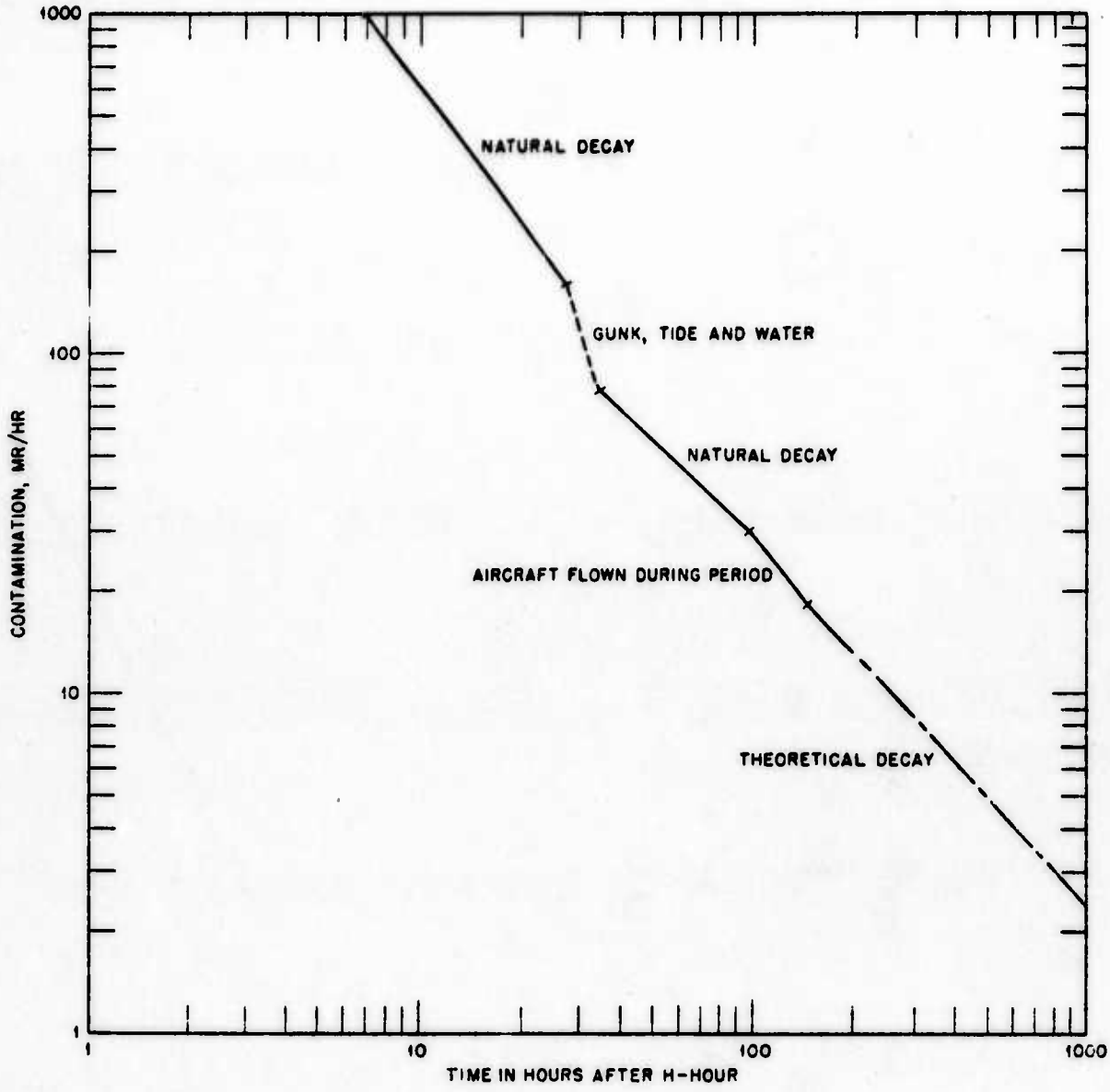

Fig. C.10 — F-84G aircraft contamination; Shot NANCY. 24 March 1953; aircraft No. 51-1051-A. Time of first survey, 1200 PST (2000 GMT). Values plotted are average over-all aircraft contamination.

Table C.14—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT NANCY, 24 MARCH 1953, 1310 GMT, AIRCRAFT NO. 51-1055-A

	Loading	Contamination, mr/hr						
		First reading, 24 March, 2015 hr	Second reading, 26 March, 1635 hr	Third reading, 26 March, 2200 hr	Fourth reading, 27 March, 1605 hr	Fifth reading, 27 March, 2400 hr	Sixth reading, 28 March, 1605 hr	Seventh reading, 30 March, 1525 hr
Cockpit								
Air intake (6 in. inside)	700	700	50	36	29	26	21	15
Right inner landing gear door		800	70	44	35	29	24	17
Right wing (leading edge)	1300	1300	118	60	50	40	34	22
Right wing tip		800	60	25	21	17	15	10
Right wing tip tank	3200	600	30	19	17	13	10	7
Right side turbine		800	90	60	43	32	30	20
Right horizontal stabilizer		800	70	27	24	16	16	11
Tail pipe (6 in. inside)		600	60	36	27	25	21	15
Left horizontal stabilizer		600	60	24	21	16	14	11
Left side turbine		800	98	60	44	35	33	21
Left wing tip tank	3500	700	40	19	19	15	14	8
Left wing tip		700	55	24	23	15	13	9
Left wing (leading edge)	1100	1100	120	60	47	38	32	23
Left inner landing gear door		900	80	55	43	32	28	19
Dive brake		2200	150	80	60	46	40	27

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, gunk, Tide, and water; after fifth reading, natural decay; after sixth reading, natural decay and aircraft flown during period.

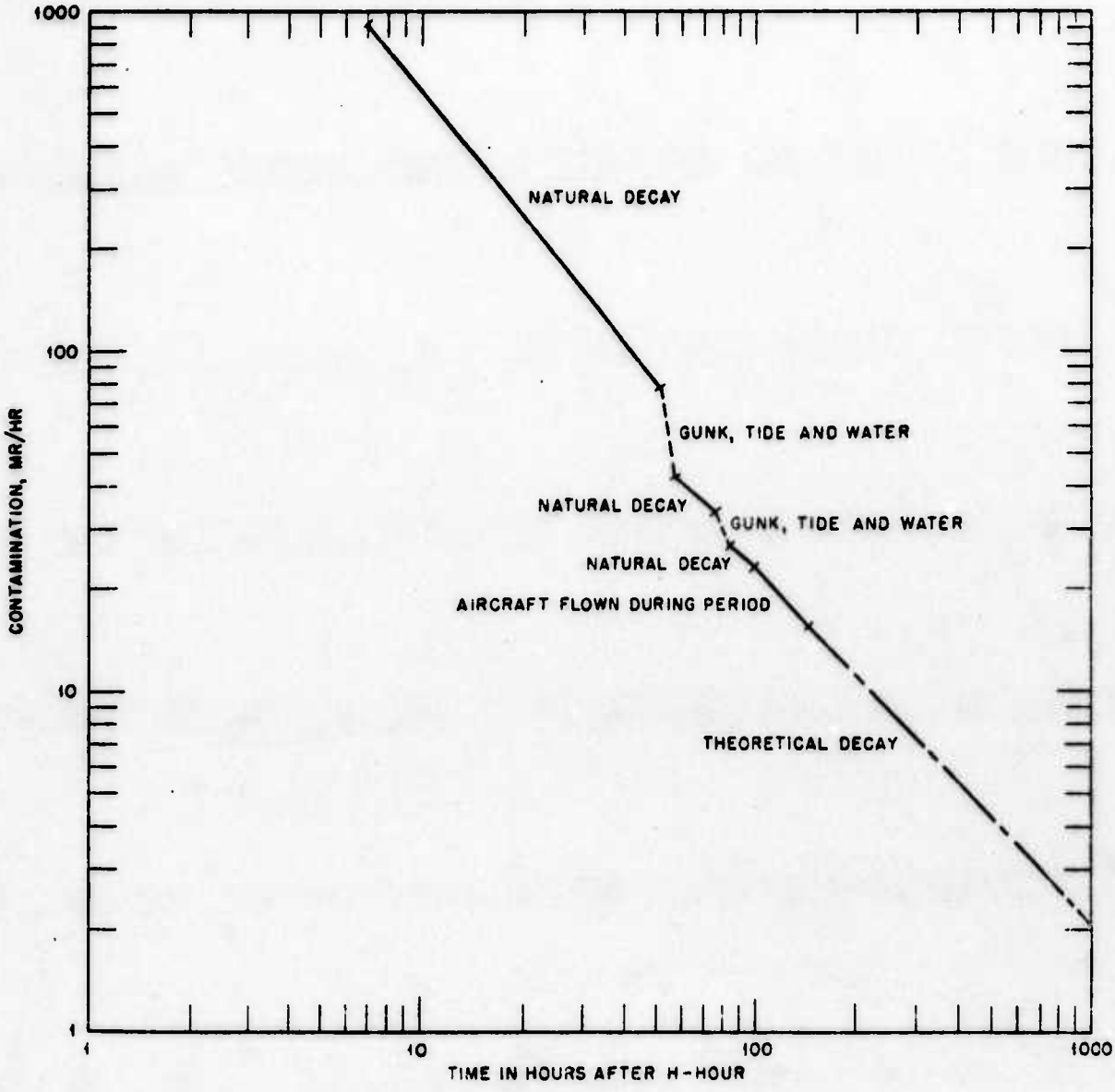

Fig. C.11 — F-84G aircraft contamination; Shot NANCY, 24 March 1953; aircraft No. 51-1055-A. Time of first survey, 1215 PST (2015 GMT). Values plotted are average over-all aircraft contamination.

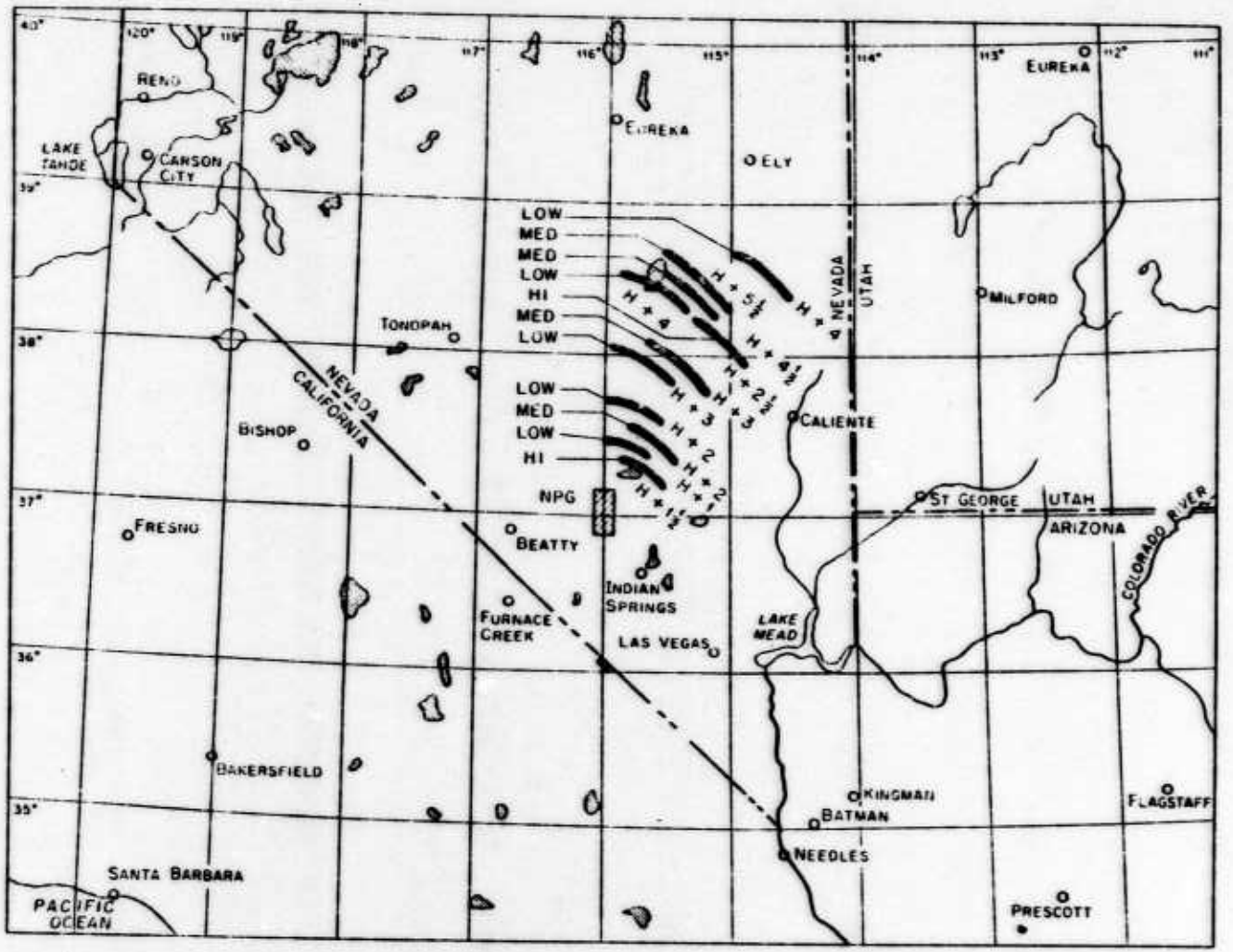

Fig. C.12 — Cloud track, Shot NANCY, 24 March 1953. Low, 12,000 ft MSL. Medium, 18,000 ft MSL. High, 22,000 to 25,000 ft MSL.

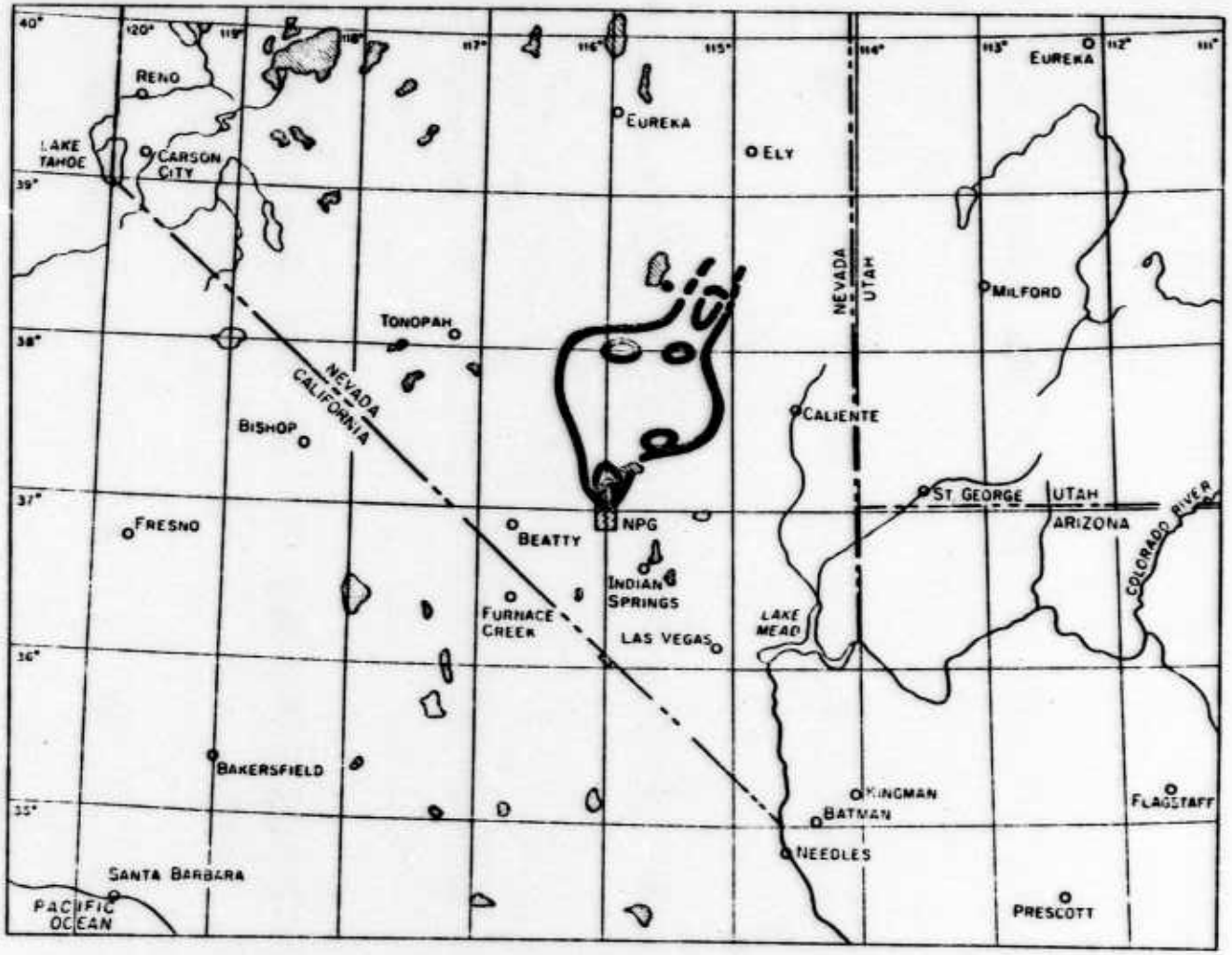

Fig. C.13 — Aerial survey, fall-out data plot, Shot NANCY, 24 March 1953.

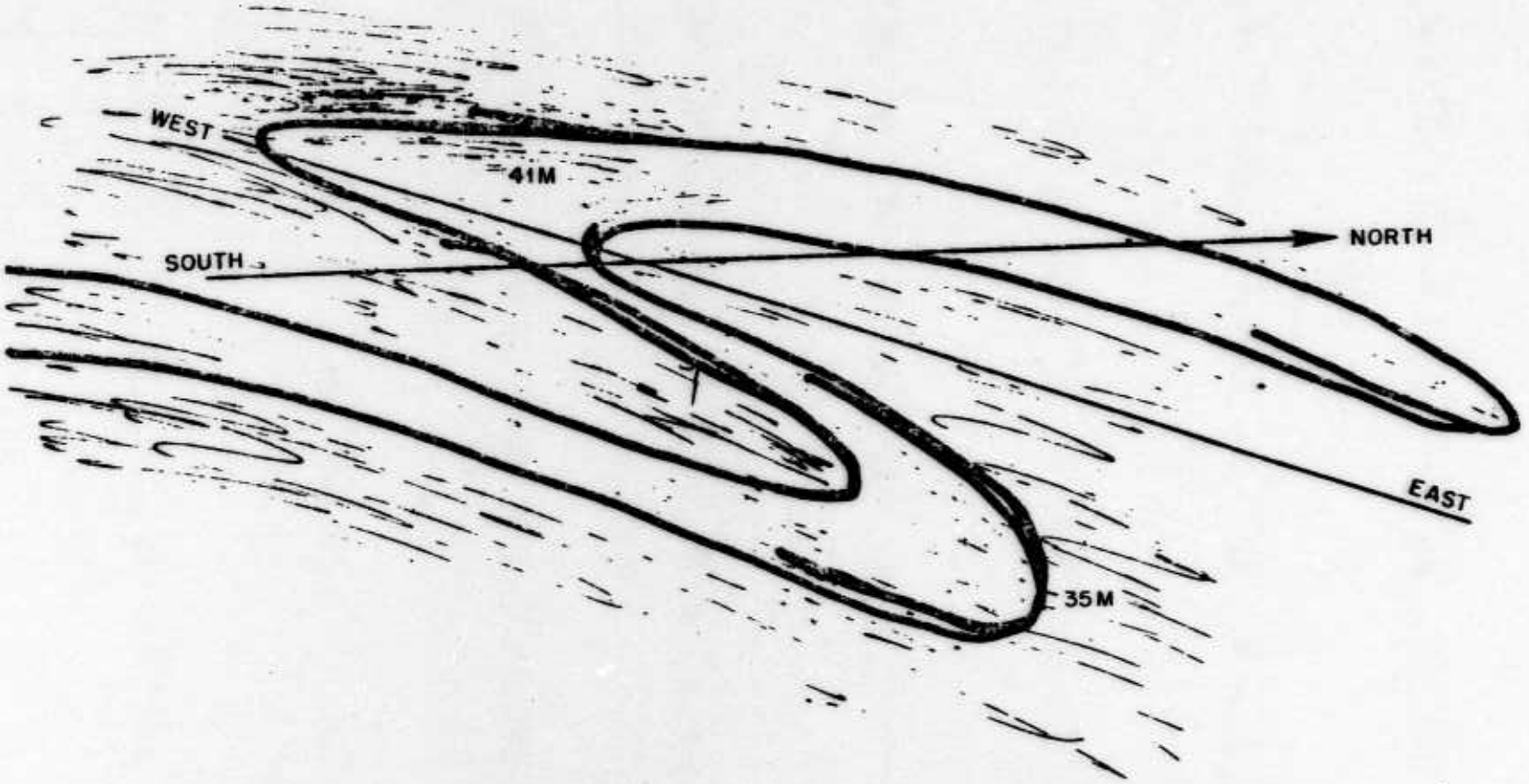

Fig. C.14—Shot NANCY, 24 March 1953; time, H + 3 hr 45 min.

ANNEX D

RUTH SHOT SUMMARY

Final activities for the third shot in this series RUTH started with briefings being conducted at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, at 1400 and 1500 hr, 30 March, respectively. The weather briefing, at the Control Point, was held at 2100 hr on 30 March 1953. At shot time the skies were clear with the winds at 10,000 ft from 310° at 18 knots to 310° at 30 knots at 25,000 ft. H-hour was set for 0500 PST (1300 GMT), 31 March 1953. This was to be a different type shot from those which had been fired prior to this time in Nevada. Sponsor for the shot was the University of California Radiation Laboratory.

The obtaining of gas samples was the major interest on this shot.

The shot was detonated on schedule, and twenty-seven sorties were flown by test aircraft in support of this operation. Participating aircraft were as follows:

No.	Type	Project	Code Name
10	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	B-50	Sampler controller	Skull Cap
1	H-5	Terrain survey	Fire Fly 1
2	L-20	Terrain survey	Ever Ready 4 and 5
1	C-47	Photo	Tin Type
3	B-29	IBDA	Dish Rag 1, 2, and 3
1	H-23	Terrain survey	Cattle Car
2	B-29	Samplers	Cat Nip 1 and 2
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop

The approximate yield was 0.2 to 0.3 kt, which meant that there was not as much cloud for the samplers to work with as had been anticipated. The peak cloud height was 14,300 ft MSL.

This shot was expected to be a very low order detonation with a forecast yield of 1.5 to 3 kt. Also, the possibility existed that no fission would take place. In this case we were prepared to take two samples of the cloud from the HE explosion.

The specific requirements, in case of fission, were to obtain eight particulate and eight snap samples with the F-84's. Also, two B-29's were to sample for AF and collect two particulate and two "gas-bottle" samples.

The exposure required of the F-84 pilots to obtain a fraction of 2×10^{-9} was calculated to be 0.13 r at 2 hr after detonation.

For the B-29 pilots, 0.1 r was sufficient to obtain a sample fraction of 2×10^{-9}; however, to pump the gas bottles to the desired pressure required that approximately 20 min be spent in the cloud.

To sample a small cloud that was forecast to go to a height of only 14,000 ft with 10 aircraft required close timing. It was planned to make an early penetration with one F-84 (at H + 30 min) and, if forecast peak intensities were verified, to begin sampling at that time with as close an interval as possible for the rest of the aircraft. This would require an exposure greater than the 0.13 r originally intended, but, with the savings in exposure from the use of lead seats and vests, it was believed feasible.

The first penetration was made at H + 35 min, and a peak of 70 r/hr was observed. This was very close to the forecast peak, and sampling proceeded rapidly.

This, incidentally, was the earliest penetration made for the entire series of tests and provided some valuable information in regard to peak intensity vs time (Fig. A.1).

All samples collected during this mission exceeded the minimum requirements.

One integron failure occurred; however, by cross-checking the readings of other instruments, a satisfactory sample was obtained.

The two B-29 high-level cloud trackers were not assigned a mission and were instructed to land at Indian Springs Air Force Base, Nevada, shortly after H-hour.

Communications for this shot had improved but were still not up to the desired standards for the large aircraft participation anticipated on the following shot.

The terrain survey graph is not included in this annex because of the lack of sufficient fall-out.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Three, 1300 GMT, 31 March 1953

Cloud Cover: Clear
Precipitation: No precipitation within 500 miles downstream
Height Ground Zero: 4164 ft MSL
Burst Height: 4464 ft MSL

Pressure:	Ground Zero	873 mb
	Burst height	863 mb
Virtual Temperature:	Ground Zero	4.8°C
	Burst height	8.5°C
Actual Temperature:	Ground Zero	4.4°C
	Burst height	8.1°C
Relative Humidity:	Ground Zero	48%
	Burst height	32%
Altimeter Setting:	30.00 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	360°	04 knots
6,000	010°	12 knots
8,000	350°	13 knots
10,000	310°	18 knots
15,000	300°	22 knots
20,000	310°	29 knots
25,000	310°	30 knots

Height of Tropopause: 35,500 ft MSL

Table D.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Skull Cap	Sampler controller	ISAFB	1245	1305	1620	1834	Controlled all samplers very smoothly. Had Cat Nip aircraft penetrate cloud in trail so both aircraft would be working at the same time that the cloud was dissipating rapidly.
F-84	Tiger Red 1	Sampler	ISAFB	1256	1305	1315	1323	Snooper reported 13 min after H-hour. Base of cloud at 13,600; top at 14,300.
F-84	Tiger Red 1	Sampler	ISAFB	1533			1546	Aborted. Left tip tank failed to feed.
F-84	Tiger Red 2	Sampler	ISAFB	1327	1330	1416	1422	Remainder of sampler aircraft flew very successful missions.
F-84	Tiger Red 3	Sampler	ISAFB	1515	1527	1555	1612	
F-84	Tiger Red 4	Sampler	ISAFB	1525	1540	1630	1647	
F-84	Tiger White 1	Sampler	ISAFB	1322	1328	1350	1405	
F-84	Tiger White 3	Sampler	ISAFB	1629	1645	1810	1825	
F-84	Tiger White 4	Sampler	ISAFB	1545	1558	1700	1719	
F-84	Tiger Blue 2	Sampler	ISAFB	1555	1615	1710	1728	
F-84	Tiger Blue 3	Sampler	ISAFB	1607	1627	1750	1812	
F-84	Tiger Blue 4	Sampler	ISAFB	1621	1635	1755	1812	
H-5	Fire Fly 1	Terrain survey	ISAFB	1301	1320	1435	1437	Satisfactory mission.
L-20	Ever Ready 4	Terrain survey	ISAFB	1500	1521	1615	1637	Satisfactory mission.
L-20	Ever Ready 5	Terrain survey	ISAFB	1401	1431	1729	1749	Satisfactory mission.
C-47	Tin Type	Photo	ISAFB	1200	1219	1305	1315	In orbit at H-hour. Very little information due to small size of shot.
B-29	Dish Rag 1	IBDA	Kirtland	0815	1045	1306	1507	All Dish Rag aircraft were in desired position at H-hour, and information received was satisfactory.
B-29	Dish Rag 2	IBDA	Kirtland	0825	1105	1309	1509	
B-29	Dish Rag 3	IBDA	Kirtland	0835	1107	1309	1514	
P2V2	Motor Boat	Radiac	Kirtland	0845	1125	1455	1505	Mission was very satisfactory. Flew only one flight due to low yield. Landed at KAFB.
H-23	Cattle Car	Terrain survey	Desert Rock	1600	1610	1740	1810	Completed a successful mission.
B-29	Cat Nip 1	Cloud sampler	ISAFB	1250	1305	1520	1550	Penetrated cloud for 30 min to obtain gas samples. Successful mission.
B-29	Cat Nip 2	Cloud sampler	ISAFB	1255	1310	1522	1552	
B-29	Cook Book 1	Tracking	ISAFB	1236	1306	1340	1410	Very little high-altitude tracking necessary by B-29 tracking aircraft due to size of shot.
B-29	Cook Book 2	Tracking	ISAFB	1240	1303	1335	1400	
B-29	Cook Book 3	Tracking	ISAFB	1317	1330	1730	1753	Flew a successful tracking mission.
C-47	Rag Mop	Terrain survey	ISAFB	1529	1545	1730	1752	Short mission due to little fall-out and small readings.

Table D.2—MANNED SAMPLING DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 042,	1	1337	70	31	0.15	0.2	6	14.5	Yes
Tiger White 1,	2	1345	55	50	0.25	0.4	13	13.5	No
	3	1350	35	90	0.45	0.7	20	13	No
F-84, 032,	1	1354	25	55	0.15	0.075		13.5	Yes
Tiger Red 2,	2	1403	23	42	0.27	0.12	7.8	13.5	No
	3	1408	12	85	0.35	0.15	8.4	13	No
	4	1414	8	24	0.45	0.15	8	13.5	No
F-84, 037, Tiger Red 3,	1	1535	0.5		0.2	0.05	1.9	13.5	Yes
F-84, 049, Tiger Red 4,	1	1609	0.2		0.08		0.64	13.5	Yes
F-84, 054, Tiger Blue 2,	1	1640	0.1		0.1		0.31	13	Yes
F-84, 038, Tiger White 4,	1	1640	0.08		0.08		1.1	13.5	Yes
F-84, 055,	1	1725	0.07		0.1	0.05	0.3	12.5	Yes
Tiger Blue 3,	2	1730	0.07		0.1	0.05	0.42	12.5	No
	3	1750	0.08		0.1	0.05	0.6	12.5	No
F-84, 046, Tiger Blue 4,	1	1730					0.55	12.5	Yes
F-84, 035,	1	1727	0.08			0.04	0.34	13	Yes
Tiger White 3,	2	1810	0.09		0.05		0.44	12.7	No

Table D.3—RADIATION RECEIVED BY PERSONNEL ON SHOT RUTH, 31 MARCH 1953, 1300 GMT

Name	Position	Reading, mr
	Pilot	400
	Pilot	120

Table D.4—B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 427324

	Loading	Contamination, mr/hr		
		First reading, 31 March, 1606 hr	Second reading, 2 April, 1605 hr	Third reading, 2 April, 2215 hr
Nose		22	1	3
Air intake engine 3	600	350	22	12
Left turboengine 3		250	23	13
Right turboengine 3				
Air intake engine 4	500	320	20	11
Left turboengine 4		300	25	11
Right turboengine 4				
Right wing (leading edge)		100	6	4
Right scanner blister		30	2.5	3
Right horizontal stabilizer		40	1	1.2
Left horizontal stabilizer		25	1.5	1.2
Left scanner blister		40	3	2
Left wing (leading edge)		100	5	8
Air intake engine 1	600	400	27	12
Left turboengine 1		160	28	7
Right turboengine 1				
Air intake engine 2	600	340	23	10
Left turboengine 2		140	24	10
Right turboengine 2				
Filter box, left wing	650	100	20	
Left wheel well door		240	11	9
Antenna		15	2	1
Radar radome		200	16	11
Pitot		160	2	4
A-1 filter box				
Right wheel well door		340	14	9
Filter box, right wing	800	100	6	
Cockpit		30		1

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

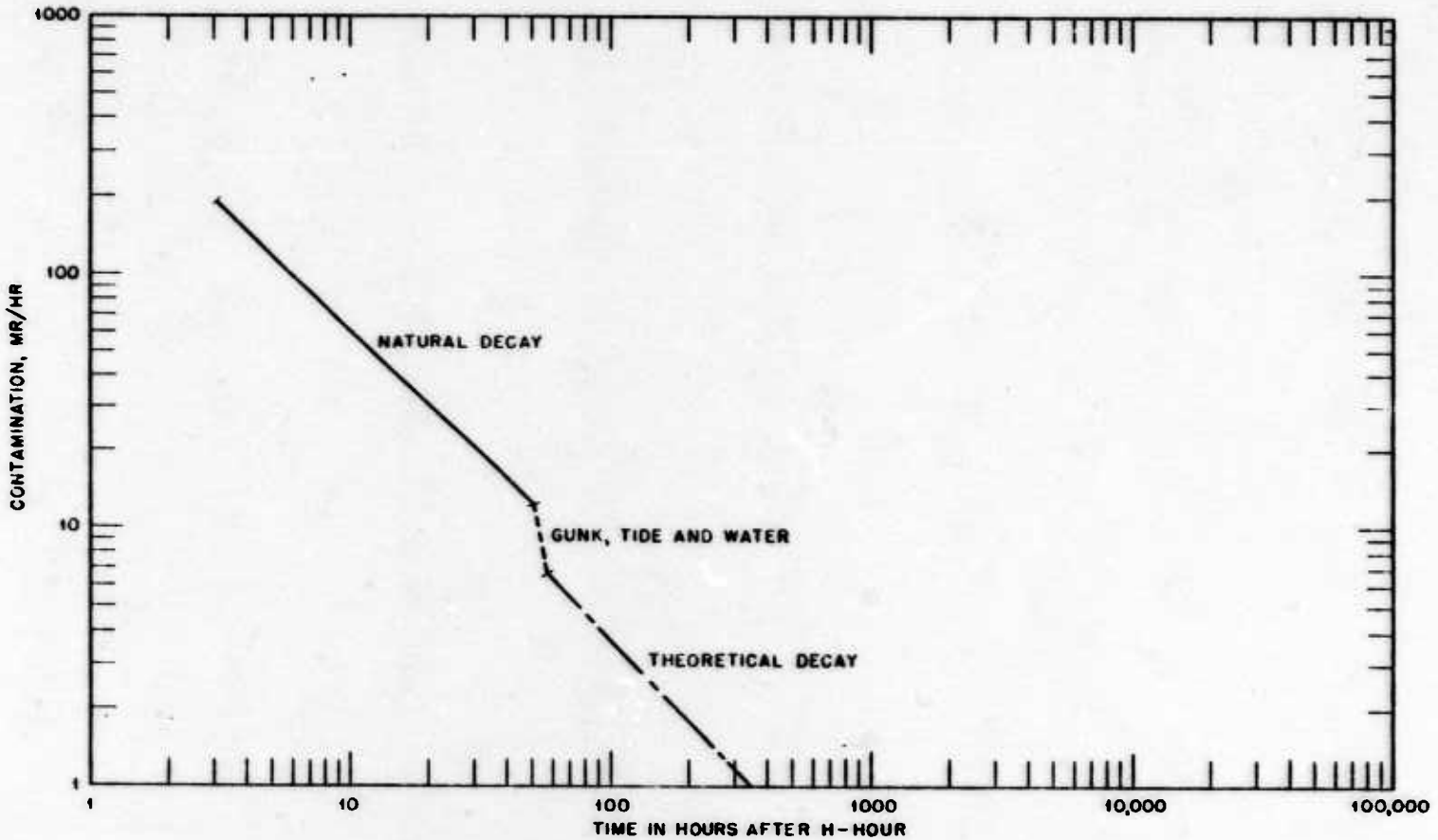

Fig. D.1 — B-29 aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 427324. Time of first survey, 0806 PST (1606 GMT). Values plotted are average over-all aircraft contamination.

Table D.5 — B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 486397

	Loading	Contamination, mr/hr				
		First reading, 31 March, 1648 hr	Second reading, 2 April, 1525 hr	Third reading, 2 April, 2100 hr	Fourth reading, 3 April, 1635 hr	Fifth reading, 4 April, 1530 hr
Nose		49	2	1.6	1	1
Air intake engine 3		1000	49	31	24	19
Left turboengine 3	1300	900	40	30	20	17
Right turboengine 3						
Air intake engine 4		1100	60	24	16	14
Left turboengine 4	1400	1000	65	14	15	12
Right turboengine 4						
Right wing (leading edge)		420	21	11	9	6
Right scanner blister		140	7	2.2	2	1.8
Right horizontal stabilizer		150	6	2.5	2	2
Left horizontal stabilizer		160	12	6	3.5	4
Left scanner blister		150	9	2.3	2.7	2.5
Left wing (leading edge)		480	18	8	7	6
Air intake engine 1		1300	50	34	28	23
Left turboengine 1	1400	1300	50	28	25	19
Right turboengine 1						
Air intake engine 2		1000	53	31	28	21
Left turboengine 2	1400	900	60	39	30	23
Right turboengine 2						
Filter box, left wing	2000	445	16	10		
Left wheel well door		600	36	25	21	16
Antenna		100	6			
Radar radome		600	43	31	23	19
Pitot		110	6		4	2.2
A-1 filter box						
Right wheel well door		600	31	22	18	14
Filter box, right wing		480	16	10		
Cockpit						

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third and fourth readings, natural decay.

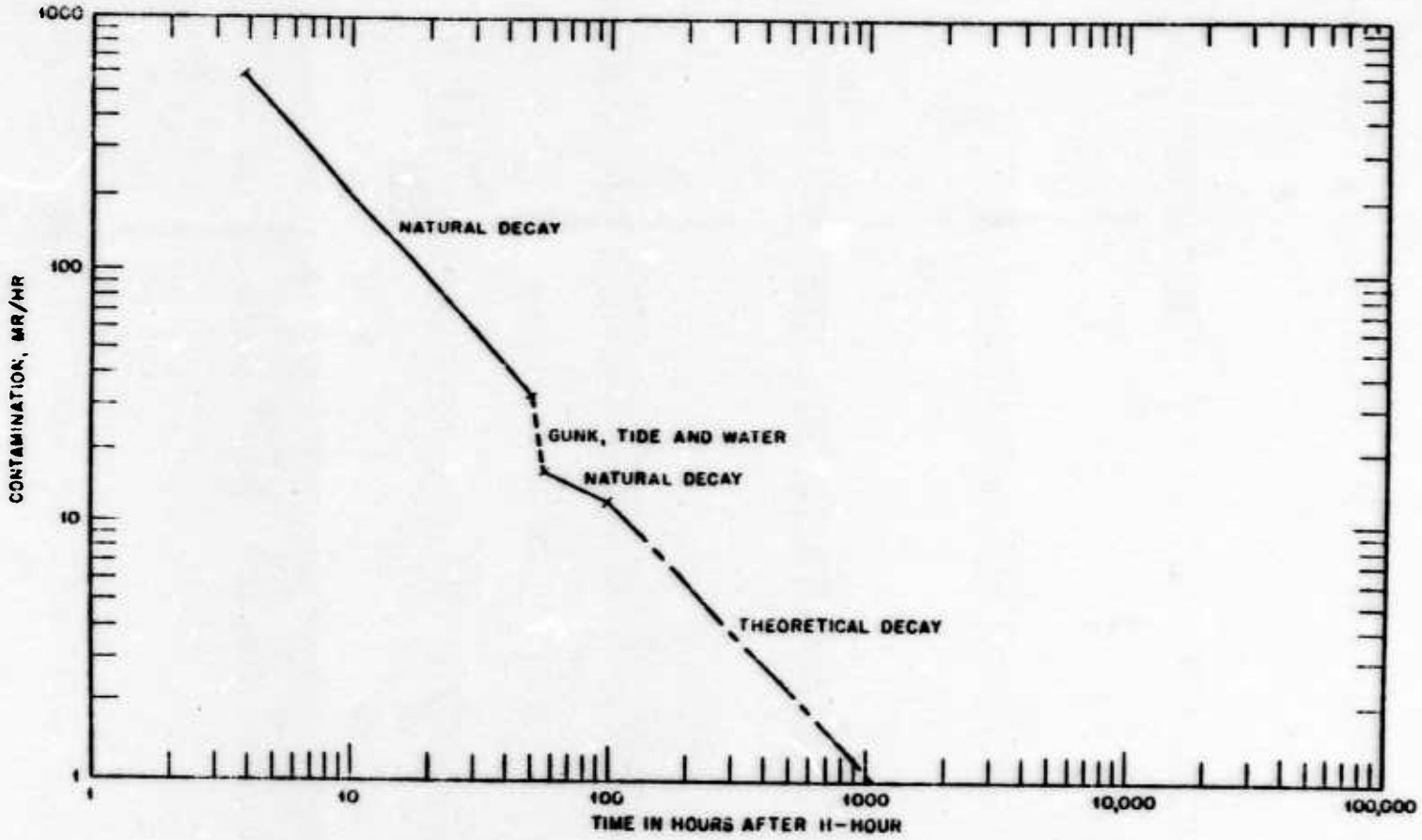

Fig. D.2—B-29 aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 486397. Time of first survey, 0848 PST (1649 GMT). Values plotted are average over-all aircraft contamination.

Table D.6—B-25 AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 786

	Loading	Contamination, mr/hr		
		First reading, 31 March, 1755 hr	Second reading, 1 April, 1810 hr	Third reading, 1 April, 2315 hr
Nose		10	1	1
Nose wheel well		18	2	2
Oil cooler engine 2	110	80	15	15
Air intake engine 2	110	100	10	10
Right wheel well		60	4	4
Right wing (leading edge)		30	2	2
Right horizontal stabilizer		20	4	1
Left horizontal stabilizer		20	4	1
Left wing (leading edge)		30	2	3
Left wheel well		40	7	4
Air intake engine 1	120	120	10	10
Oil cooler engine 1	120	90	14	8
Forward entrance door		20	4	1
Pitot tube		22		
Radio compass dome		32	4	2
Rear entrance door				
Cockpit		25	4	3

Note: Decontamination used after first reading, natural decay; after second reading, Tide and water.

Table D.7—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1032-A

	Loading	Contamination, mr/hr			
		First reading, 31 March, 1445 hr	Second reading, 1 April, 1755 hr	Third reading, 1 April, 1900 hr	Fourth reading, 1 April, 2355 hr
Cockpit					
Air intake (6 in. inside)	305	200	16	15	14
Right inner landing gear door		260	15	15	13
Right wing (leading edge)	625	420	28	26	22
Right wing tip		175	10	8	8
Right wing tip tank	3200	135	6	5	5
Right side turbine		435	22	21	16
Right horizontal stabilizer		220	12	10	9
Tail pipe (6 in. inside)		260	16	14	12
Left horizontal stabilizer		210	12	10	9
Left side turbine		445	22	21	15
Left wing tip tank	3400	115	8	5.5	5
Left wing tip		245	9	7	7
Left wing (leading edge)	600	420	28	26	21
Left inner landing gear door		250	15	14	12
Dive brake		525	30	28	24

Note: Decontamination used after first reading, natural decay; after second reading, Tide and water; after third reading, gunk, Tide, and water.

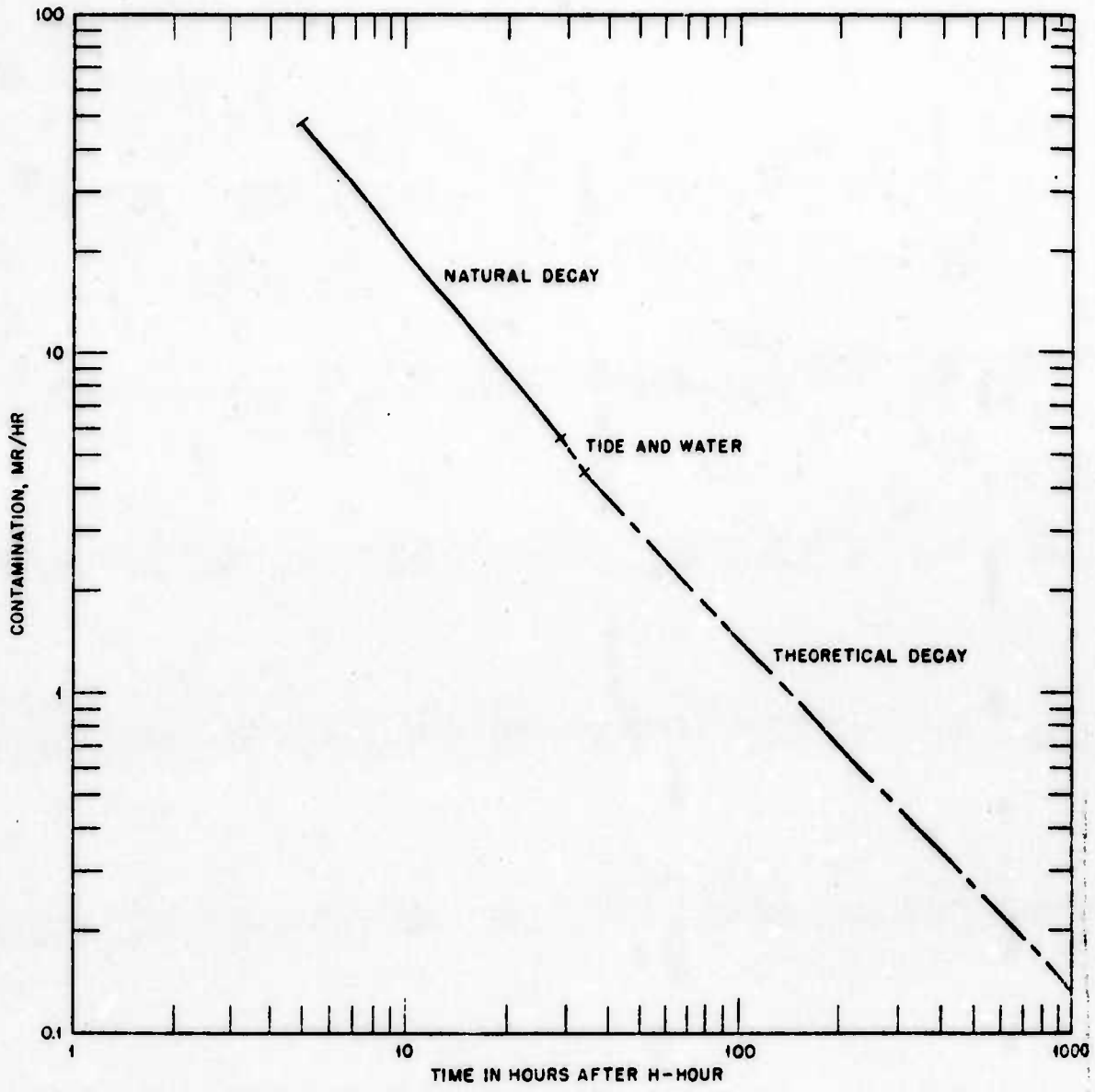

Fig. D.3—B-29 aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 786. Time of first survey, 0955 PST (1755 GMT). Values plotted are average over-all aircraft contamination.

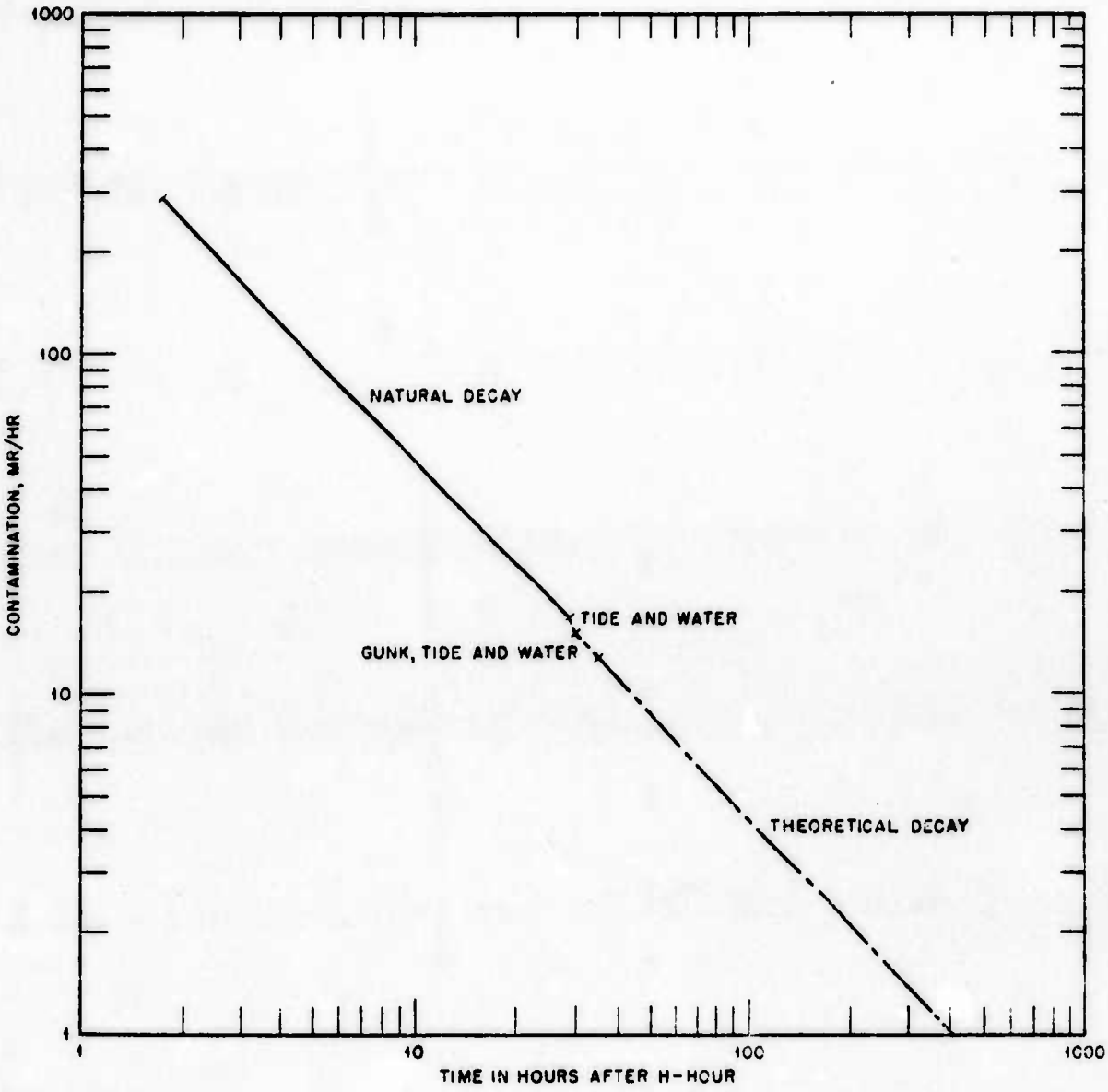

Fig. D.4—F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1032-A. Time of first survey, 0645 PST (1445 GMT). Values plotted are average over-all aircraft contamination.

Table D.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1037-A

		Contamination, mr/hr			
	Loading	First reading, 31 March, 1700 hr	Second reading, 1 April, 1745 hr	Third reading, 1 April, 1905 hr	Fourth reading, 2 April, 0005 hr
Cockpit					
Air intake (6 in. inside)	105	105	14	13	12
Right inner landing gear door		150	14	11	12
Right wing (leading edge)	200	200	20	20	18
Right wing tip		120	10	9	8
Right wing tip tank	1200	100	6	5.5	5
Right side turbine		205	22	18	14
Right horizontal stabilizer		140	10	9	9
Tail pipe (6 in. inside)		200	14	13	14
Left horizontal stabilizer		155	10	9	8
Left side turbine		205	25	18	12
Left wing tip tank	1000	120	7	5	5
Left wing tip		155	11	9	9
Left wing (leading edge)	240	220	22	20	19
Left inner landing gear door		190	18	16	14
Dive brake		225	28	24	20

Note: Decontamination used after first reading, natural decay; after second reading, Tide and water; after third reading, gunk, Tide, and water.

Table D.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1038-A

		Contamination, mr/hr	
	Loading	First reading, 31 March, 1745 hr	Second reading, 1 April, 1725 hr
Cockpit			
Air intake (6 in. inside)	80	40	3.4
Right inner landing gear door		40	3
Right wing (leading edge)	110	80	8
Right wing tip		10	3
Right wing tip tank	700	25	2.4
Right side turbine		70	7
Right horizontal stabilizer		40	4
Tail pipe (6 in. inside)		60	5.5
Left horizontal stabilizer		40	4
Left side turbine		60	9
Left wing tip tank	800	34	2.6
Left wing tip		32	3.2
Left wing (leading edge)	130	80	8
Left inner landing gear door		20	4
Dive brake		110	12

Note: Decontamination used after first reading, natural decay.

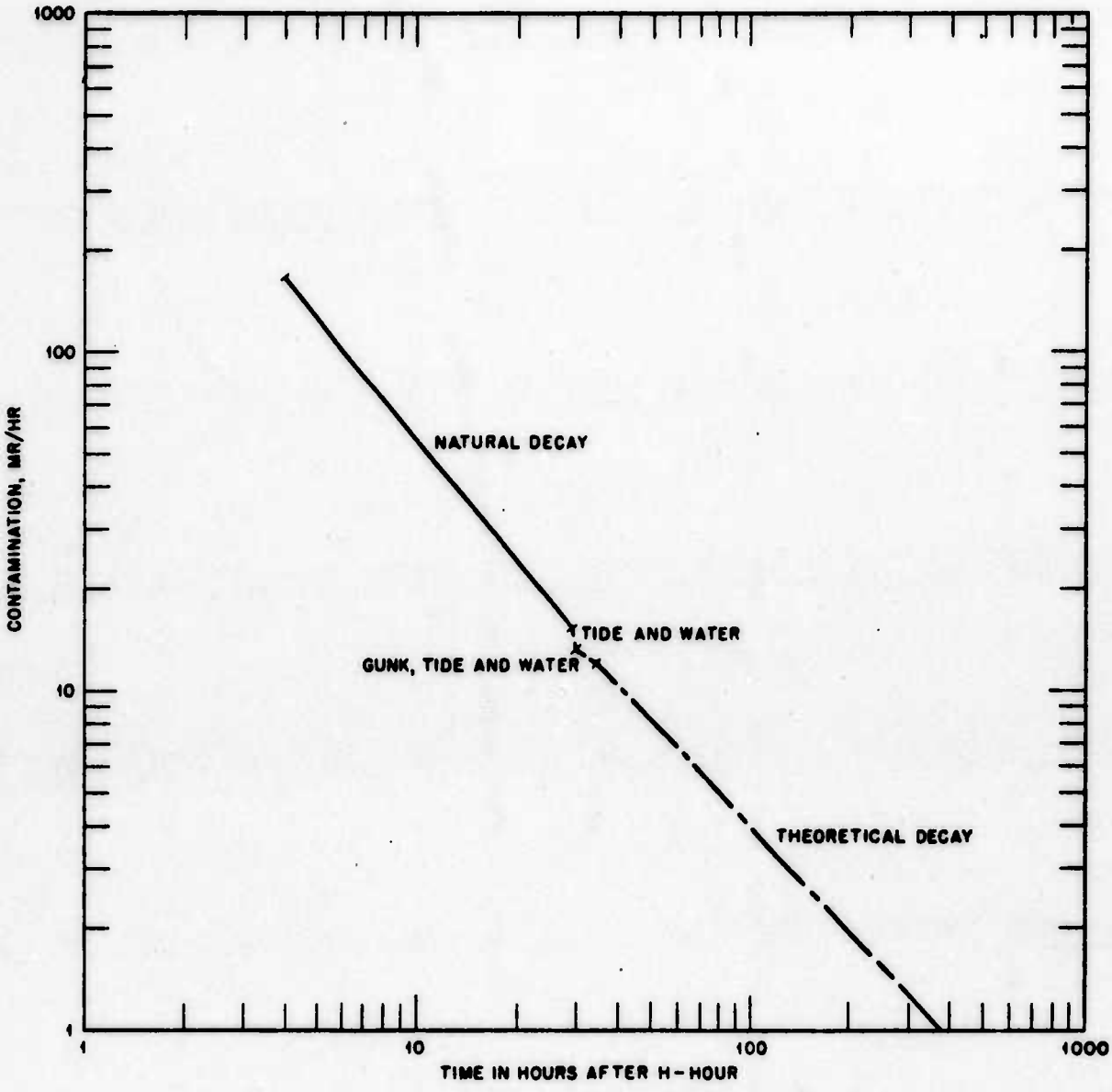

Fig. D.5—F-84G aircraft contamination; Shot [redacted], 31 March 1953; aircraft No. 51-1037-A. Time of first survey, 0900 PST (1700 GMT). Values plotted are average over-all aircraft contamination.

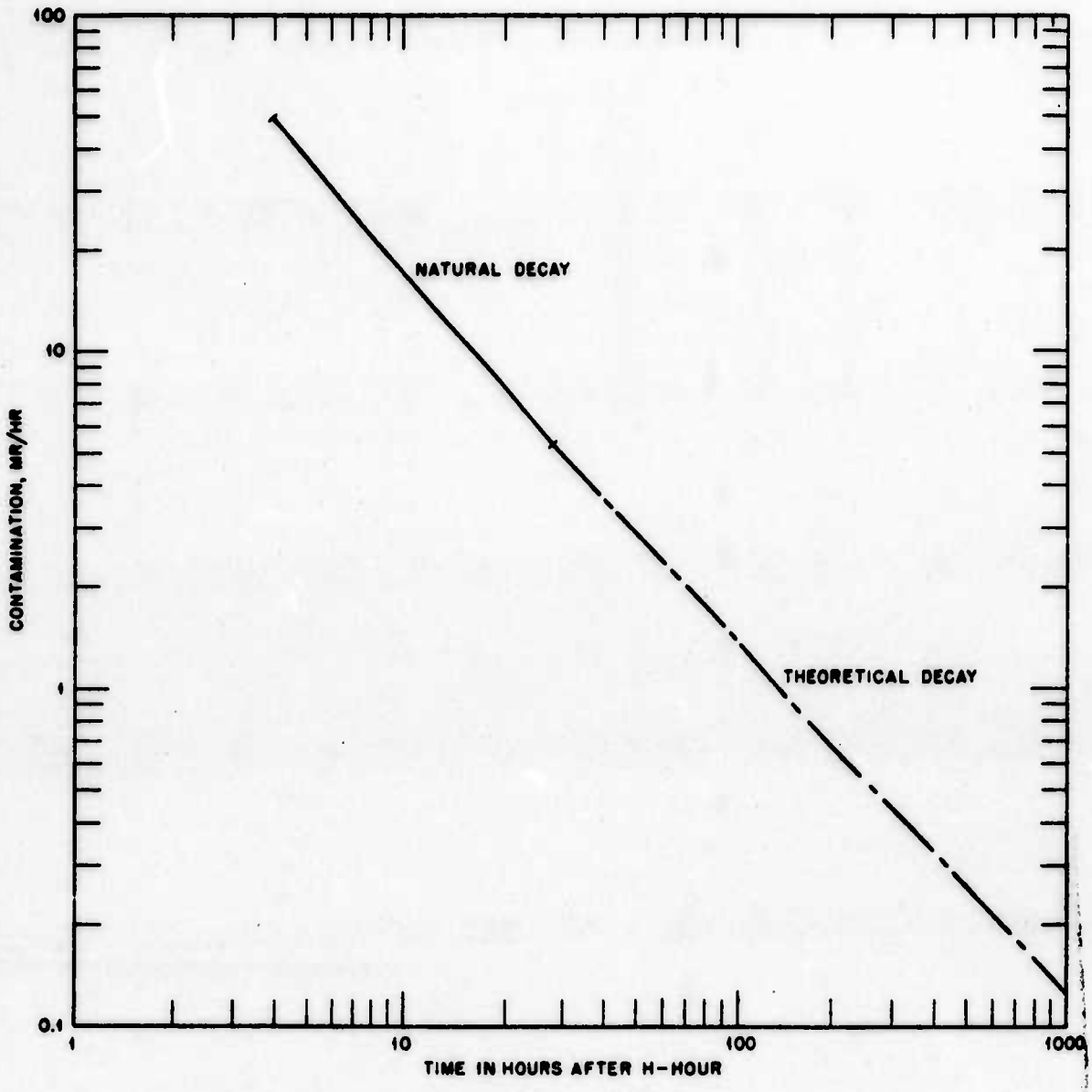

Fig. D.6 — F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1038-A. Time of first survey, 0945 PST (1745 GMT). Values plotted are average over-all aircraft contamination.

Table D.10—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1042-A

		Contamination, mr/hr			
	Loading	First reading, 31 March, 1440 hr	Second reading, 1 April, 1800 hr	Third reading, 1 April, 2320 hr	Fourth reading, 2 April, 1500 hr
Cockpit					
Air intake (6 in. inside)	500	280	14	12	11
Right inner landing gear door		455	15	13	12
Right wing (leading edge)	1400	800	29	24	21
Right wing tip		280	11	9	8
Right wing tip tank	8000	220	8	6	6
Right side turbine		1000	30	19	17
Right horizontal stabilizer		410	13	10	9
Tail pipe (6 in. inside)		550	18	16	14
Left horizontal stabilizer		430	12	10	10
Left side turbine		1100	27	19	17
Left wing tip tank	5000	210	7	5	66
Left wing tip		260	9	7	6
Left wing (leading edge)	1300	800	28	22	21
Left inner landing gear door		460	16	14	13
Dive brake		1000	34	29	26

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay.

Table D.11—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1045-A

		Contamination, mr/hr	
	Loading	First reading, 31 March, 1850 hr	Second reading, 1 April, 1630 hr
Cockpit			
Air intake (6 in. inside)	30	20	8
Right inner landing gear door		26	9
Right wing (leading edge)	55	46	15
Right wing tip		14	5
Right wing tip tank	180	10	4
Right side turbine		50	13
Right horizontal stabilizer		18	5
Tail pipe (6 in. inside)		22	8
Left horizontal stabilizer		16	5.5
Left side turbine		40	12
Left wing tip tank	180	10	3
Left wing tip		16	4.5
Left wing (leading edge)	55	50	16
Left inner landing gear door		26	9
Dive brake		60	18

Note: Decontamination used after first reading, natural decay.

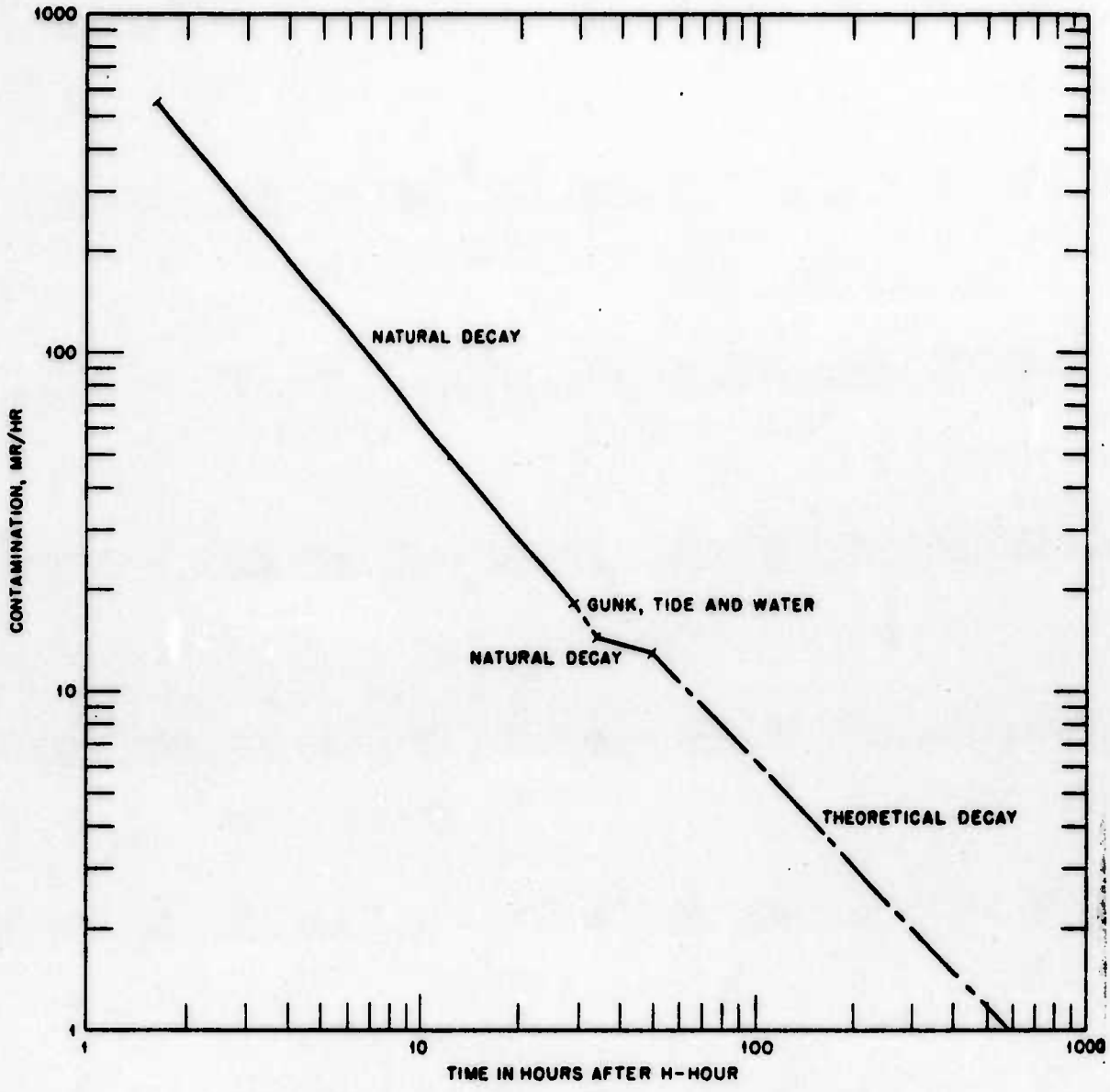

Fig. D.7 — F-84G aircraft contamination; Shot RUTH, 21 March 1953; aircraft No. 51-1042-A. Time of first survey, 0640 PST (1440 GMT). Values plotted are average over-all aircraft contamination.

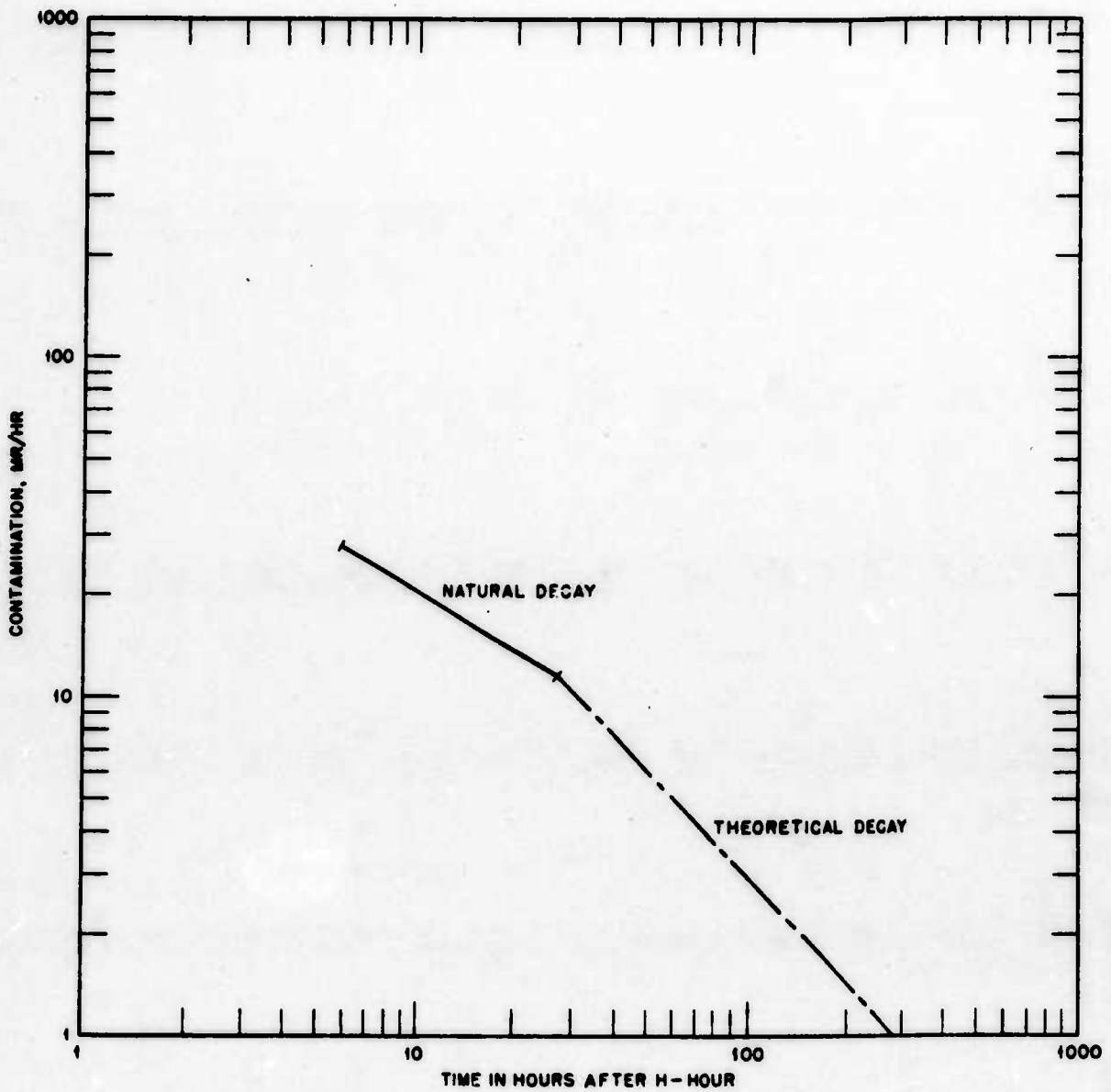

Fig. D.8—F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1045-A. Time of first survey, 1050 PST (1850 GMT). Values plotted are average over-all aircraft contamination.

Table D.12—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1046-A

	Loading	Contamination, mr/hr	
		First reading, 31 March, 1825 hr	Second reading, 1 April, 1550 hr
Cockpit			
Air intake (6 in. inside)	20	18	2
Right inner landing gear door		27	3
Right wing (leading edge)	44	38	5
Right wing tip		14	2.5
Right wing tip tank	300	12	1
Right side turbine		42	5.5
Right horizontal stabilizer		22	2.7
Tail pipe (6 in. inside)		28	4
Left horizontal stabilizer		22	3
Left side turbine		43	6
Left wing tip tank	300	18	1
Left wing tip		21	3
Left wing (leading edge)	42	42	6
Left inner landing gear door		29	3
Dive brake		100	9

Note: Decontamination used after first reading, natural decay.

Table D.13—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1049-A

	Loading	Contamination, mr/hr		
		First reading, 31 March, 1715 hr	Second reading, 1 April, 1645 hr	Third reading, 2 April, 1510 hr
Cockpit				
Air intake (6 in. inside)	80	55	10	15
Right inner landing gear door		70	16	13
Right wing (leading edge)	135	95	24	24
Right wing tip		45	7	8
Right wing tip tank	360	40	6	8
Right side turbine		100	21	19
Right horizontal stabilizer		75	11	12
Tail pipe (6 in. inside)		105	16	15
Left horizontal stabilizer		65	13	12
Left side turbine		100	22	19
Left wing tip tank	420	60	4	5
Left wing tip		80	7	8
Left wing (leading edge)	120	120	24	22
Left inner landing gear door		95	13	12
Dive brake		100	26	23

Note: Decontamination used after first and second readings, natural decay.

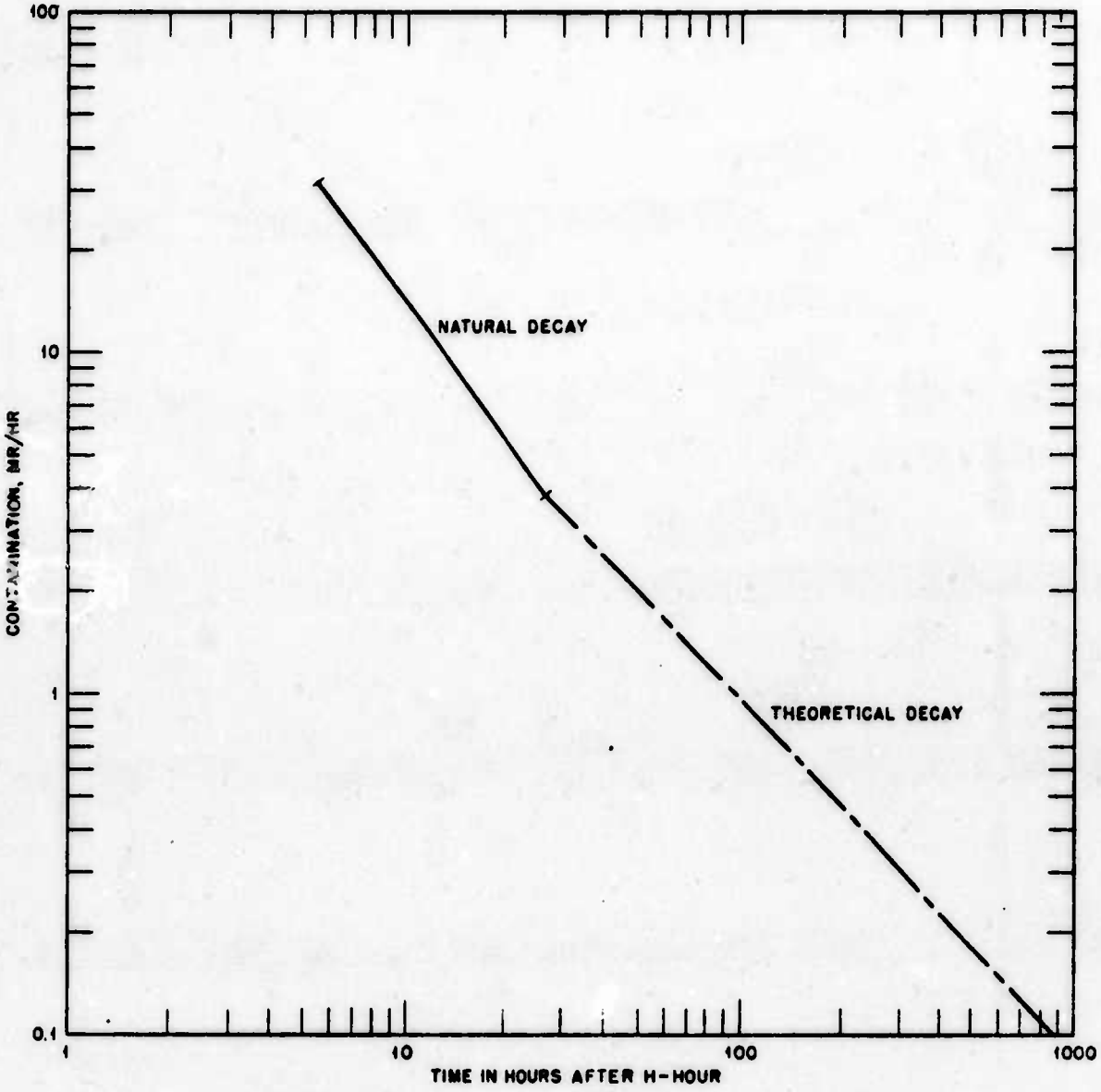

Fig. D.9 — F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1046-A. Time of first survey, 1025 PST (1825 GMT). Values plotted are average over-all aircraft contamination.

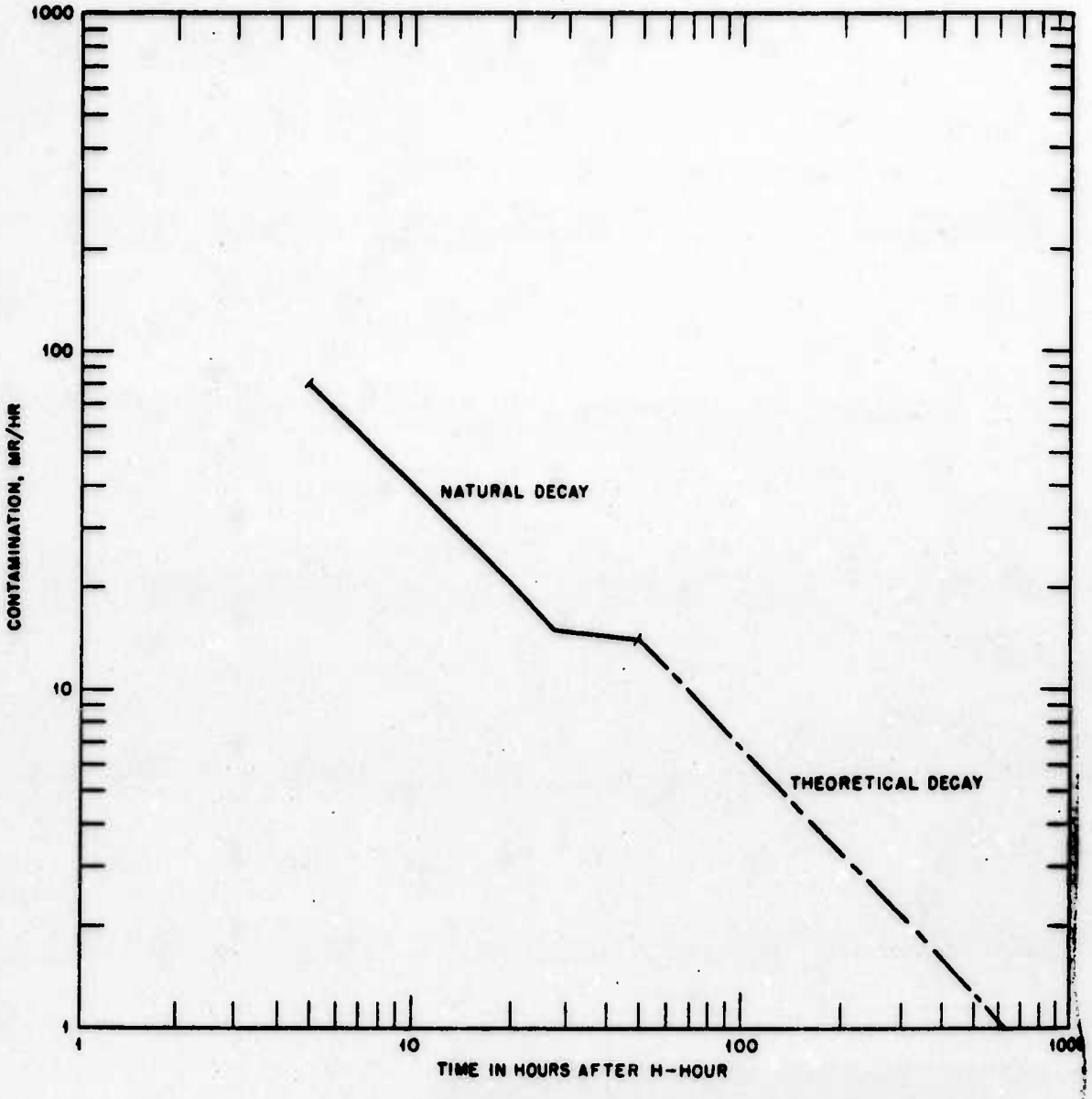

Fig. D.10 — F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1049-A. Time of first survey, 0915 PST (1715 GMT). Values plotted are average over-all aircraft contamination.

Table D.14—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1054-A

	Loading	Contamination, mr/hr	
		First reading, 31 March, 1755 hr	Second reading, 1 April, 1730 hr
Cockpit			
Air intake (6 in. inside)	400	120	1.5
Right inner landing gear door		120	2
Right wing (leading edge)	200	140	4
Right wing tip		50	1
Right wing tip tank	400	10	1
Right side turbine		30	4
Right horizontal stabilizer		15	2
Tail pipe (6 in. inside)		20	3
Left horizontal stabilizer		120	2
Left side turbine		20	4.4
Left wing tip tank	800	60	1
Left wing tip		10	1.2
Left wing (leading edge)	1150	35	4.5
Left inner landing gear door		10	2.4
Dive brake		160	7

Note: Decontamination used after first reading, natural decay.

Table D.15—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RUTH, 31 MARCH 1953, 1300 GMT, AIRCRAFT NO. 51-1055-A

	Loading	Contamination, mr/hr		
		First reading, 31 March, 1835 hr	Second reading, 1 April, 1650 hr	Third reading, 1 April, 1720 hr
Cockpit				
Air intake (6 in. inside)	70	34	10	10
Right inner landing gear door		26	11	11
Right wing (leading edge)	80	48	21	20
Right wing tip		16	8	6
Right wing tip tank	280	10	5	4
Right side turbine		26	16	14
Right horizontal stabilizer		14	8	6
Tail pipe (6 in. inside)		30	10	9
Left horizontal stabilizer		18	7	6
Left side turbine		28	17	16
Left wing tip tank	280	20	4	4
Left wing tip		20	6	5
Left wing (leading edge)	80	44	20	18
Left inner landing gear door		30	13	12
Dive brake		100	24	22

Note: Decontamination used after first reading, natural decay; after second reading, Tide and water.

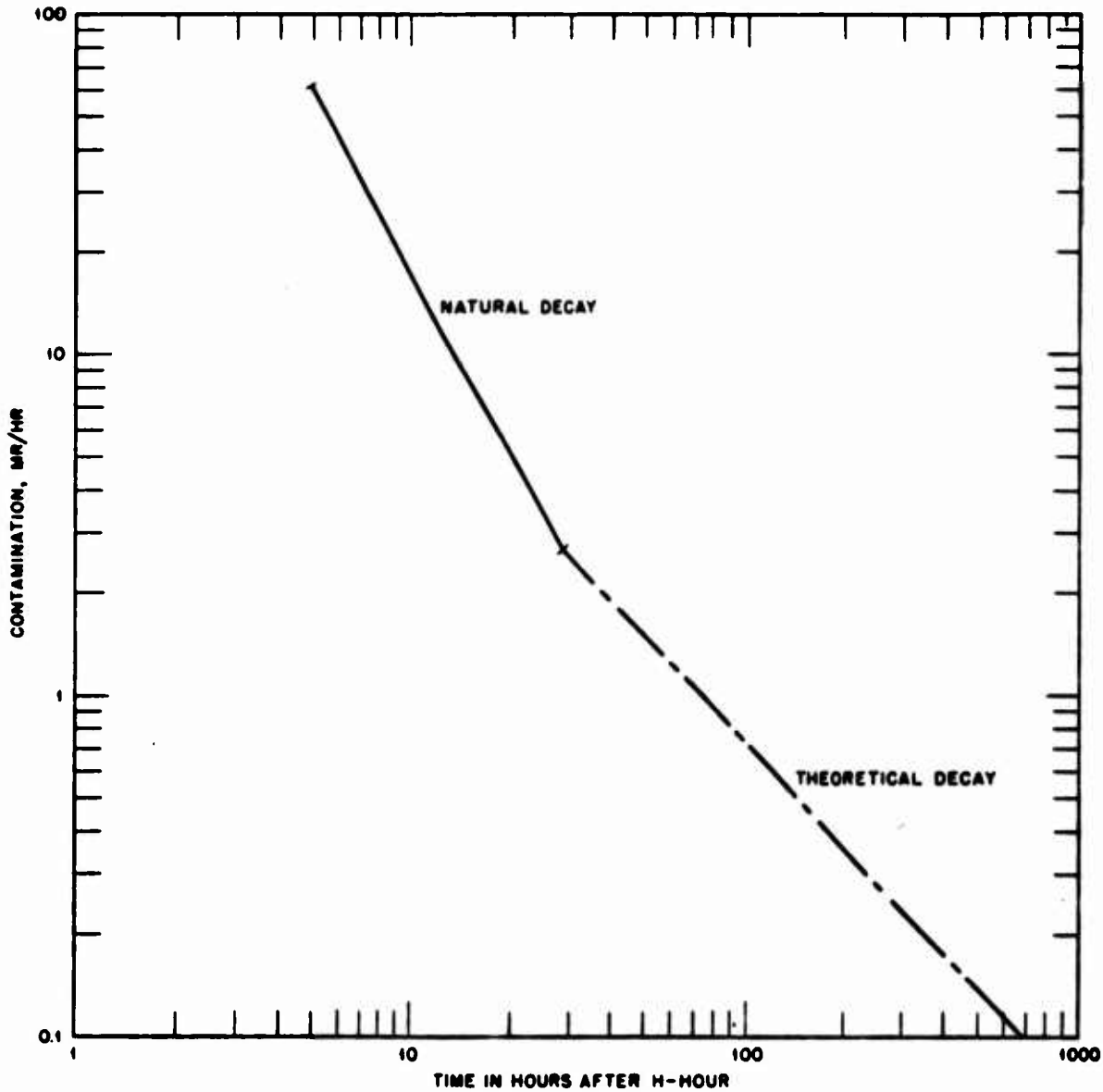

Fig. D.11 — F-84G aircraft contamination; Shot RAINIER, 31 March 1953; aircraft No. 51-1054-A. Time of first survey, 0955 PST (1755 GMT). Values plotted are average over-all aircraft contamination.

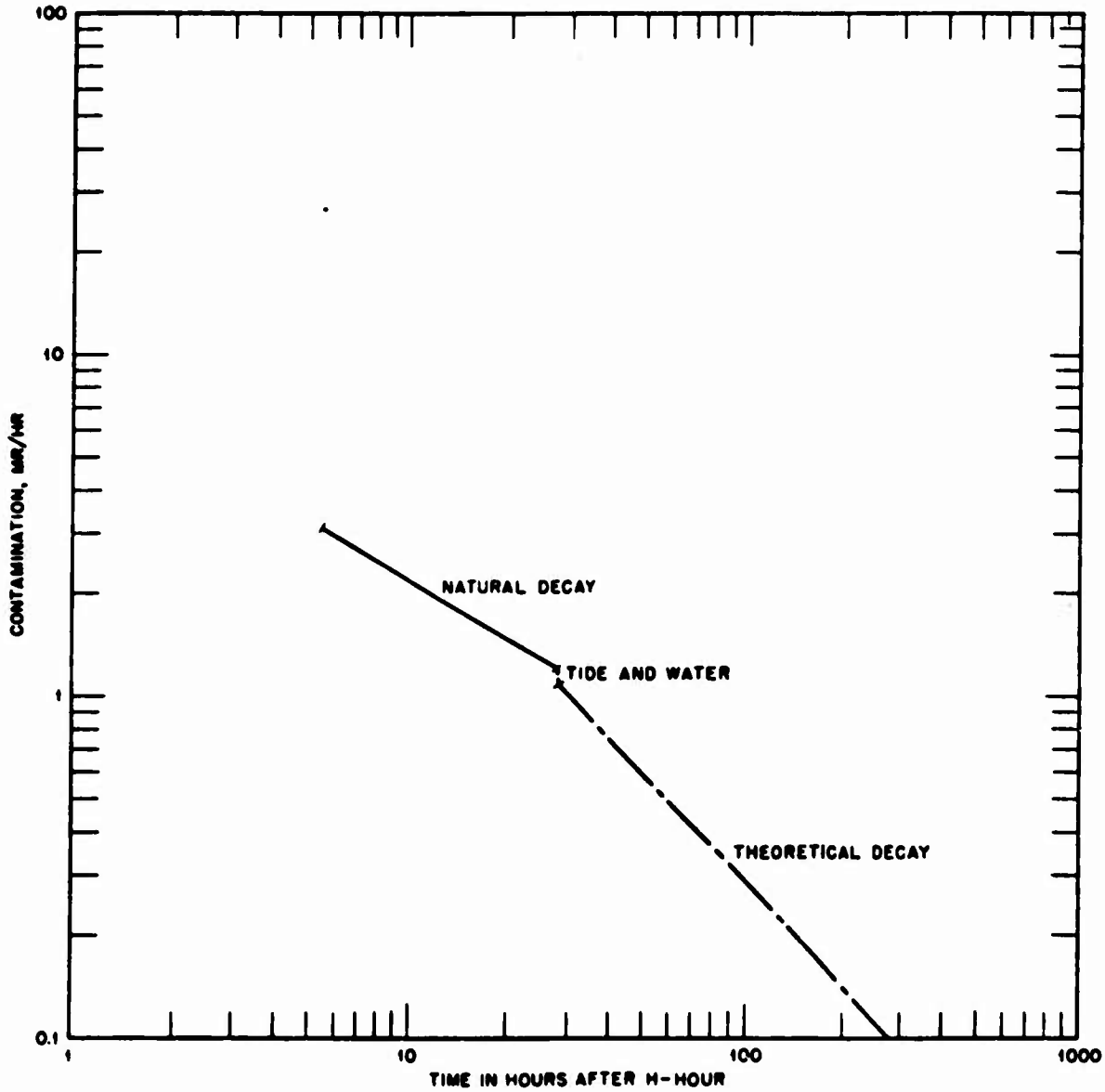

Fig. D.12 — F-84G aircraft contamination; Shot RUTH, 31 March 1953; aircraft No. 51-1055-A. Time of first survey, 1035 PST (1835 GMT). Values plotted are average over-all aircraft contamination.

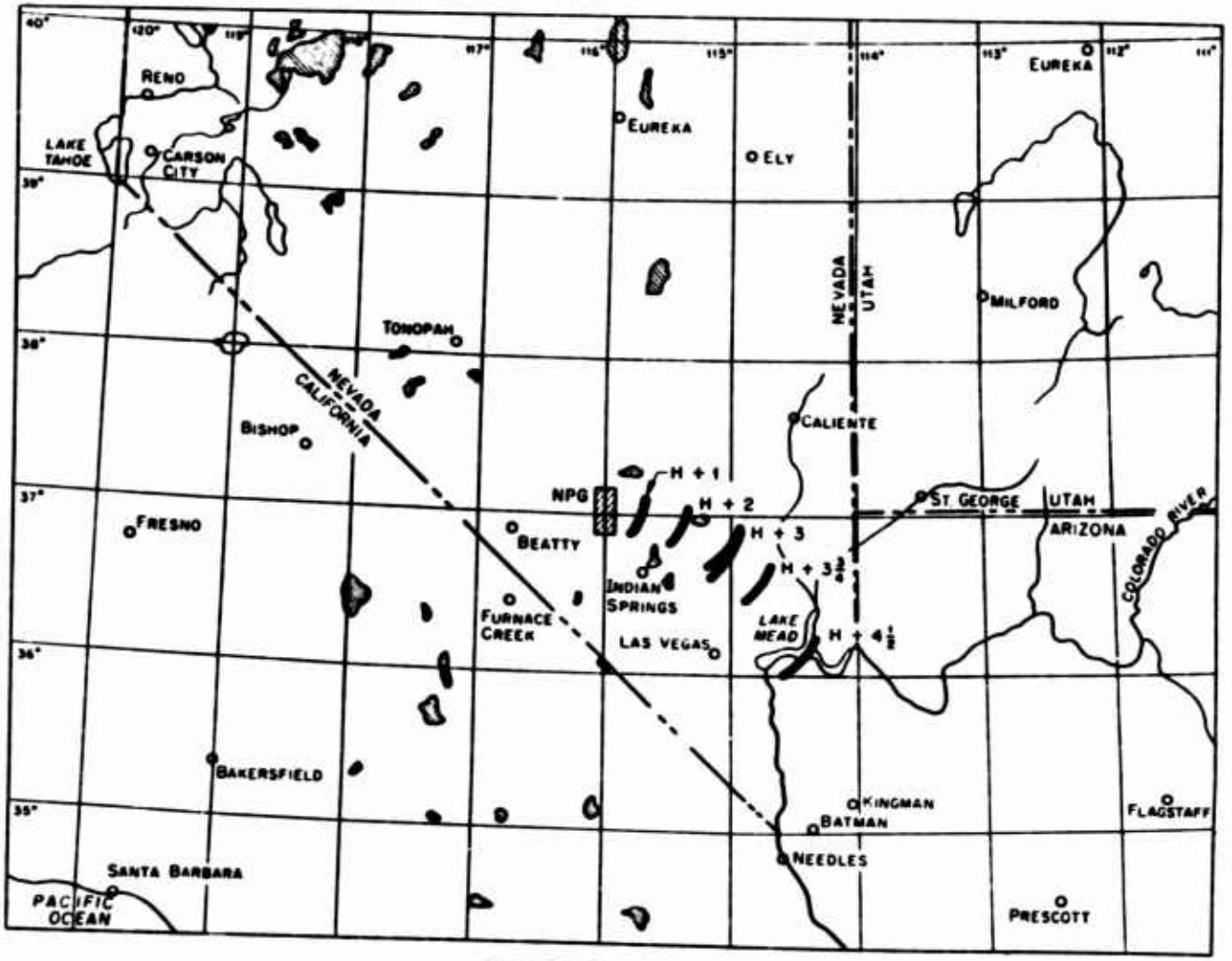

Fig. D.13—Cloud track, Shot RUTH, 31 March 1953. Cloud top, 14,300 ft MSL.

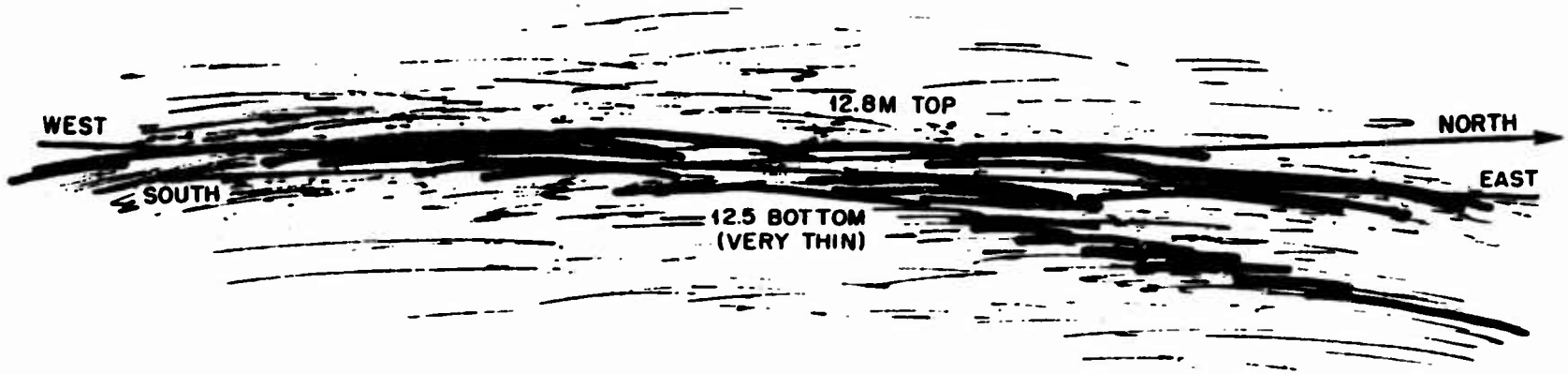

Fig. D.14—Shot RUTH, 31 March 1953; time, H + 3 hr 40 min.

ANNEX E

DIXIE SHOT SUMMARY

The B-50 drop aircraft released a unit. The yield was 11 kt.

Final briefings for participating aircrews were held at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, at 1400 and 1500 hr, respectively, on 5 April 1953 for the DD-1 shot, scheduled for detonation at 0730 PST (1530 GMT) at the Nevada Proving Grounds on 6 April 1953. On 5 April 1953 at 0830 PST, the first weather briefing was held at the Control Point, and since the weather forecast was favorable the mission was called on. The final weather briefing for the Test Manager's advisory panel staff and invited participants was conducted at 2100 PST. The actual weather was 3/10 cloud coverage at 30,000 ft, with no precipitation within 5000 miles downstream. Winds at bombing altitude, 29,000 ft above target, were 290°/92 knots. The height of the tropopause was 38,500 ft MSL.

H-hour was scheduled for 0730 PST, with the actual detonation time being 0729:38.413 PST and the official circular error 565 ft at 0530 (N-80 ft ± 20 ft and E-560 ft ± 20 ft). The burst altitude was 130 ft low or 6020 ft above the target (predicted, 6150 ft). The cloud rise was 40,100 ft.

A total of 75 sorties were flown on this shot, with one of the blast and thermal, Project 5.2, B-50 aircraft aborting immediately after take-off due to the loss of No. 4 engine. All other aircraft were in their positions at the scheduled time to complete a very satisfactory mission.

The participating aircraft are as follows:

No.	Type	Project	Code Name
1	B-50	Drop aircraft	Alley Cat
2	B-29	Canister drop	Pump Gun 1 and 2
2	QF-80	Drone	Brow Beat 2 and 3
4	T-33	Director	Brow Beat 4, 6, 9, and 10
4	F-86	Fighter	Brow Beat 12, 13, 14, and 15
1	B-50	Canister drop and sampler controller	Wide Open and Skull Cap
1	B-47	Canister drop	Polar Bear
7	T-33	TAC	Leap Frog 1 to 7
3	B-50	Blast and thermal	Clay Pigeon 1, 2, and 3
4	HRS	Effects	Sand Blower A, B, C, and D
1	B-17	Drone radar checker	Brow Beat 11
10	F-84	Cloud samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-5	Terrain survey	Fire Fly 1
1	H-18	Terrain survey	Fire Fly 2

No.	Type	Project	Code Name
2	L-20	Terrain survey	Ever Ready 4 and 5
1	C-45	Terrain survey	Ever Ready 3
1	C-47	Photo	Tin Type
1	B-29	IBDA	Dish Rag 2
13	B-47	SAC	Back Bone
1	B-29	Cloud sampler	Cap Nip 1
2	B-29	Cloud tracker	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop

Project 1.3 received all the information desired from the 14 canisters dropped for a highly successful mission. The Project 4.1 drone phase encountered a little difficulty in that the first drone did not penetrate the cloud but went under it. Drone No. 2 penetrated the very bottom of the cloud and recorded a reading of 4000 r peak intensity at the wing tips. The drone landings and take-offs were very successful. This was the first nullo flight for jet drones in a continental nuclear test.

The Project 4.1 canister phase of the test was not fully successful due to outside interference on their assigned telemetering channel. Both the B-50 and B-47 made successful releases of five canisters each, with the greater portion of them penetrating the cloud as scheduled.

The information obtained from the two blast and thermal B-50 aircraft, Project 5.2, was adequate. Projects 6.2 (IBDA), 6.11 (TAC Indoctrination), and 6.3 (SAC IBDA) and the DWET photo aircraft also flew satisfactory missions.

This shot was forecast for a yield of 20 kt and a cloud height rise of 40,000 ft.

A minimum sampling effort was required, in so far as quantity was concerned, with a fraction of 2×10^{-10} desired. This required an exposure of 0.1 r at H + 2 hr; however, it was planned to make two penetrations at less than H + 2 hr, probably H + 1 hr 30 min and 1 hr 45 min, depending on cloud dispersion.

Winds were on the order of 100 knots at H-hour, and shortly after detonation the cloud began to disperse rapidly. This was further complicated by the fact that it was an airdrop and there was very little mixing of ground dirt, as in the case with a tower shot, to color the cloud.

The first penetration was made at H + 1 hr 15 min, and a peak intensity of 10 r/hr was observed. This was less than normally expected, and it was decided to dispatch all aircraft as rapidly as possible.

Even with rapid sampling, penetrations were required over 300 nautical miles distant from Indian Springs Air Force Base, Nevada. In one instance navigating on the return trip was complicated by lower clouds and high winds.

Sampling was very difficult due to high burst height; however, adequate quantities were obtained for the requesting agencies.

The terrain survey aircraft found very little fall-out due to the high burst altitude.

Owing to the high and varying winds, the circular error was within allowable tolerance but was not as satisfactory as previous airdrops. All desired information was obtained by participating organizations.

The decay curves contained in this and previous annexes are not included in the remaining annexes. In order that these curves may be projected on charts, a number of readings must be made of the contaminated aircraft, which required additional exposure of the aircraft decontamination crews. It was determined that the previous information obtained was so similar that further curves would not be required.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Four, 1530 GMT, 6 April 1953

Cloud Cover: 3/10 at 30,000 ft
Precipitation: No precipitation within 500 miles downstream
Height Ground Zero: 4191 ft MSL
Burst Height: 10,211 ft MSL

Pressure:	Ground Zero	861 mb
	Burst height	686 mb
Virtual Temperature:	Ground Zero	16.1°C
	Burst height	0.2°C
Actual Temperature:	Ground Zero	15.5°C
	Burst height	0.6°C
Relative Humidity:	Ground Zero	25%
	Burst height	36%
Altimeter Setting:	29.66 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	345°	04 knots
6,000	300°	03 knots
8,000	310°	13 knots
10,000	280°	28 knots
15,000	280°	31 knots
20,000	290°	72 knots
25,000	290°	65 knots
30,000	290°	92 knots
35,000	290°	65 knots
40,000	290°	122 knots
45,000	290°	119 knots
50,000	290°	78 knots

Height of Tropopause: 38,500 ft MSL

Table E.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT DANIEL, 6 APRIL 1953, 1530 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Alley Cat	Drop aircraft	KAFB	1030	1333	1539	1720	A very successful mission.
B-29	Pump Gun 1	Canister drop	KAFB	1120	1418	1532	1720	Very successful mission. All canisters dropped and required information obtained.
B-29	Pump Gun 2	Canister drop	KAFB	1130	1412	1541	1745	Very successful mission. All canisters dropped and required information obtained.
QF-80	Brow Beat 2	Drone	ISAFB	1417	1425	1559	1605	Drone was taken off and landed successfully. First jet drone operation in ZI nuclear tests.
T-33	Brow Beat 4	Director	ISAFB	1417	1425	1559	1610	
T-33	Brow Beat 10	Director	ISAFB	1417	1425	1559	1610	
F-86	Brow Beat 12	Fighter	ISAFB	1418	1425	1559	1608	
F-86	Brow Beat 13	Fighter	ISAFB	1418	1425	1559	1608	
QF-80	Brow Beat 3	Drone	ISAFB	1433	1450	1538	1556	Drone was taken off and landed successfully. Did not penetrate cloud but went under it.
T-33	Brow Beat 6	Director	ISAFB	1433	1450	1538	1602	
T-33	Brow Beat 9	Director	ISAFB	1432	1450	1538	1600	
B-50	Skull Cap	Sampler controller	ISAFB	1252	1536	2045	2053	
F-84	Tiger Red 1	Sampler	ISAFB	1714	1724	1835	1840	All sampler aircraft had a very successful operation.
F-84	Tiger Red 2	Sampler	ISAFB	1630	1640	1720	1730	
F-84	Tiger Red 3	Sampler	ISAFB	1726	1735	1834	1839	
F-84	Tiger Red 4	Sampler	ISAFB	1748	1750	1910	1921	
F-84	Tiger White 1	Sampler	ISAFB	1743	1750	1912	1919	
F-84	Tiger White 4	Sampler	ISAFB	1524	1535	1605	1619	Snooper, cloud height top 40,000 ft MSL; base 36,500 ft MSL.
F-84	Tiger White 4	Sampler	ISAFB	1800	1805	1945	2003	
F-84	Tiger Blue 2	Sampler	ISAFB	1630	1640	1725	1737	
F-84	Tiger Blue 3	Sampler	ISAFB	1728	1733	1736	1757	
F-84	Tiger Blue 4	Sampler	ISAFB	1800	1806	1954	2000	
H-5	Fire Fly 1	Terrain survey	ISAFB	1326	1350	1935	1945	Landed on helo pad at 1400. Airborne at 1545. Successful mission.
YH-18	Fire Fly 2	Terrain survey	ISAFB	2030	2043	2300	2335	

Table E.1 — (Continued)

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
L-20	Ever Ready 4	Terrain survey	ISAFB	1730	1745	1900	1916	Successful mission.
C-45	Ever Ready 3	Terrain survey	ISAFB	1435	1443	1546	1558	
L-20	Ever Ready 5	Terrain survey	ISAFB	1726	1750	1809	1827	
C-47	Tin Type	Photo	ISAFB	1430	1446	1533	1546	Successful mission; good position.
B-29	Dish Rag 2	BDA	KAFB	1110	1404	1538	1740	
B-47	Back Bone 12 aircraft	SAC	MacDill AFB	Unknown	1455	1533	Unknown	
B-29	Cat Nip 1	Cloud sampling	ISAFB	1635	1646	2001	2013	Obtained necessary samples.
B-29	Cat Nip 2	Cloud sampling	ISAFB					Stand-by.
F-86	Brow Beat 14	Fighter	ISAFB	1434	1450	1538	1600	
F-86	Brow Beat 15	Fighter	ISAFB	1434	1450	1538	1600	
B-50	Wide Open	Proj. 4.1	KAFB	1252	1320	1536	1715	Took over as Skull Cap.
B-47	Polar Bear	Proj. 4.1	KAFB	1405	1515	1540	1650	Dropped all canisters but failed to obtain necessary information.
B-50	Clay Pigeon 1	Blast and thermal	KAFB	1040	1321	1544	1720	Flew a successful mission.
B-50	Clay Pigeon 2	Blast and thermal	KAFB	1050	1335	1533	1725	
B-50	Clay Pigeon 3	Blast and thermal	KAFB	1100			1217	Aborted 1137Z GMT. Feathered No. 4.
T-33	Leap Frog 1	TAC	ISAFB	1407	1427	1433	1606	Flight of 4. Landed at George AFB. Very successful mission.
T-33	Leap Frog 2	TAC	ISAFB	1408	1427	1433	1606	Flight of 3. Landed at George AFB. Very successful mission.
HRS2	Sand Blower A, B, C, D	Effects	Desert Rock	1325	1330	1540	1600	Successful mission.
B-17	Brow Beat 11	Drone radar checker	ISAFB	1349	1400	1440	1503	
B-29	Cook Book 1	Cloud tracker	ISAFB	1615	1625	1730	1837	
B-29	Cook Book 2	Cloud tracker	ISAFB	1614	1625	1820	1835	Successful mission.
B-25	Cook Book 3	Cloud tracker	ISAFB	1546	1555	1651	1730	
C-47	Rag Mop	Terrain survey	ISAFB	1745	1800	2133	2145	Successful mission; good communications.

Table E.2—MANNED SAMPLING DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1032, Tiger Red 2,	1	1645	10	130	0.8	0.6		38.5	Yes
F-84, 1054, Tiger Blue 2,	1	1648	6	110	0.08		0.14	38.5	Yes
	2	1659	9	70	0.17	0.06	2.8	39.5	No
F-84, 1028, Tiger Red 1,	1	1754	2.5	35	0.2		2.4	36	Yes
F-84, 1037, Tiger Red 3,	1	1755	2.5	89	0.05		2.8	39.2	Yes
	2	1805	1.9	55	0.15		3.6	39.4	No
F-84, 1042, Tiger White 1,	1	1812	1.5	12	0.2		2.06	39.7	Yes
F-84, 1049, Tiger Red 4,	1	1830	1.5	100	0.1		0.6	36	No
	2	1840	1.5	20	0.19		1.2	36	No
F-84, 1038, Tiger White 4,	1	1851	1	2	0.05		1.2	35	No
	2	1856	0.15		0.08		2	37.5	No
F-84, 1046, Tiger Blue 4,	1	1845	1		0.05		1.2	35	No
	2	1900	1.5	10	1.0		3.8	37	No

Table E.3—RADIATION RECEIVED BY PERSONNEL ON SHOT DIXIE, 6 APRIL 1953, 1530 GMT

Name	Position	Reading, mr
	Pilot	980
	Pilot	40
	Pilot	270
	Pilot	225
	Pilot	240
	Pilot	300
	Pilot	210
	Pilot	240
	Pilot	210

Table E.4— F-80 AIRCRAFT CONTAMINATION DATA FOR SHOT ~~SIMILE~~ 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 8644

	Loading	Contamination, mr/hr	
		First reading, 1 April, 1645 hr	Second reading, 7 April, 1842 hr
Dive brake		500	9
Right air intake (6 in. inside)		500	10
Right wing (leading edge)	1000	420	6
Right wing tip	4000	1200	4
Right wing tip tank		3600	4
Right side turbine		3200	13
Right horizontal stabilizer		500	12
Tail pipe (6 in. inside)		140	7
Left horizontal stabilizer		300	8
Left side turbine		3800	13
Left wing tip tank		3200	4
Left wing tip		800	9
Left wing (leading edge)		500	6
Left air intake		500	9
Nose		100	1

Note: Decontamination used after first reading, natural decay.

Table E.5— F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT ~~SIMILE~~ 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1028-A

	Loading	Contamination, mr/hr	
		First reading, 6 April, 1915 hr	Second reading, 7 April, 1635 hr
Cockpit			
Air intake (6 in. inside)	110	90	9
Right inner landing gear door		120	12
Right wing (leading edge)	170	150	15
Right wing tip		85	9
Right wing tip tank	1000	60	9
Right side turbine		150	17
Right horizontal stabilizer		120	12
Tail pipe (6 in. inside)		110	13
Left horizontal stabilizer		110	12
Left side turbine		140	16
Left wing tip tank	1000	60	8
Left wing tip		85	9
Left wing (leading edge)	170	130	16
Left inner landing gear door		135	15
Dive brake		165	20

Note: Decontamination used after first reading, natural decay.

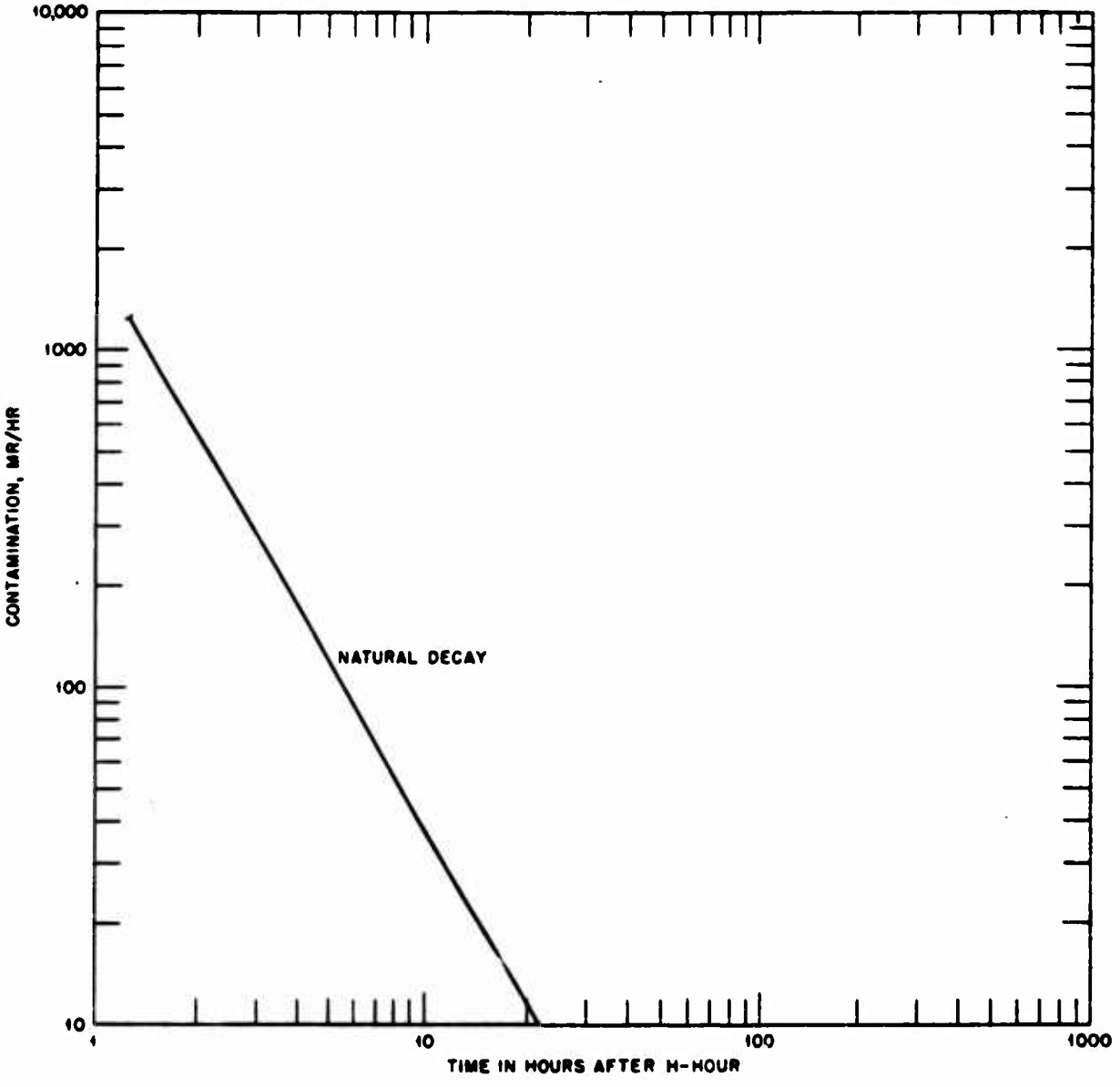

Fig. E.1 — F-80 aircraft contamination; Shot BIXIE, 6 April 1953; aircraft No. 8644. Time of first survey, 0845 PST. Values plotted are average over-all aircraft contamination.

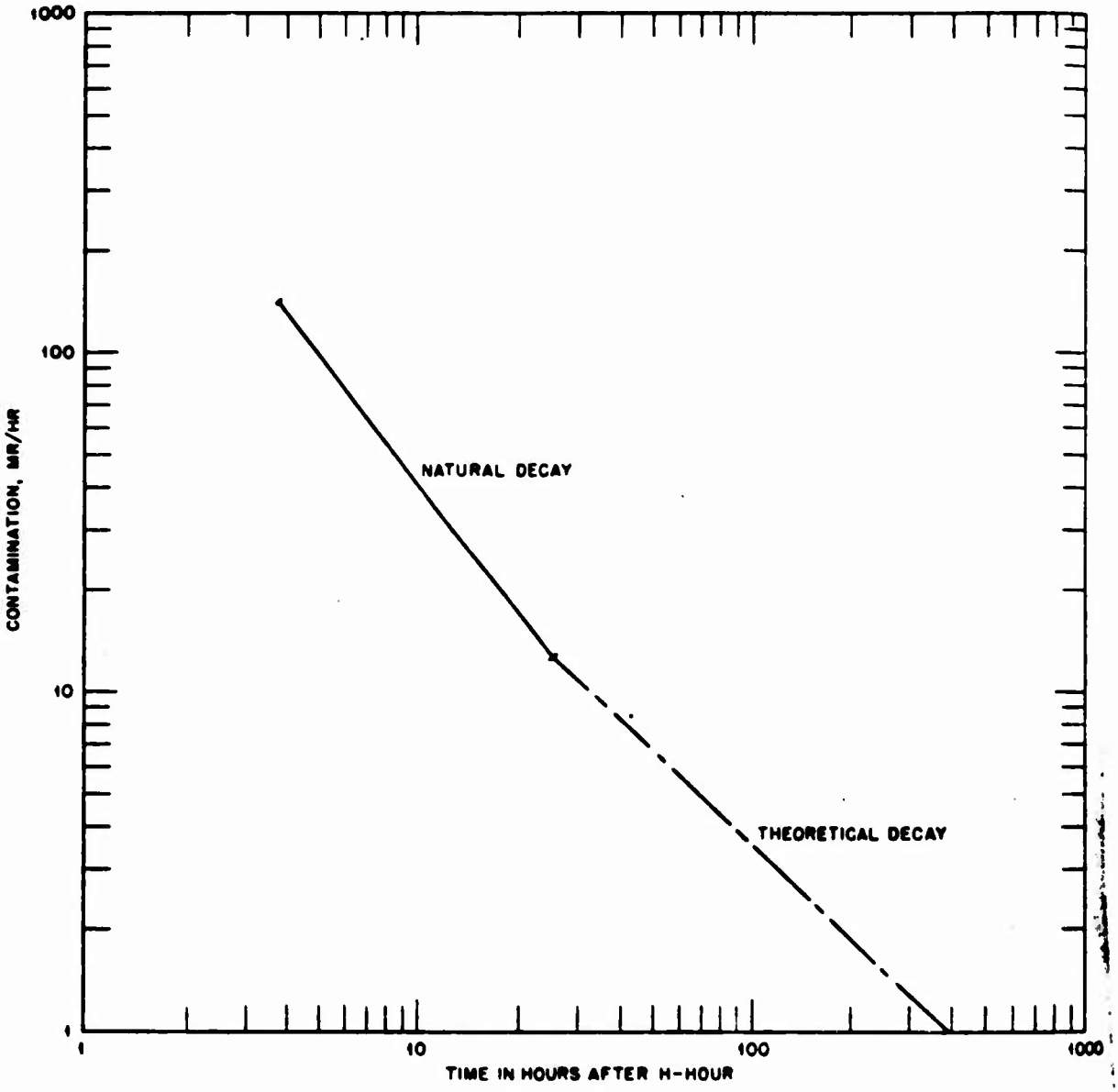

Fig. E.2—F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1028-A. Time of first survey, 1115 PST. Values plotted are average over-all aircraft contamination.

Table E.6—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1032-A

	Loading	Contamination, mr/hr			
		First reading, 6 April, 1747 hr	Second reading, 7 April, 1642 hr	Third reading, 7 April, 1825 hr	Fourth reading, 8 April, 1530 hr
Cockpit					
Air intake (6 in. inside)	600	310	21	18	12
Right inner landing gear door		380	24	17	13
Right wing (leading edge)	750	520	36	25	19
Right wing tip		250	17	8	6
Right wing tip tank	8000	165	12	9	5
Right side turbine		900	39	30	22
Right horizontal stabilizer		600	22	13	8
Tail pipe (6 in. inside)		750	28	24	17
Left horizontal stabilizer		700	23	13	8
Left side turbine		900	37	29	20
Left wing tip tank	7000	150	10	8	4
Left wing tip		210	15	8	7
Left wing (leading edge)	700	700	35	25	18
Left inner landing gear door		600	25	18	13
Dive brake		800	42	28	16

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay.

Table E.7—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1037-A

	Loading	Contamination, mr/hr			
		First reading, 6 April, 1855 hr	Second reading, 7 April, 1710 hr	Third reading, 7 April, 2210 hr	Fourth reading, 8 April, 1525 hr
Cockpit					
Air intake (6 in. inside)	300	120	15	12	11
Right inner landing gear door		145	18	12	10
Right wing (leading edge)	200	157	21	16	14
Right wing tip		200	11	8	7
Right wing tip tank	1900	180	10	6	6
Right side turbine		300	28	24	18
Right horizontal stabilizer		150	14	10	9
Tail pipe (6 in. inside)		200	23	19	16
Left horizontal stabilizer		140	14	10	9
Left side turbine		300	31	24	19
Left wing tip tank	1600	80	10	6	6
Left wing tip		120	14	11	10
Left wing (leading edge)	200	180	21	15	13
Left inner landing gear door		200	19	15	13
Dive brake		230	29	18	16

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay.

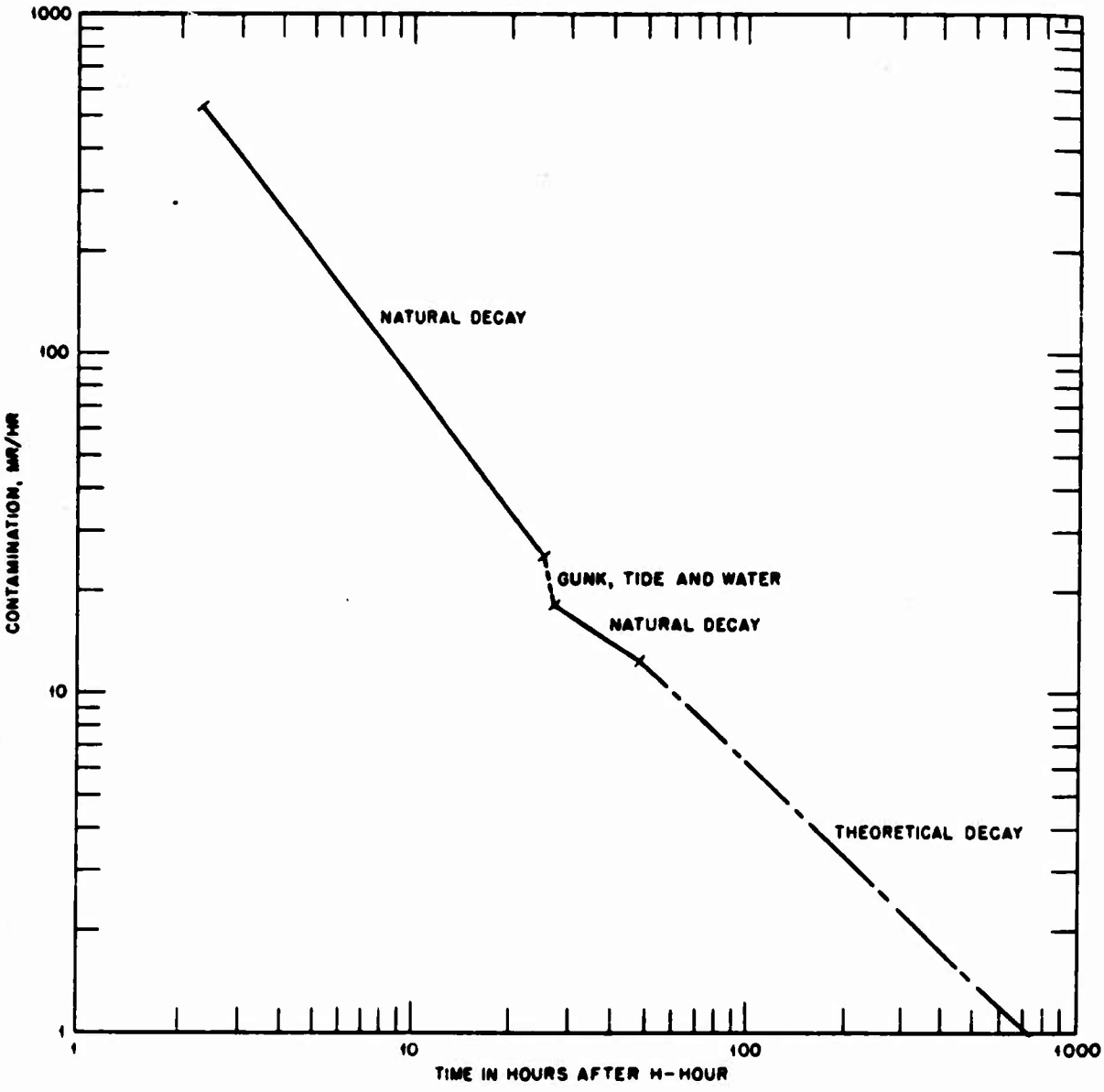

Fig. E.3 — F-84G aircraft contamination; Shot [redacted], 3 April 1953; aircraft No. 51-1032-A. Time of first survey, 0947 PST. Values plotted are average over-all aircraft contamination.

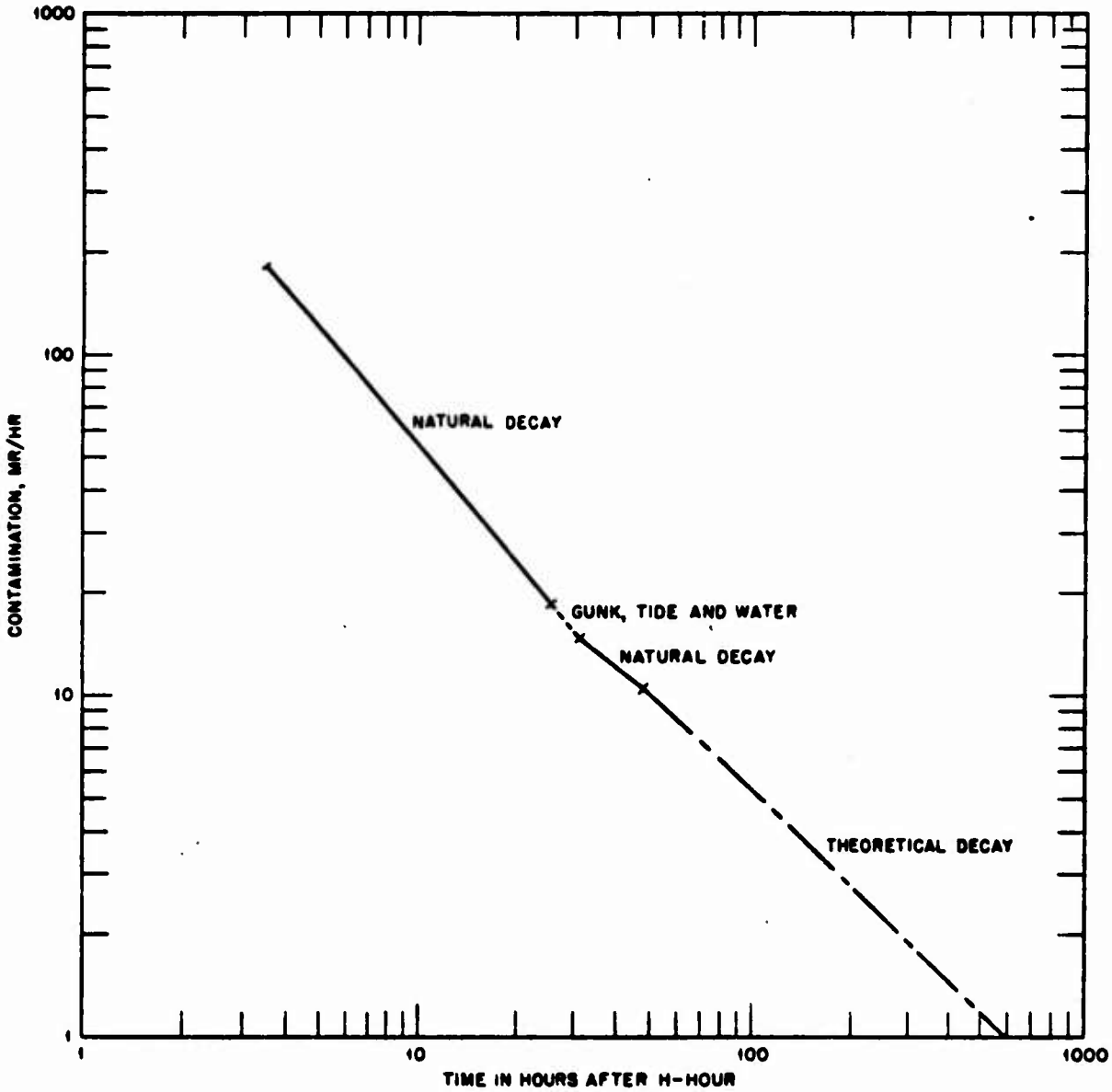

Fig. E.4 — F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1037-A. Time of first survey, 1055 PST. Values plotted are average over-all aircraft contamination.

Table E.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1038-A

	Loading	Contamination, mr/hr: First reading, 6 April, 2010 hr	Contamination, mr/hr: Second reading, 7 April, 1545 hr
Cockpit			
Air intake (6 in. inside)	30	26	8
Right inner landing gear door		60	7
Right wing (leading edge)	70	60	9
Right wing tip		24	5
Right wing tip tank	400	60	4
Right side turbine		45	9
Right horizontal stabilizer		60	6
Tail pipe (6 in. inside)		28	8
Left horizontal stabilizer		18	7
Left side turbine		46	10
Left wing tip tank	390	16	6
Left wing tip		24	5
Left wing (leading edge)	80	44	9
Left inner landing gear door		34	8
Dive brake		100	12

Note: Decontamination used after first reading, natural decay.

Table E.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1042-A

	Loading	Contamination, mr/hr: First reading, 6 April, 1932 hr	Contamination, mr/hr: Second reading, 7 April, 1625 hr	Contamination, mr/hr: Third reading, 7 April, 1655 hr
Cockpit				
Air intake (6 in. inside)	90	80	12	12
Right inner landing gear door		100	15	13
Right wing (leading edge)	130	120	19	17
Right wing tip		65	10	8
Right wing tip tank	1150	35	9	7
Right side turbine		140	21	20
Right horizontal stabilizer		100	13	11
Tail pipe (6 in. inside)		110	18	17
Left horizontal stabilizer		90	13	11
Left side turbine		130	21	19
Left wing tip tank	1000	32	9	6
Left wing tip		42	9	6
Left wing (leading edge)	130	110	21	17
Left inner landing gear door		105	17	13
Dive brake		145	27	22

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

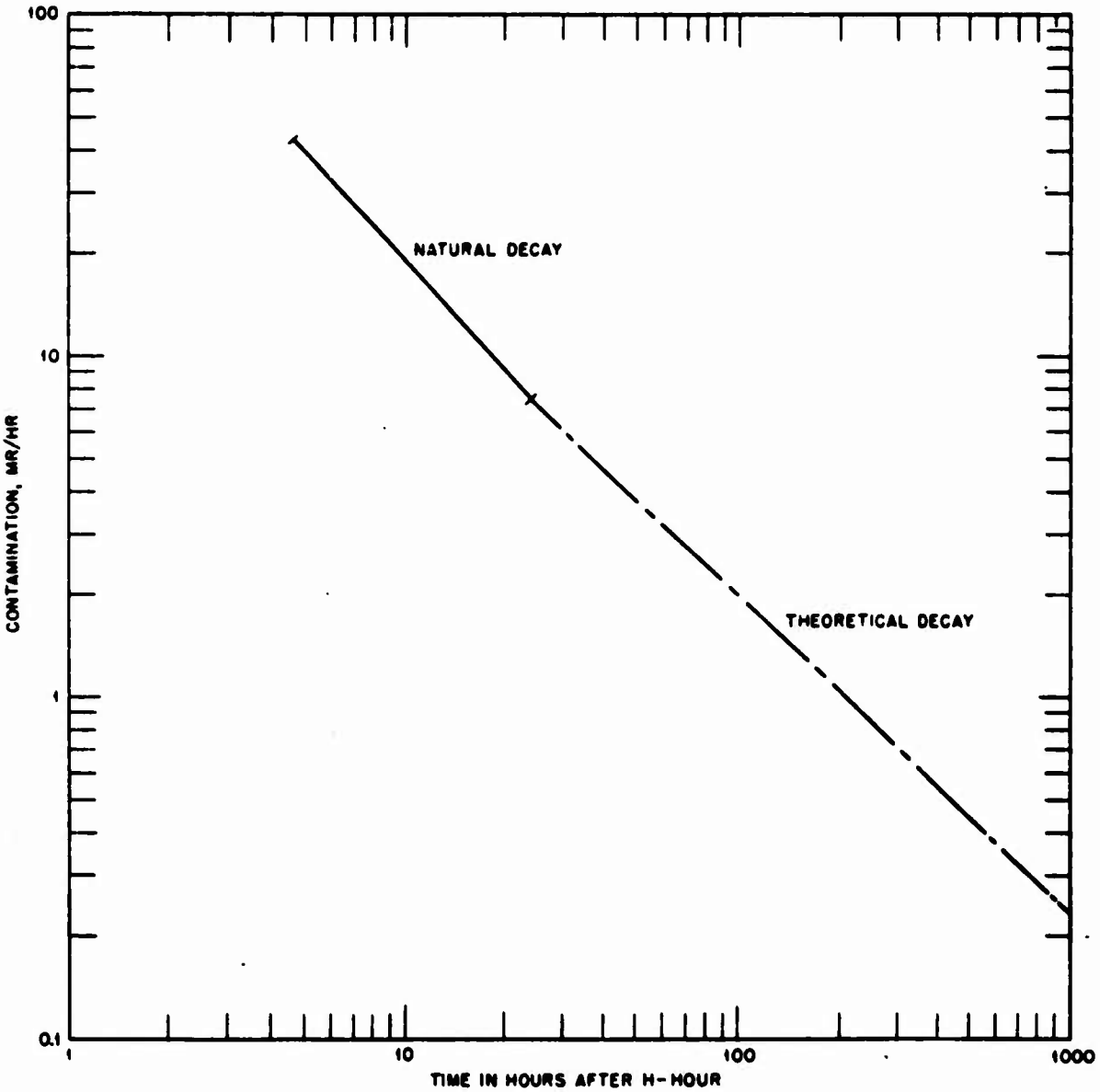

Fig. E.5 — F-84G aircraft contamination; Shot DAKOTA, 6 April 1953; aircraft No. 51-1038-A. Time of first survey, 1210 PST. Values plotted are average over-all aircraft contamination.

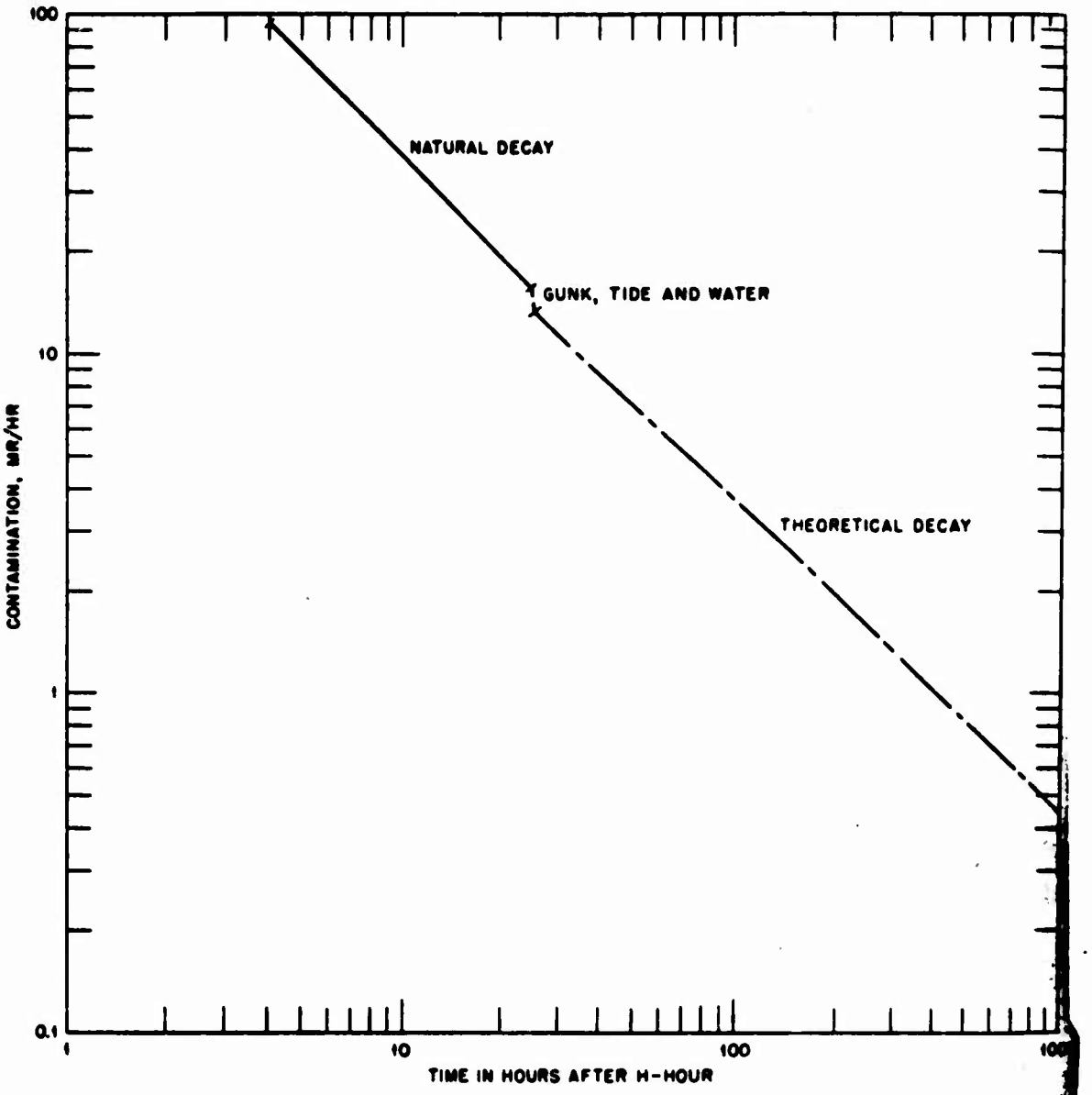

Fig. E.6 — F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1042-A. Time of first survey, 1132 PST. Values plotted are average over-all aircraft contamination.

Table E.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1046-A

	Loading	Contamination, mr/hr		
		First reading, 6 April, 2020 hr	Second reading, 7 April, 1705 hr	Third reading, 7 April, 1905 hr
Cockpit				
Air intake (6 in. inside)	130	110	15	14
Right inner landing gear door		130	17	10
Right wing (leading edge)	190	170	22	12
Right wing tip		80	10	6
Right wing tip tank	1500	90	11	5
Right side turbine		170	24	18
Right horizontal stabilizer		120	15	9
Tail pipe (6 in. inside)		140	20	16
Left horizontal stabilizer		130	16	8
Left side turbine		170	24	17
Left wing tip tank	1300	80	12	5
Left wing tip		90	11	4
Left wing (leading edge)	200	170	24	13
Left inner landing gear door		140	19	9
Dive brake		210	31	12

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

Table E.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1049-A

	Loading	Contamination, mr/hr		
		First reading, 6 April, 2000 hr	Second reading, 7 April, 1735 hr	Third reading, 7 April, 2240 hr
Cockpit				
Air intake (6 in. inside)	140	120	24	20
Right inner landing gear door		145	27	15
Right wing (leading edge)	210	200	38	22
Right wing tip		125	20	9
Right wing tip tank	490	100	16	11
Right side turbine		300	30	22
Right horizontal stabilizer		80	28	14
Tail pipe (6 in. inside)		110	22	19
Left horizontal stabilizer		80	28	16
Left side turbine		80	30	22
Left wing tip tank	300	125	16	9
Left wing tip		100	24	10
Left wing (leading edge)	210	210	34	20
Left inner landing gear door		180	28	16
Dive brake		270	39	22

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

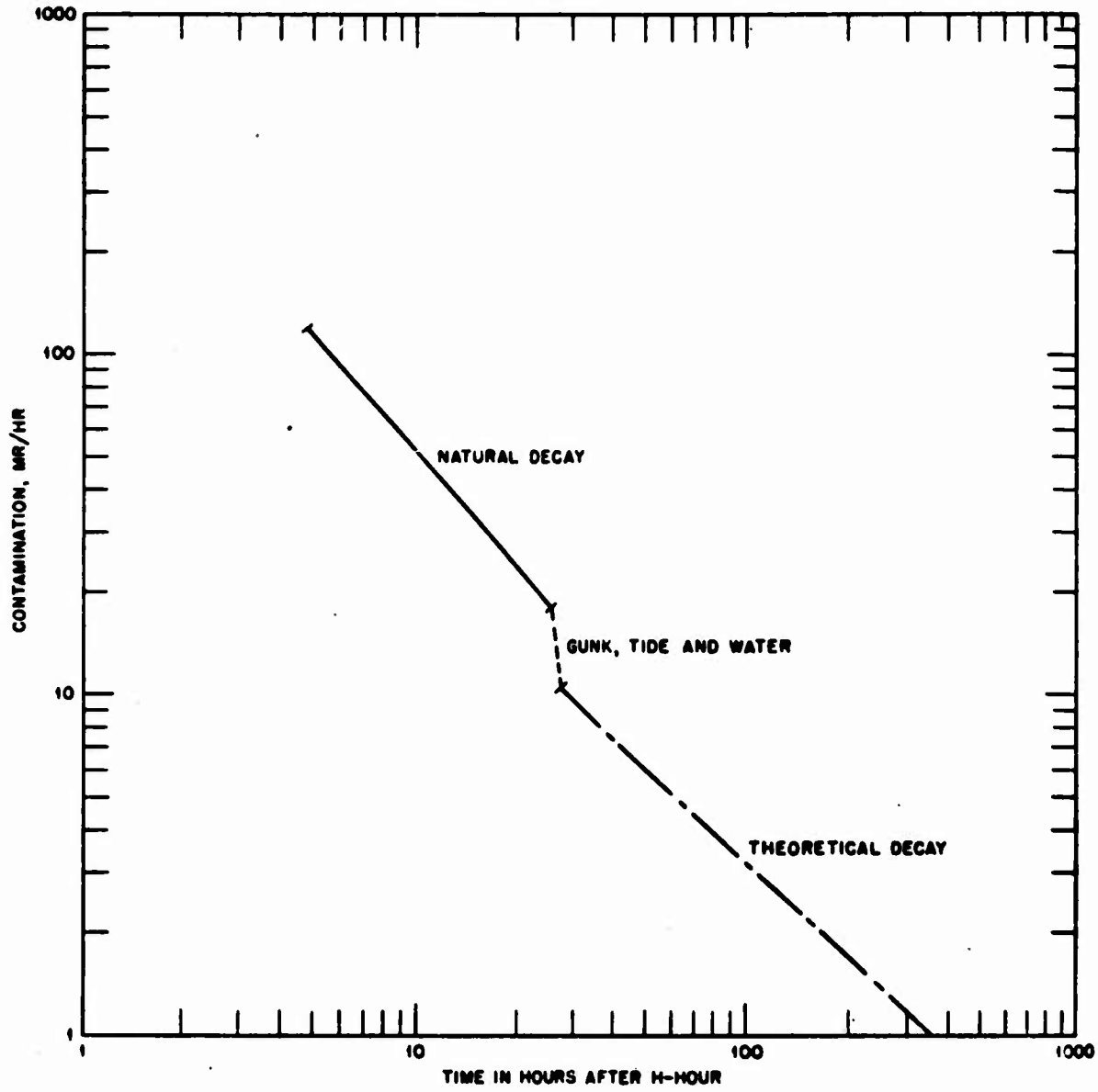

Fig. E.7 — F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1046-A. Time of first survey, 1220 PST. Values plotted are average over-all aircraft contamination.

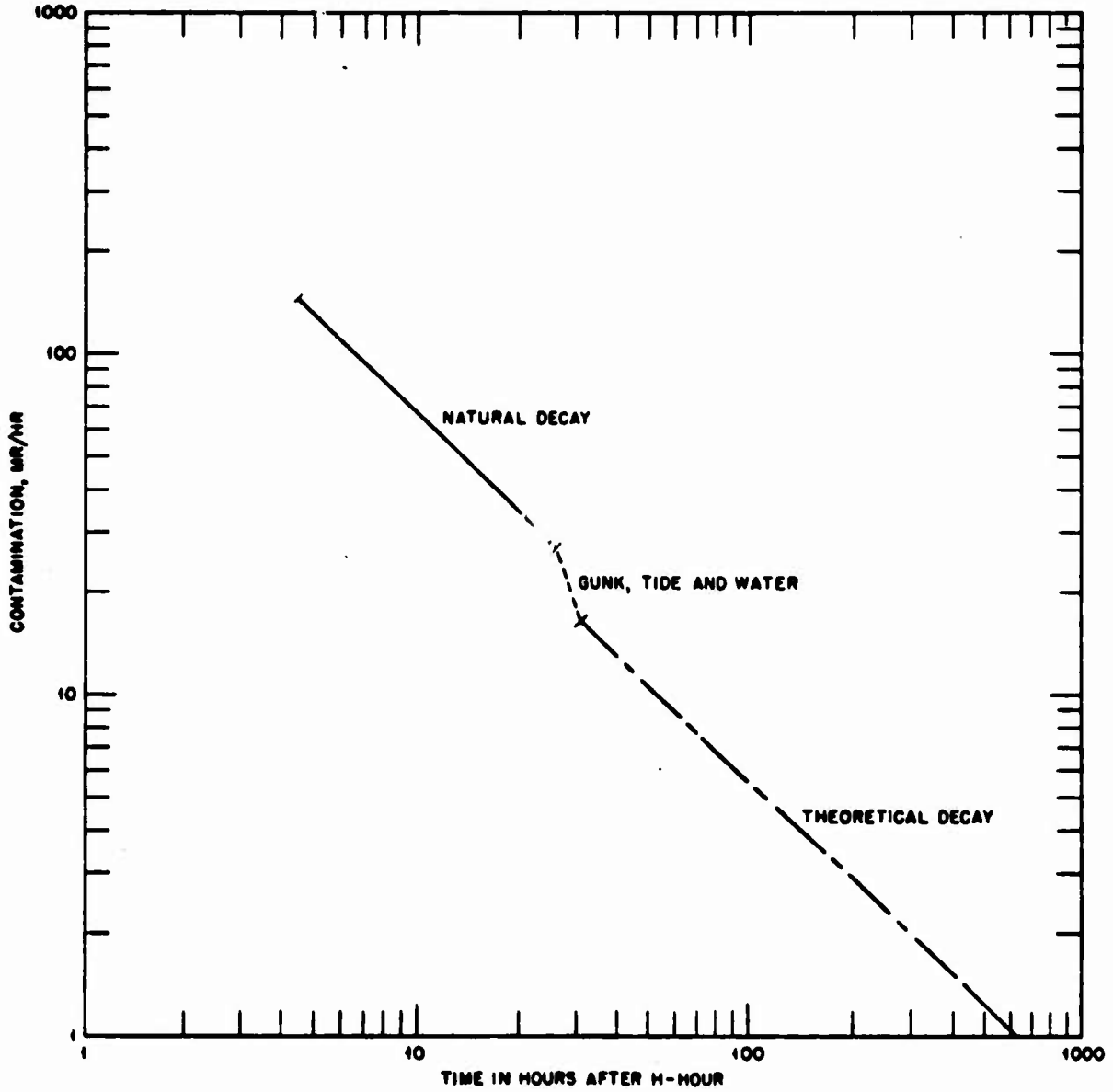

Fig. E.8—F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1049-A. Time of first survey, 1200 PST. Values plotted are average over-all aircraft contamination.

Table E.12 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT DIXIE, 6 APRIL 1953, 1530 GMT, AIRCRAFT NO. 51-1054-A

	Contamination, mr/hr		
	Loading	First reading, 6 April, 1800 hr	Second reading, 7 April, 1620 hr
Cockpit			
Air intake (6 in. inside)	60	60	6
Right inner landing gear door		90	8
Right wing (leading edge)	100	100	8
Right wing tip		33	5
Right wing tip tank	700	30	4
Right side turbine		190	11
Right horizontal stabilizer		70	8
Tail pipe (6 in. inside)		120	10
Left horizontal stabilizer		70	8
Left side turbine		150	11
Left wing tip tank	700	30	5
Left wing tip		33	6
Left wing (leading edge)	90	100	9
Left inner landing gear door		90	8
Dive brake		120	12

Note: Decontamination used after first reading, natural decay.

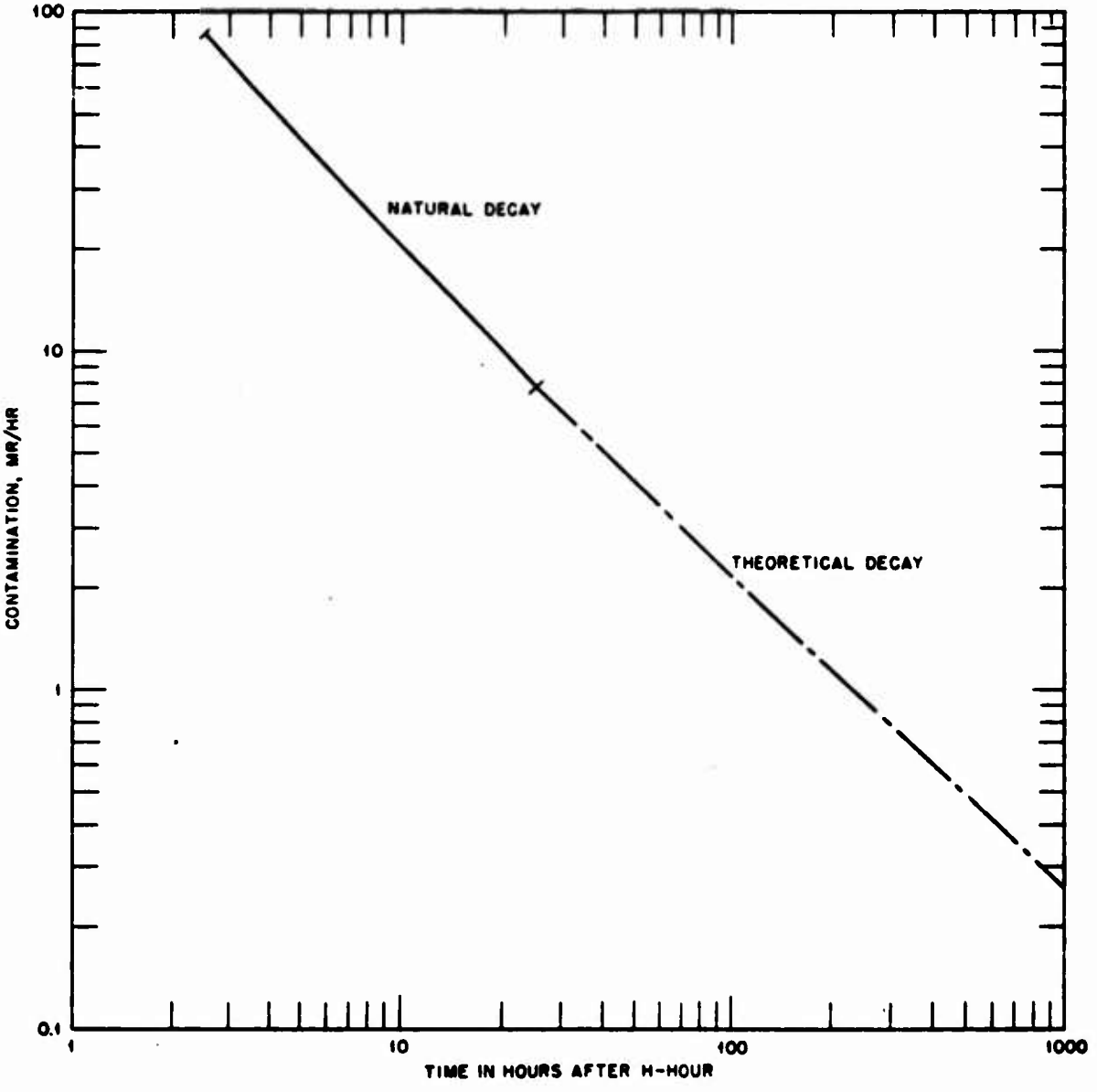

Fig. E.9—F-84G aircraft contamination; Shot DIXIE, 6 April 1953; aircraft No. 51-1054-A. Time of first survey, 1000 PST. Values plotted are average over-all aircraft contamination.

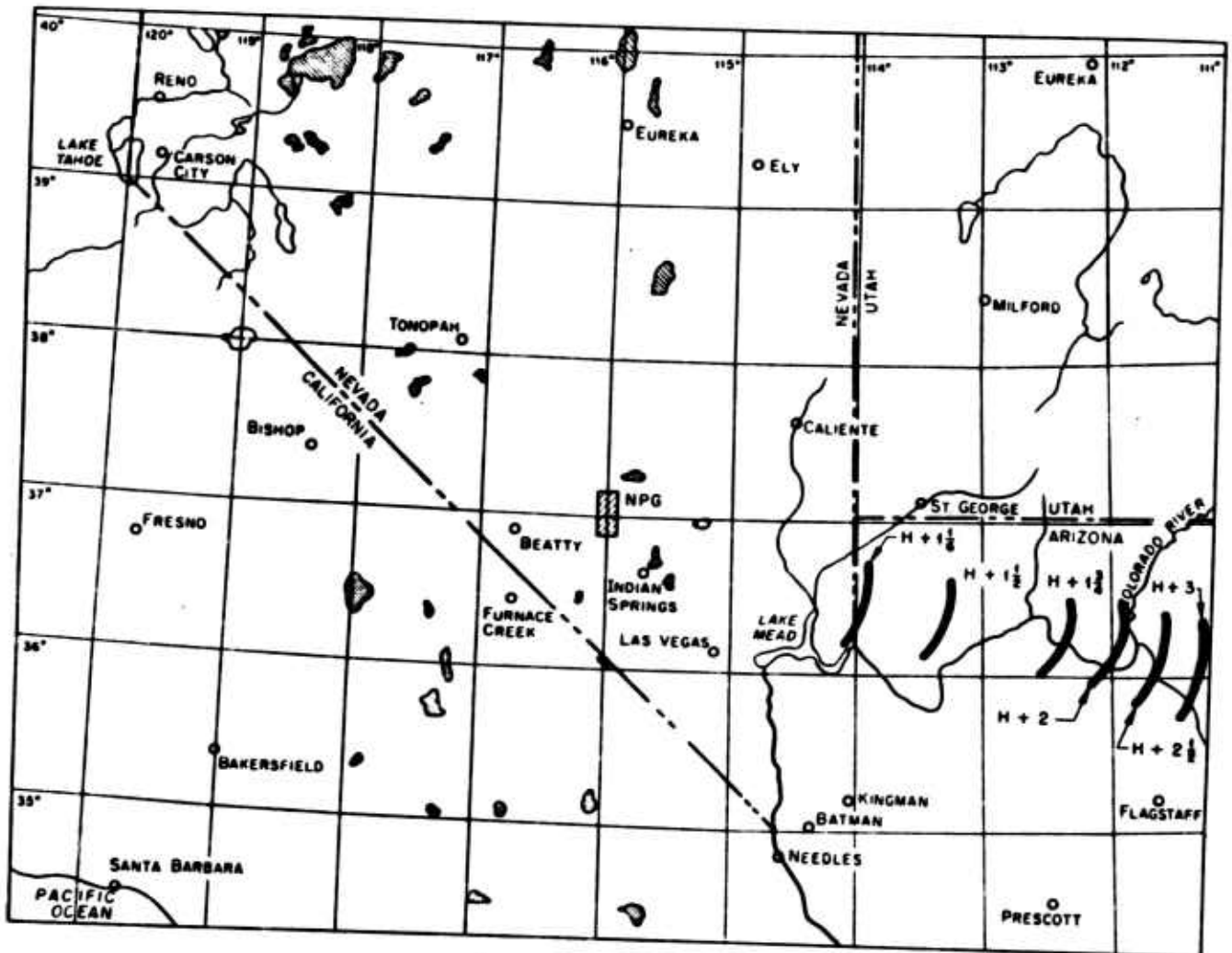

Fig. E.10 — Cloud track, Shot Dixie, 6 April 1953. Bottom of cloud, 31,500 ft MSL. Top of cloud, 42,500 ft MSL.

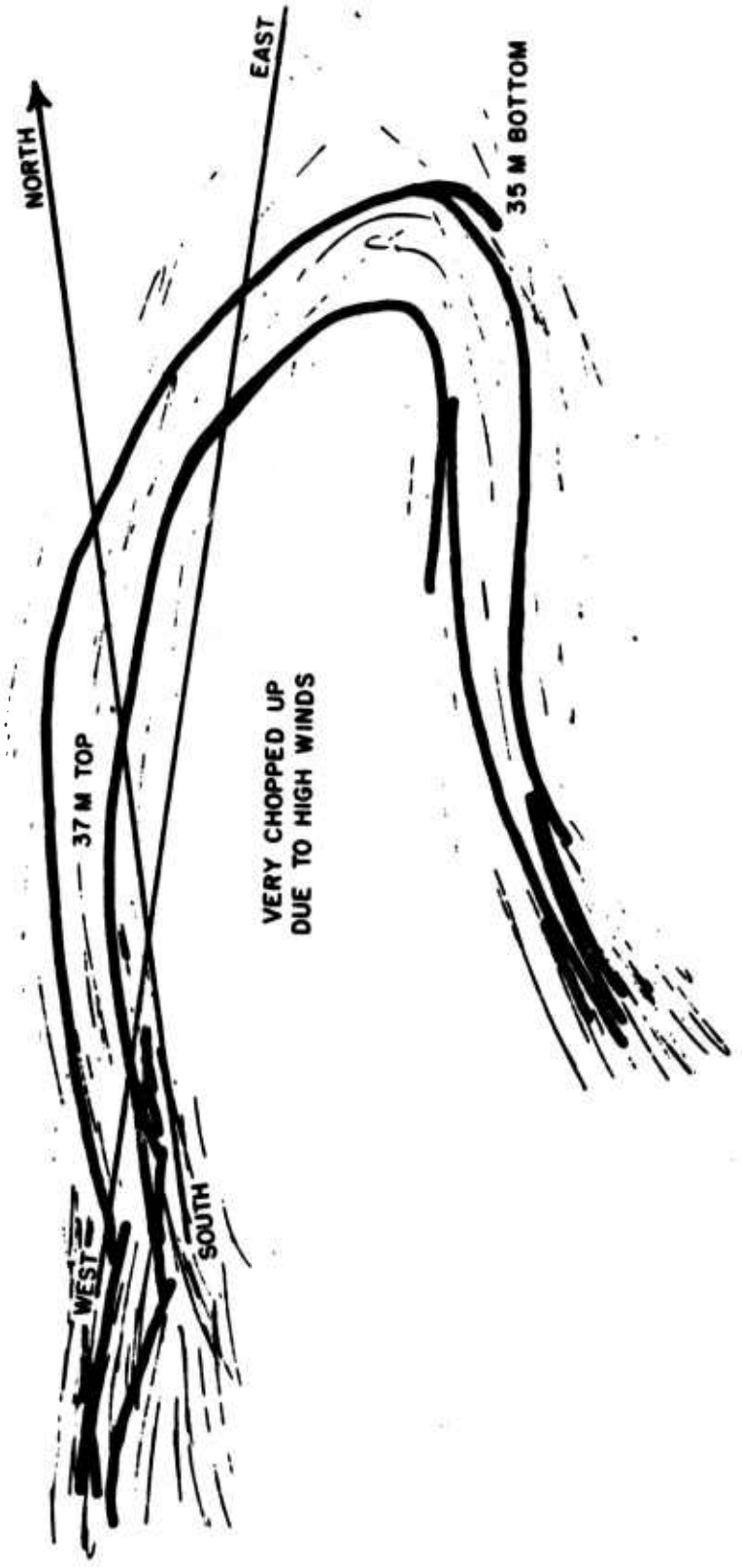

Fig. E.11—Shot [redacted], 6 April 1953; time, H+4 hr.

ANNEX F

RAT SHOT SUMMARY

Aircrew briefings were held at Indian Springs Air Force Base, Nevada, at 1500 hr on 10 April 1953. The Test Manager's weather briefing for RAT was held at 2100 PST, 10 April 1953. The skies were forecast to be clear with cloudiness beginning between 1000 and 1100 hr in the morning. The winds were from 360° at 10,000 ft to 300° at 112 knots at 25,000 ft MSL.

H-hour was scheduled to be 0445 PST (1245 GMT), 11 April 1953. The yield was anticipated to be 0.1 to 0.3 kt. Owing to small anticipated yield, the two B-29 cloud trackers were not scheduled to participate. Furthermore, owing to the anticipated inability to gather technical data from this low yield device, no aircraft were scheduled out of Kirtland Air Force Base, New Mexico. This meant that all test aircraft participating for RAT would be flown from Indian Springs Air Force Base, and these comprised 19 sorties. Participating aircraft were as follows:

No.	Type	Project	Code Name
1	B-50	Sampler controller	Skull Cap
9	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-5	Terrain survey	Fire Fly 1
1	L-20	Terrain survey	Ever Ready 4
2	B-29	Cloud samplers	Cat Nip 1 and 2
1	C-47	Terrain survey	Rag Mop
3	H-19	Army effects	Sand Blower A, B, and C

The device was detonated at the scheduled time with an approximate yield of 0.2 kt. To meet any exigencies that might arise, two F-84 sampling aircraft were airborne and were in the area at shot time. This procedure was established so that the aircraft would be readily available in the event that only an HE detonation had occurred.

The sampling picture was complicated somewhat from a personnel exposure viewpoint by changing the order of shots. The BADGER device was originally scheduled to be detonated as No. 5 test and RAT as No. 6. BADGER was a high yield device and RAT was a very low yield one. To change pilots at this point would require an exposure of 5 r for the second group. This was resolved by retaining the first group through the sixth shot. It was made possible because of the savings in exposure from the use of lead seats and vests and keeping the aircraft as clean as possible.

Again a low exposure of 0.1 r was required to obtain a sample fraction of 2×10^{-9}. This was for a $\frac{1}{3}$-kt device.

The sampling problem was similar to the one for shot RUTH. For this mission all aircraft had been equipped with lead seats, and eight lead vests had been completed. The sample requirement was to obtain eight particulate and snap samples from the F-84's and two particulate and gas-bottle samples from the B-29's. Again this would require close timing to get 10 samples from a small cloud. The cloud rose to a height of approximately 14,000 ft with an early indication of 0.3 kt. A relatively early penetration was made at H + 45 min. A peak of 40 r/hr was observed. This was very close to that forecast, and sampling proceeded as rapidly as possible.

The winds at sampling altitude were light, and sampling was done close to Indian Springs Air Force Base. This worked out well since the F-84's, working at 11,000 ft to 12,000 ft, had a high rate of fuel consumption.

Because of the small cloud, two aircraft did not get the required sample. However, since one was a spare aircraft and the other was only 15% low, the sampling effort was considered successful. The University of California Radiation Laboratory personnel indicated complete satisfaction with the samples obtained and stated that the quantity and quality were better than they had anticipated or required.

Cloud height was forecast to be 15,000 ft due to the unstable air mass. The actual cloud height was 14,000 ft.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Five, 1245 GMT, 11 April 1953

Cloud Cover: Clear
Precipitation: No precipitation within 300 miles downstream
Height Ground Zero: 4240 ft MSL
Burst Height: 4340 ft MSL

Pressure:	Ground Zero	869 mb
	Burst height	866 mb
Virtual Temperature:	Ground Zero	0.0°C
	Burst height	0.2°C
Actual Temperature:	Ground Zero	0.3°C
	Burst height	0.1°C
Relative Humidity:	Ground Zero	43%
	Burst height	40%
Altimeter Setting:	29.99 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	045°	05 knots
6,000	360°	18 knots
8,000	360°	31 knots
10,000	360°	31 knots
15,000	310°	28 knots
20,000	300°	44 knots
25,000	300°	112 knots

Height of Tropopause: 38,300 ft MSL

Table F.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT RAY, 11 APRIL 1953, 1245 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Skull Cap	Sampler controller	ISAFB	1232	1245	1628	1648	A very satisfactory mission.
F-84	Tiger Red 2	Sampler	ISAFB	1431	1445	1535	1558	All samplers obtained excellent samples.
F-84	Tiger Red 4	Sampler	ISAFB	1239	1254	1351	1404	Snooper. Flew close to cloud immediately after detonation to find out whether it was an HE or nuclear detonation. Cloud height report: Top 14,000 at H + 10 min.
F-84	Tiger White 1	Sampler	ISAFB	1451	1505	1622	1636	
F-84	Tiger White 2	Sampler	ISAFB	1241	1255	1330	1345	Snooper. Stood by for immediate penetration of cloud if it was an HE shot. Penetrated at approximately H + 35 min.
F-84	Tiger White 3	Sampler	ISAFB	1453	1506	1623	1637	
F-84	Tiger White 4	Sampler	ISAFB	1423	1436	1544	1559	
F-84	Tiger Blue 1	Sampler	ISAFB	1439	1454	1520	1535	
F-84	Tiger Blue 2	Sampler	ISAFB	1440	1454	1519	1535	
F-84	Tiger Blue 4	Sampler	ISAFB	1445	1459	1612	1627	
H-5	Fire Fly 1	Terrain survey	ISAFB	1255	1308	1434	1449	Successful mission. Low readings due to yield.
L-20	Ever Ready 4	Terrain survey	ISAFB	1455	1500	1616	1629	Successful mission.
B-29	Cat Nip 1	Sampler	ISAFB	1250	1304	1453	1507	Very successful gas samples. Both Cat Nips flew through cloud in trail to save time.
B-29	Cat Nip 2	Sampler	ISAFB	1254	1308	1500	1514	
C-47	Rag Mop	Terrain survey	ISAFB	1501	1515	1805	1823	
H-19	Sand Blower A	Army	Desert Rock	1036	1042	1400	1407	Satisfactory mission. Were airborne at shock wave arrival and proceeded to Ground Zero immediately as practice assault mission.
H-19	Sand Blower B	Army	Desert Rock	1246	1251	1311	1317	
H-19	Sand Blower C	Army	Desert Rock	1246	1252	1308	1315	

Table F.2—MANNED SAMPLING DATA FOR SHOT RAY, 11 APRIL 1953, 1245 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 043,	1	1330	40	30	0.29	0.4	4.8	11	Yes
Tiger White 2,	2	1336	35	60	0.40	0.9	10.5	11	No
F-84, 049,	1	1342	16	29	0.1	0.13	5	11	Yes
Tiger Red 4,	2	1347	13	34	0.2	0.22	11	10.5	No
	3	1351	12	52	0.37	0.40	19	11	No
F-84, 051,	1	1504	1	2	0.01	0.05	0.44	12	Yes
Tiger Blue 1,	2	1508	0.5		0.03	0.07	1.2	12.9	No
	3	1513	0.5		0.09	0.09	2.4	12.8	No
F-84, 054,	1	1504	1		0.01	0.08	0.6	12	No
Tiger Blue 2	2	1510	1		0.03	0.08	1.2	9	Yes
	3	1515	0.75		0.1	0.1	2.3	12.8	No
F-84, 032,	1	1529	0.9				0.6	12.6	Part
Tiger Red 2,	2	1534	0.6		0.01		1	11.6	Part
	3	1540	0.3		0.02		1.2	11.5	Yes
	4	1546	0.35		0.03		1.4	11.4	No
F-84, 038,	1	1529	0.8				0.16	11.5	No
Tiger White 4,	2	1534	0.4		0.1		0.18	12	Part
	3	1540	0.3		0.2		0.24	11.5	Yes
	4	1546	0.3		0.3		0.26	12	No
F-84, 042,	1	1554					0.02	12	Yes
Tiger White 1,	2	1603	0.07				0.16	11.5	No
	3	1610	0.09				0.3	11.5	No
	4	1620	0.07				0.46	11.5	No
	5	1625	0.1				0.56	12	No
F-84, 045,	1	1552			0.05		0.13	11.5	Yes
Tiger White 3,	2	1601			0.05		0.3	11.5	No
	3	1619			0.09		0.7	11.5	No
	4	1623	0.09		0.1		0.75	11.5	No
F-84, 046,	1	1558	0.1		0.02		0.44	11	Yes
Tiger Blue 4,	2	1614	0.1		0.04		0.59	11	No

Table F.3 — RADIATION RECEIVED BY PERSONNEL ON SHOT RAY, 11 APRIL 1953, 1245 GMT

Name	Position	Reading, mr
	Pilot	340
	Pilot	90
	Pilot	130
	Pilot	430
	Pilot	130
	Pilot	40
	Pilot	130
	Pilot	130
	Pilot	130
	Pilot	340

Table F.4 — B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT RAY, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 486397

Loading	Contamination, mr/hr			
	First reading, 11 April, 1540 hr	Second reading, 13 April, 1650 hr	Third reading, 13 April, 2140 hr	Fourth reading, 14 April, 1555 hr
Nose	85	3	3	2
Air intake engine 3	1000	27	14	10
Left turboengine 3	1400	35	18	14
Right turboengine 3	1300	36	25	19
Air intake engine 4	1300	34	12	6
Left turboengine 4	1400	34	17	14
Right turboengine 4	1600	48	15	10
Right wing (leading edge)	480	16	12	10
Right scanner blister	160	8	5	1
Right horizontal stabilizer	180	7	6	1
Left horizontal stabilizer	180	7	6	1
Left scanner blister	190	9	6	1
Left wing (leading edge)	520	19	14	11
Air intake engine 1	1200	42	20	14
Left turboengine 1	1000	34	16	14
Right turboengine 1	1300	43	19	16
Air intake engine 2	1000	32	14	12
Left turboengine 2	1200	39	22	18
Right turboengine 2	1300	44	26	20
Filter box, left wing	600	16		
Left wheel well door	1000	27	14	12
Antenna				
Radar radome	500	20	12	10
Pitot	160	8	5	4
A-1 filter box				
Right wheel well door	800	26	13	12
Filter box, right wing	600	16		
Cockpit				

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay.

Table F.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAY, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1032-A

	Loading	Contamination, mr/hr: First reading, 11 April, 1625 hr	Contamination, mr/hr: Second reading, 12 April, 2140 hr
Cockpit			
Air intake (6 in. inside)	80	60	7
Right inner landing gear door		80	6
Right wing (leading edge)	150	110	12
Right wing tip		60	4
Right wing tip tank		32	3
Right side turbine		100	10
Right horizontal stabilizer		60	6
Tail pipe (6 in. inside)		80	8
Left horizontal stabilizer		65	4
Left side turbine		100	10
Left wing tip tank		26	2
Left wing tip		60	2
Left wing (leading edge)	120	110	13
Left inner landing gear door		80	7
Dive brake		120	12

Note: Decontamination used after first reading, natural decay.

Table F.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAY, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1046-A

	Loading	Contamination, mr/hr: First reading, 11 April, 1645 hr	Contamination, mr/hr: Second reading, 12 April, 2100 hr
Cockpit			
Air intake (6 in. inside)	20	18	2
Right inner landing gear door		28	3.8
Right wing (leading edge)	42	36	4.5
Right wing tip		16	2.2
Right wing tip tank		15	1.6
Right side turbine		44	7
Right horizontal stabilizer		14	4
Tail pipe (6 in. inside)		24	4
Left horizontal stabilizer		14	3
Left side turbine		44	6.5
Left wing tip tank		10	2
Left wing tip		17	2
Left wing (leading edge)	45	40	5
Left inner landing gear door		25	4
Dive brake		38	6

Note: Decontamination used after first reading, natural decay.

Table F.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAT, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1038-A

	Loading	Contamination, mr/hr	
		First reading, 11 April, 1630 hr	Second reading, 12 April, 2135 hr
Cockpit			
Air intake (6 in. inside)	31	22	2
Right inner landing gear door		33	2
Right wing (leading edge)	90	46	4
Right wing tip		23	2
Right wing tip tank		21	2
Right side turbine		70	5
Right horizontal stabilizer		23	2
Tail pipe (6 in. inside)		60	2
Left horizontal stabilizer		24	3
Left side turbine		80	5
Left wing tip tank		18	2
Left wing tip		19	1
Left wing (leading edge)	80	48	4
Left inner landing gear door		41	3
Dive brake		100	6

Note: Decontamination used after first reading, natural decay.

Table F.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAT, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1042-A

	Loading	Contamination, mr/hr	
		First reading, 11 April, 1655 hr	Second reading, 12 April, 2145 hr
Cockpit			
Air intake (6 in. inside)	27	22	4.3
Right inner landing gear door		43	9
Right wing (leading edge)	90	90	11
Right wing tip		24	5
Right wing tip tank		16	4
Right side turbine		100	12
Right horizontal stabilizer		60	7
Tail pipe (6 in. inside)		70	14
Left horizontal stabilizer		60	6
Left side turbine		90	11
Left wing tip tank		19	4
Left wing tip		24	4
Left wing (leading edge)		95	11
Left inner landing gear door		70	7
Dive brake		140	16

Note: Decontamination used after first reading, natural decay.

Table F.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAT 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1043-A

	Loading	Contamination, mr/hr: First reading, 11 April, 1520 hr	Contamination, mr/hr: Second reading, 13 April, 1535 hr
Cockpit			
Air intake (6 in. inside)	500	100	3
Right inner landing gear door		180	4
Right wing (leading edge)	1000	240	6
Right wing tip		80	2
Right wing tip tank	5000	60	2
Right side turbine		325	10
Right horizontal stabilizer		80	4
Tail pipe (6 in. inside)		180	4
Left horizontal stabilizer		90	2
Left side turbine		420	12
Left wing tip tank	4600	80	3
Left wing tip		300	4
Left wing (leading edge)	1200	400	8
Left inner landing gear door		300	7
Dive brake		400	16

Note: Decontamination used after first reading, natural decay.

Table F.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAT, 11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1045-A

	Loading	Contamination, mr/hr: First reading, 11 April, 1706 hr	Contamination, mr/hr: Second reading, 12 April, 2240 hr
Cockpit			
Air intake (6 in. inside)	40	35	4
Right inner landing gear door		80	4
Right wing (leading edge)	120	110	9
Right wing tip		55	2
Right wing tip tank		20	1
Right side turbine		140	9
Right horizontal stabilizer		70	3
Tail pipe (6 in. inside)		80	5
Left horizontal stabilizer		60	3
Left side turbine		140	6
Left wing tip tank		22	2
Left wing tip		32	2
Left wing (leading edge)	110	110	7
Left inner landing gear door		80	2
Dive brake		165	14

Note: Decontamination used after first reading, natural decay.

Table F.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAY.
11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1049-A

	Loading	Contamination, mr/hr		
		First reading, 11 April, 1530 hr	Second reading, 13 April, 1530 hr	Third reading, 13 April, 1625 hr
Cockpit				
Air intake (6 in. inside)	700	220	8	8
Right inner landing gear door		430	16	11
Right wing (leading edge)	1,700	700	21	17
Right wing tip		260	10	7
Right wing tip tank	10,000	160	6	4
Right side turbine		650	22	18
Right horizontal stabilizer		270	10	9
Tail pipe (6 in. inside)		360	13	11
Left horizontal stabilizer		270	10	8
Left side turbine		600	23	15
Left wing tip tank		190	5	4
Left wing tip		230	8	6
Left wing (leading edge)	1,900	600	21	17
Left inner landing gear door		390	15	10
Dive brake		800	25	16

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

Table F.12 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAY,
11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1051-A

	Loading	Contamination, mr/hr		
		First reading, 11 April, 1610 hr	Second reading, 12 April, 2300 hr	Third reading, 12 April, 2345 hr
Cockpit				
Air intake (6 in. inside)	150	120	7	5
Right inner landing gear door		210	11	6
Right wing (leading edge)	420	340	21	14
Right wing tip		100	4	2
Right wing tip tank		80	4	1
Right side turbine		340	19	13
Right horizontal stabilizer		120	6	4
Tail pipe (6 in. inside)		190	10	8
Left horizontal stabilizer		120	6	3
Left side turbine		380	20	14
Left wing tip tank		80	3	1
Left wing tip		100	3	1
Left wing (leading edge)	440	340	22	15
Left inner landing gear door		230	12	7
Dive brake		1200	80	16

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

Table F.13 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT RAY,
11 APRIL 1953, 1245 GMT, AIRCRAFT NO. 51-1054-A

	Loading	Contamination, mr/hr		
		First reading, 11 April, 1600 hr	Second reading, 12 April, 2325 hr	Third reading, 13 April, 0015 hr
Cockpit				
Air intake (6 in. inside)	140	110	4	5
Right inner landing gear door		240	9	5
Right wing (leading edge)	450	250	15	9
Right wing tip		110	3	2
Right wing tip tank		90	2	1
Right side turbine		450	21	14
Right horizontal stabilizer		160	4	5
Tail pipe (6 in. inside)		310	15	12
Left horizontal stabilizer		160	5	4
Left side turbine		480	22	19
Left wing tip tank		85	1	.1
Left wing tip		110	2	1
Left wing (leading edge)	480	400	16	11
Left inner landing gear door		290	11	7
Dive brake		1400	70	18

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water.

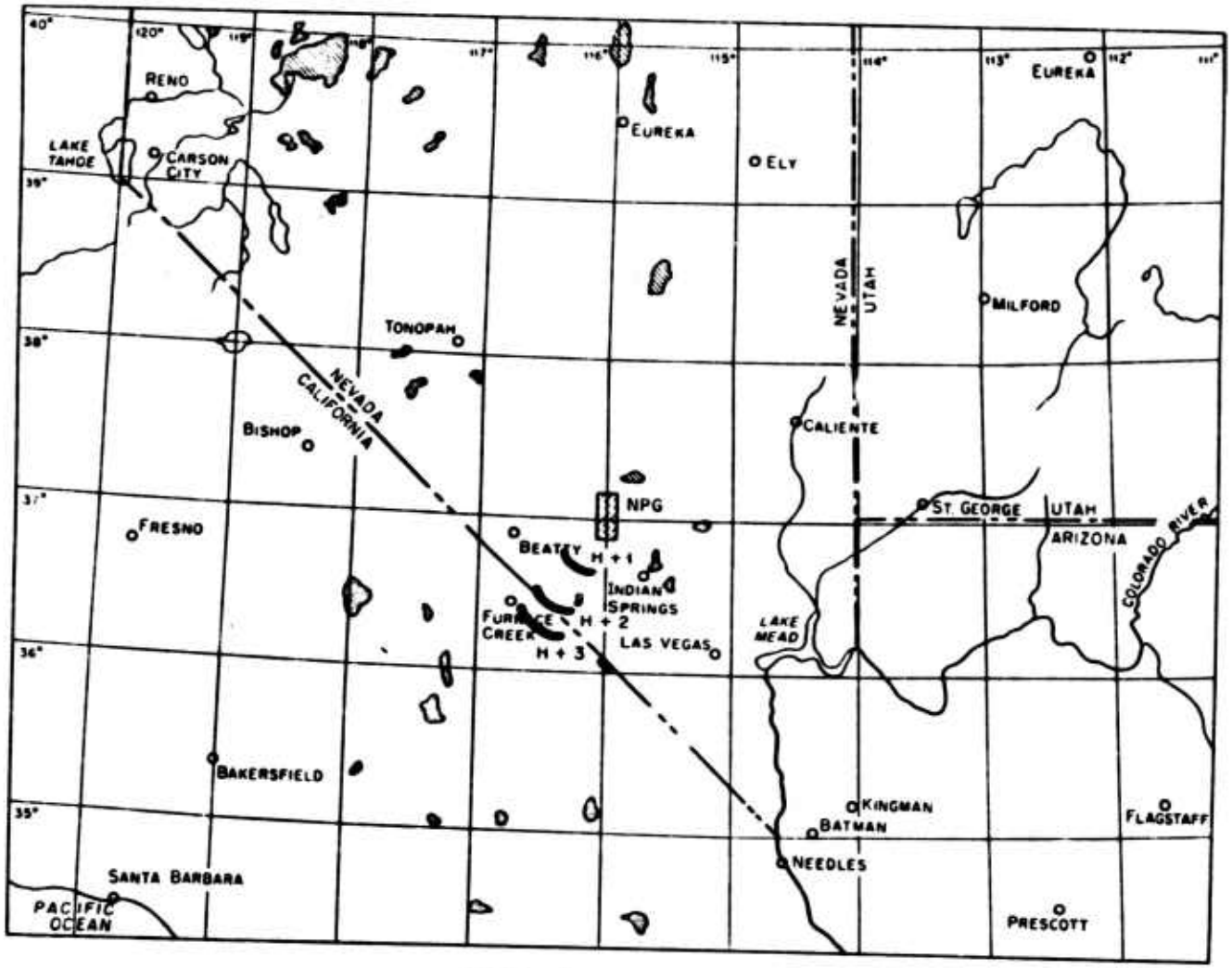

Fig. F.1 — Cloud track, Shot RAY, 11 April 1953. Top of cloud, 14,000 ft MSL.

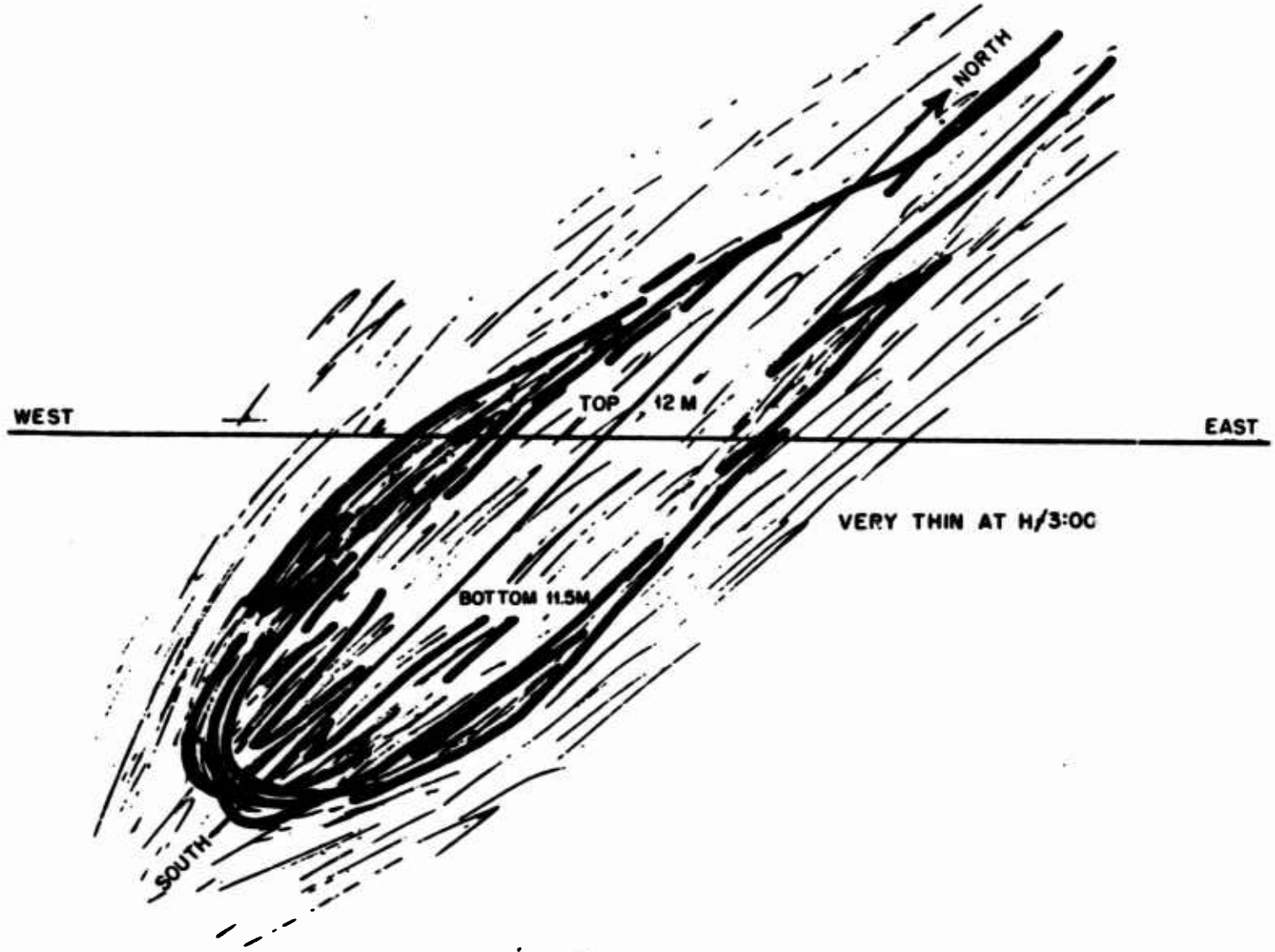

Fig. F.2—Shot RAT, 11 April 1953; time, H+3 hr.

ANNEX G

BADGER SHOT SUMMARY

Briefings for this shot were held at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, at 1400 and 1500 hr, respectively. The Control Point weather briefing and final conference for the BADGER detonation was held at 2100 PST, 17 April 1953. H-hour was scheduled for 0435 PST (1235 GMT), 18 April 1953. The sky was forecast to be clear with a possibility of high scattered cirrus. The winds were forecast to be generally westerly up to 70 knots.

For several reasons this shot was of particular interest to Los Alamos Scientific Laboratory, and, to satisfy some of the experiments, early gas samples were required. It was planned to put two F-84 samplers into the cloud at H + 1 hr, and the sampling procedures were established accordingly.

The BADGER device was detonated at the scheduled H-hour on 18 April 1953 with an approximate yield of 27 kt.

The winds at shot time were from 270° at 17 knots at 10,000 ft and from 300° at 40,000 ft at 68 knots. There were 80 sorties flown by test aircraft for this detonation. The participating aircraft are as follows:

No.	Type	Project	Code Name
1	C-47	Photo	Tin Type
2	B-29	IBDA	Dish Rag 1 and 2
12	B-50	SAC IBDA	Back Bone
2	F8F	Drone mother	Duck Bill 1 and 2
3	AD2	Armed fighters	Duck Bill 6, 7, and 8
1	P2V2	Radiac	Motor Boat
1	HRS 2	Army liaison	Cattle Car
1	B-29	Sampler (AF	Cat Nip 1
2	B-29	Cloud tracker	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	B-50	Sampler controller	Skull Cap
10	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-5	Terrain survey	Fire Fly 1
1	H-18	Terrain survey	Fire Fly 2
1	L-20	Terrain survey	Ever Ready 4
1	C-47	Terrain survey	Rag Mop
39	H-19	Assault aircraft	Ever Gold
4	H-19	Effects	Sand Blower A, B, C, and D

This shot was supposed to be the largest of the series and an important one from a sampling standpoint. Since quite a reduction in exposure had been gained and this was the last shot for the first group of pilots, it was proposed to use the surplus exposure dosage to obtain samples as large as possible.

Nine F-84's and one B-29 were flown to obtain 10 particulate and gas samples. Two early penetrations were planned—one at H + 1 hr and one at H + 1 hr 30 min. All aircraft had lead seats installed, and pilots were equipped with lead vests. It might be mentioned here that the first aircraft to penetrate the cloud came out with the hottest sample that has been obtained to date.

Early measurements produced an estimate of 29 kt. This being smaller by 11 kt than that originally forecast, some adjustments were made.

The first two samplers were exposed to 2.2 r/hr and 1.75 r/hr, respectively.

The best sample obtained was approximately 4.5 times the minimum required, and the worst was approximately 50% low. Only two samples were under the minimum as far as quantity was concerned. No attempt is made to determine the quality for any of the missions since this was determined by the Los Alamos Scientific Laboratory.

An unfortunate incident occurred during the postdetonation period in that the monitor assigned to the helicopter low-level survey of the immediate shot area was inexperienced in airborne operations and directed the pilot to fly in such a manner that they each accumulated 14.2 r for the mission. The pilot was released from any further duty involving radiation and was returned to his home station.

Sample removal operations at Indian Springs Air Force Base, Nevada, were smooth and efficient as was the rest of the aircraft operation.

One of the Indirect Bomb Damage Assessment aircraft, Project 6.2, aborted its mission because of engine failure and returned to Kirtland Air Force Base, New Mexico.

The Navy drone participation (Project 5.1) was canceled shortly prior to H-hour due to technical control difficulties, making it inadvisable to launch the drone. Since the drone mother and fighter aircraft were already airborne, they were assigned an orbit position and altitude in their orbit areas for timing practice for an actual shot.

All operations for the [redacted] shot were complete on 19 April 1953, at approximately 1030 PST.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Six, 1235 GMT, 18 April 1953

Cloud Cover: Clear
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4492 ft MSL
Burst Height: 4792 ft MSL

Pressure:	Ground Zero	862 mb
	Burst height	852 mb
Virtual Temperature:	Ground Zero	8.2°C
	Burst height	7.5°C
Actual Temperature:	Ground Zero	7.7°C
	Burst height	7.2°C
Relative Humidity:	Ground Zero	40%
	Burst height	39%
Altimeter Setting:	30.03 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	360°	09 knots
6,000	010°	24 knots
8,000	290°	06 knots
10,000	270°	17 knots
15,000	320°	30 knots
20,000	290°	35 knots
25,000	290°	43 knots
30,000	310°	46 knots
35,000	300°	54 knots
40,000	300°	68 knots
45,000	280°	52 knots
50,000	290°	17 knots

Height of Tropopause: 39,320 ft MSL

Table G.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Skull Cap	Sampler controller	ISAFB	1229	1245	1851	1904	Directed samplers very efficiently for a successful mission.
F-84	Tiger Red 1	Sampler	ISAFB	1531	1541	1651	1701	All samplers flew a very successful mission.
F-84	Tiger Red 3	Sampler	ISAFB	1644	1656	1848	1900	
F-84	Tiger Red 4	Sampler	ISAFB	1342	1410	1510	1520	
F-84	Tiger White 1	Sampler	ISAFB	1345	1410	1530	1541	
F-84	Tiger White 2	Sampler	ISAFB	1525	1550	1646	1657	
F-84	Tiger White 3	Sampler	ISAFB	1325	1340	1414	1424	Penetrated cloud at approximately H + 1 hr 10 min to meet LASL requirements. Received a filter paper reading of 100 r/hr. Aircraft skin reading of 22 r/hr and pilot 2.6 r/hr.
F-84	Tiger White 4	Sampler	ISAFB	1233	1237	1255	1306	Snooper reported top of cloud at 37,200 and base of cloud at 27,500, 15 min after H-hour.
F-84	Tiger White 4	Sampler	ISAFB	1628	1642	1800	1810	Tiger White 4 replaced Tiger Blue 4 on this mission.
C-47	Tin Type	Photo	ISAFB	1137	1150	1240	1256	
B-29	Dish Rag 1	IBDA	KAFB	0850			0905	Lost No. 4 engine on take-off; mission aborted.
B-29	Dish Rag 2	IBDA	KAFB	0900	1150	1245	1440	
B-50	Back Bone	SAC IBDA	Castle AFB	Unknown	1214	1240	Unknown	Twelve aircraft ½ mile short of assigned mission at H-hour.
F8F	Duck Bill 1	5.1	ISAFB	1059	1215	1242	1300	Drone aircraft did not participate due to last-minute difficulties in control features of both drone aircraft. Special instrumentation in the stand-by drone was damaged during ground loop in attempted take-off. Other Duck Bill aircraft proceeded with their mission at assigned altitudes, etc., for actual shot experience.
F8F	Duck Bill 2	5.1	ISAFB	1100	1215	1242	1259	
AD2	Duck Bill 6	5.1	ISAFB	1101	1215	1242	1300	
AD2	Duck Bill 7	5.1	ISAFB	1102	1215	1242	1301	
AD2	Duck Bill 8	5.1	ISAFB	1103	1215	1242	1302	
P2V2	Motor Boat	Radiac	KAFB	0830	1124	1628	1648	Landed at ISAFB for sundown and sunup mission.
HRS2	Cattle Car	Army liaison	Desert Rock	1455	1500	1530	1600	Successful.

Table G.1 — (Continued)

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-29	Cat Nip 1	Sampler	ISAFB	1303	1315	1618	1630	Good samples were obtained.
B-29	Cook Book 1	Cloud tracker	ISAFB	1250	1308	1927	1940	All trackers had a very satisfactory mission; all were contaminated upon return to the base.
B-29	Cook Book 2	Cloud tracker	ISAFB	1255	1312	1825	1839	
B-25	Cook Book 3	Cloud tracker	ISAFB	1240	1255	1630	1642	
F-84	Tiger Blue 1	Sampler	ISAFB	1320	1330	1343	1353	Penetrated cloud at approximately H + 1 hr 10 min to meet LASL requirements. Received a filter reading of 100 r/hr. Aircraft skin reading of 22 r/hr and pilot 2.6 r/hr.
F-84	Tiger Blue 3	Sampler	ISAFB	1639	1650	1848	1902	
H-5	Fire Fly 1	Terrain survey	ISAFB	1245	1250	1407	1413	Successful mission, but pilot and Rad monitor received a total reading of 14 r/hr due to monitor's inexperience.
H-18	Fire Fly 2	Terrain survey	ISAFB	1302	1308	1549	1600	Satisfactory mission.
L-20	Ever Ready 4	Terrain survey	ISAFB	1420	1504	1640	1654	Satisfactory mission.
P2V2	Motor Boat	Radiac	Nellis AFB	1601	1620	1728	1742	Landed at ISAFB for return to KAFB.
C-47	Rag Mop	Terrain survey	ISAFB	1645	1650	1958	2008	Communications were very poor on HF. Aircraft did not have channel 20.
P2V2	Motor Boat	Radiac	ISAFB	1831			2051	Departed ISAFB to return to KAFB.
H-19	Ever Gold	Assault aircraft	Desert Rock	1231	1233	1640	1700	39 aircraft.
P2V2	Motor Boat	Radiac	ISAFB	0017	0030	0120	0200	Landed at Nellis AFB.
H-19	Sand Blower	Effects	Desert Rock	1100	1129	1340	1410	Only two left area at this time. Other two returned to home base approximately 4 hr later.

Table G.2 — MANNED SAMPLING DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1051, Tiger Blue 1,	1	1342	100	70	2.2	5		36.5	70%
F-84, 1045, Tiger White 3,	1	1410	60	95	0.5	0.15	11	33	Yes
	2	1414	80	110	1.75	1.0	40	31	No
F-84, 1049 Tiger Red 4,	1	1445	30	50	0.2	0.2	9	32.5	Yes
	2	1452	30	50	0.4	0.2	19	32	No
	3	1456	30	184	1.1	0.5	46	32.5	No
	4	1504	25	180	1.8	1.0	70	32.5	No
F-84, 1042, Tiger White 1,	1	1511	5.0	110	0.25	0.08	5.8	32.3	Yes
	2	1519	7.5	165	0.35	0.1	7.15	32	No
	3	1525	20	130	0.65	0.25	65	33	No
F-84, 1028, Tiger Red 1,	1	1600	4	210	0.5	0.3	22	28.5	Part
	2	1618	4	140	1.0	0.2	30	31.5	Yes
	3	1631	4	130	1.2	0.2	36	32.5	No
F-84, 1043, Tiger White 2,	1	1550	5	140	0.25	0.05	8	31	Yes
	2	1604	3	130	0.5	0.21	11	33	No
	3	1610	2.5	55	0.6	0.12	14	34	No
	4	1615	3	180	1.0	0.2	25	33.5	No
	5	1630	2	30	1.2	0.25	28	33.5	No
F-84, 1038, Tiger White 4,	1	1707	1.7	70	0.07		1.8	32.8	Inop.
	2	1735	2.4	75	0.53	0.06	6.8	33.8	Inop.
F-84, 1055, Tiger Blue 3,	1	1730	2.0	40	0.15	0.4	4.6	33	No
	2	1757	1.0	180	0.4	0.5	8.0	32.5	Part
	3	1806	1.5		0.55		9.0	32.5	No
	4	1820	1.0		0.65	0.075	9.5	32.5	No
F-84, 1037, Tiger Red 3,	1	1822	1.6		0.45	0.1	8	36	Yes

Table G.3 — RADIATION RECEIVED BY PERSONNEL ON SHOT BADGER, 18 APRIL 1953, 1235 GMT

Name	Position	Reading, mr
	Pilot	14,200
	Pilot	2,575
	Pilot	475
	Pilot	40
	Pilot	460
	Pilot	2,100
	Pilot	780
	Pilot	2,210
	Pilot	1,045
	Pilot	610
	Pilot	1,720
	Pilot	~~1,220~~

Table G.4 — B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 0020

		Contamination, mr/hr		
	Loading	First reading, 18 April, 1955 hr	Second reading, 20 April, 1530 hr	Third reading, 20 April, 2315 hr
Nose			16	14
Air intake engine 3		1000	65	46
Left turboengine 3			60	26
Right turboengine 3			60	25
Air intake engine 4			120	30
Left turboengine 4			65	18
Right turboengine 4			80	15
Right wing (leading edge)			65	30
Right scanner blister			4	3
Right horizontal stabilizer				
Left horizontal stabilizer				
Left scanner blister			4	4
Left wing (leading edge)			80	38
Air intake engine 1			100	42
Left turboengine 1			55	20
Right turboengine 1			60	20
Air intake engine 2			100	31
Left turboengine 2			60	24
Right turboengine 2			60	24
Filter box, left wing				
Left wheel well door			34	20
Antenna				
Radar radome			37	22
Pitot			8	4
A-1 filter box				
Right wheel well door			40	18
Filter box, right wing				
Cockpit				

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, released for special reason.

Table G.5—B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 1918

	Loading	Contamination, mr/hr	
		First reading, 19 April, 2115 hr	Second reading, 19 April, 2325 hr
Nose		6	
Air intake engine 3	130	22	17
Left turboengine 3		11	10
Right turboengine 3		12	10
Air intake engine 4		18	
Left turboengine 4		10	8
Right turboengine 4		12	10
Right wing (leading edge)		11	
Right scanner blister		3	
Right horizontal stabilizer		6	
Left horizontal stabilizer		7	
Left scanner blister		5	
Left wing (leading edge)		16	
Air intake engine 1		18	
Left turboengine 1		13	13
Right turboengine 1		16	13
Air intake engine 2		16	14
Left turboengine 2		14	14
Right turboengine 2		15	14
Filter box, left wing			
Left wheel well door		11	
Antenna		5	
Radar radome		12	
Pitot		5	
A-1 filter box			
Right wheel well door		9	
Filter box, right wing			
Cockpit			

Note: Decontamination used after first reading, water rinse.

Table G.6—B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER\18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 486397

	Loading	Contamination, mr/hr						
		First reading, 19 April, 1445 hr	Second reading, 19 April, 1900 hr	Third reading, 20 April, 2145 hr	Fourth reading, 21 April, 2135 hr	Fifth reading, 22 April, 1615 hr	Sixth reading, 23 April, 1520 hr	Seventh reading, 24 April, 1455 hr
Nose		24	10	6	3	3	2	
Air intake engine 3	1600	140	90	60	16	16	11	12
Left turboengine 3		180	120	70	32	26	20	19
Right turboengine 3		210	130	70	30	31	25	23
Air intake engine 4		190	100	50	14	15	10	11
Left turboengine 4		160	130	80	30	28	22	20
Right turboengine 4		205	120	90	28	28	22	20
Right wing (leading edge)		110	120	60	31	28	21	18
Right scanner blister		22	18	10	8	6	4	
Right horizontal stabilizer		26	22	12	10	6	6	
Left horizontal stabilizer		22	24	12	9	6	6	
Left scanner blister		27	22	12	8	7	5	
Left wing (leading edge)		80	80	34	23	20	14	12
Air intake engine 1		240	70	50	16	16	12	12
Left turboengine 1		160	130	60	33	26	20	18
Right turboengine 1		200	140	80	30	28	22	19
Air intake engine 2		160	100	40	17	14	12	12
Left turboengine 2		180	80	80	36	29	24	20
Right turboengine 2		310	180	100	44	34	27	22
Filter box, left wing		100	40					
Left wheel well door		220	120	34	34	30	24	20
Antenna								
Radar radome		70	50	26	18	15	10	
Pitot		20	16	10	6	5	4	
A-1 filter box								
Right wheel well door		150	80	33	31	22	20	
Filter box, right wing		100	50					
Cockpit								

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, natural decay and gunk, Tide, and water; after fourth, fifth, and sixth readings, natural decay.

Table G.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER,
18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1028-A

	Loading	Contamination, mr/hr			
		First reading, 22 April, 2025 hr	Second reading, 23 April, 0010 hr	Third reading, 23 April, 1500 hr	Fourth reading, 24 April, 1437 hr
Cockpit					
Air intake (6 in. inside)	800	14	12	10	
Right inner landing gear door		33	17	18	
Right wing (leading edge)		41	22	19	17
Right wing tip		23	13	10	
Right wing tip tank		15	7	6	
Right side turbine		80	33	28	21
Right horizontal stabilizer		27	10	12	
Tail pipe (6 in. inside)		44	18	22	
Left horizontal stabilizer		26	12	10	
Left side turbine		70	32	28	12
Left wing tip tank		14	5	5	
Left wing tip		25	11	12	
Left wing (leading edge)		100	23	22	18
Left inner landing gear door		41	22	20	
Dive brake		65	27	22	20

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, natural decay and flown during period.

Table G.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1037-A

	Loading	Contamination, mr/hr				
		First reading, 21 April, 2315 hr	Second reading, 22 April, 1500 hr	Third reading, 22 April, 1715 hr	Fourth reading, 23 April, 1510 hr	Fifth reading, 24 April, 1440 hr
Cockpit						
Air intake (6 in. inside)	250	15	14	11	9	
Right inner landing gear door		30	28	14	13	
Right wing (leading edge)		41	36	21	19	
Right wing tip		23	22	8	8	
Right wing tip tank		16	15	4	6	
Right side turbine		60	52	31	26	18
Right horizontal stabilizer		25	23	9	9	
Tail pipe (6 in. inside)		35	34	26	18	
Left horizontal stabilizer		25	22	10	8	
Left side turbine		80	60	29	25	18
Left wing tip tank		12	12	4	4	
Left wing tip		19	19	8	7	
Left wing (leading edge)		38	32	20	16	
Left inner landing gear door		30	28	14	12	
Dive brake		60	49	30	17	

Note: Decontamination used after first reading, natural decay; after second reading, gunk, Tide, and water; after third reading, natural decay; after fourth reading, natural decay and flown during period.

Table G.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER
18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1038-A

	Loading	Contamination, mr/hr		
		First reading, 21 April, 2110 hr	Second reading, 21 April, 2205 hr	Third reading, 22 April, 1530 hr
Cockpit				
Air intake (6 in. inside)	250	12	11	10
Right inner landing gear door		20	12	11
Right wing (leading edge)		26	19	16
Right wing tip		16	14	11
Right wing tip tank		8	6	6
Right side turbine		42	27	22
Right horizontal stabilizer		19	13	11
Tail pipe (6 in. inside)		30	22	18
Left horizontal stabilizer		18	11	9
Left side turbine		50	26	22
Left wing tip tank		10	6	7
Left wing tip		18	13	12
Left wing (leading edge)		28	19	16
Left inner landing gear door		25	14	12
Dive brake		42	20	18

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table G.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1042-A

Loading	Contamination, mr/hr				
	First reading, 18 April, 1545 hr	Second reading, 19 April, 2125 hr	Third reading, 20 April, 1500 hr	Fourth reading, 20 April, 1630 hr	Fifth reading, 21 April, 1430 hr
Cockpit					
Air intake (6 in. inside)	400	18	12	9	8
Right inner landing gear door		38	25	14	12
Right wing (leading edge)		65	35	21	17
Right wing tip		18	16	9	7
Right wing tip tank		22	10	6	4
Right side turbine		80	44	26	19
Right horizontal stabilizer		40	19	9	8
Tail pipe (6 in. inside)		50	27	20	15
Left horizontal stabilizer		40	21	9	8
Left side turbine		75	43	25	20
Left wing tip tank		18	12	5	5
Left wing tip		22	15	8	6
Left wing (leading edge)		70	37	24	18
Left inner landing gear door		50	27	16	14
Dive brake		100	55	27	21

Note: Decontamination used after first and second readings, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay.

Table G.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1043-A

		Contamination, mr/hr			
	Loading	First reading, 22 April, 1650 hr	Second reading, 22 April, 2045 hr	Third reading, 23 April, 1510 hr	Fourth reading, 24 April, 1443 hr
Cockpit					
Air intake (6 in. inside)	500	14	10	10	
Right inner landing gear door		24	14	12	
Right wing (leading edge)		32	20	19	
Right wing tip		11	10	9	
Right wing tip tank		8	6	6	
Right side turbine		50	30	26	19
Right horizontal stabilizer		20	12	11	
Tail pipe (6 in. inside)		60	27	22	
Left horizontal stabilizer		20	12	11	
Left side turbine		60	30	26	19
Left wing tip tank		8	6	5	
Left wing tip		12	9	8	
Left wing (leading edge)		30	20	18	
Left inner landing gear door		27	16	14	
Dive brake		70	20	18	

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, natural decay and flown during period.

Table G.12 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1045-A

		Contamination, mr/hr		
	Loading	First reading, 21 April, 2115 hr	Second reading, 21 April, 2300 hr	Third reading, 22 April, 1500 hr
Cockpit				
Air intake (6 in. inside)	2600	17	14	12
Right inner landing gear door		24	17	15
Right wing (leading edge)		36	25	21
Right wing tip		42	10	9
Right wing tip tank		11	8	8
Right side turbine		36	21	18
Right horizontal stabilizer		24	11	10
Tail pipe (6 in. inside)		28	20	16
Left horizontal stabilizer		22	12	10
Left side turbine		37	22	19
Left wing tip tank		11	8	8
Left wing tip		17	12	10
Left wing (leading edge)		36	25	22
Left inner landing gear door		25	18	16
Dive brake		46	26	22

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table G.13 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER, 18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1049-A

	Loading	Contamination, mr/hr				
		First reading, 21 April, 2250 hr	Second reading, 22 April, 0015 hr	Third reading, 22 April, 1530 hr	Fourth reading, 23 April, 1505 hr	Fifth reading, 24 April, 1440 hr
Cockpit						
Air intake (6 in. inside)	1500	19	17	14	11	
Right inner landing gear door		42	24	22	18	
Right wing (leading edge)		49	31	28	23	19
Right wing tip		24	18	17	12	
Right wing tip tank		18	12	11	7	
Right side turbine		70	40	34	28	23
Right horizontal stabilizer		32	20	18	13	
Tail pipe (6 in. inside)		45	34	30	23	
Left horizontal stabilizer		32	20	17	13	
Left side turbine		65	38	33	27	23
Left wing tip tank		17	12	10	8	
Left wing tip		24	16	15	11	
Left wing (leading edge)		49	31	27	22	18
Left inner landing gear door		35	21	20	14	
Dive brake		60	29	27	20	

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water and natural decay; after fourth reading, natural decay and flown during period.

Table G.14 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER,
18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1051-A

		Contamination, mr/hr			
	Loading	First reading, 22 April, 2115 hr	Second reading, 22 April, 2400 hr	Third reading, 23 April, 1505 hr	Fourth reading, 24 April, 1435 hr
Cockpit					
Air intake (6 in. inside)	8000	22	11	14	
Right inner landing gear door		24	12	14	
Right wing (leading edge)		41	24	21	18
Right wing tip		19	12	12	
Right wing tip tank		14	8	10	
Right side turbine		29	16	12	
Right horizontal stabilizer		25	8	9	
Tail pipe (6 in. inside)		22	10	9	
Left horizontal stabilizer		24	8	8	
Left side turbine		29	14	13	
Left wing tip tank		13	8	8	
Left wing tip		19	9	9	
Left wing (leading edge)		43	25	22	18
Left inner landing gear door		24	14	14	
Dive brake		85	30	28	24

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, natural decay and flown during period.

Table G.15 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT BADGER,
18 APRIL 1953, 1235 GMT, AIRCRAFT NO. 51-1055-A

		Contamination, mr/hr			
	Loading	First reading, 22 April, 1725 hr	Second reading, 22 April, 2040 hr	Third reading, 23 April, 1500 hr	Fourth reading, 24 April, 1445 hr
Cockpit					
Air intake (6 in. inside)	250	14	12	10	
Right inner landing gear door		29	20	18	
Right wing (leading edge)		37	29	25	20
Right wing tip		17	15	14	
Right wing tip tank		11	9	8	
Right side turbine		48	32	28	20
Right horizontal stabilizer		20	14	12	
Tail pipe (6 in. inside)		38	24	21	
Left horizontal stabilizer		22	13	12	
Left side turbine		55	34	29	21
Left wing tip tank		11	7	8	
Left wing tip		13	10	9	
Left wing (leading edge)		35	27	24	20
Left inner landing gear door		37	26	22	
Dive brake		100	28	26	20

Note: Decontamination used after first reading, gunk, Tide, and water; after second and third readings, natural decay.

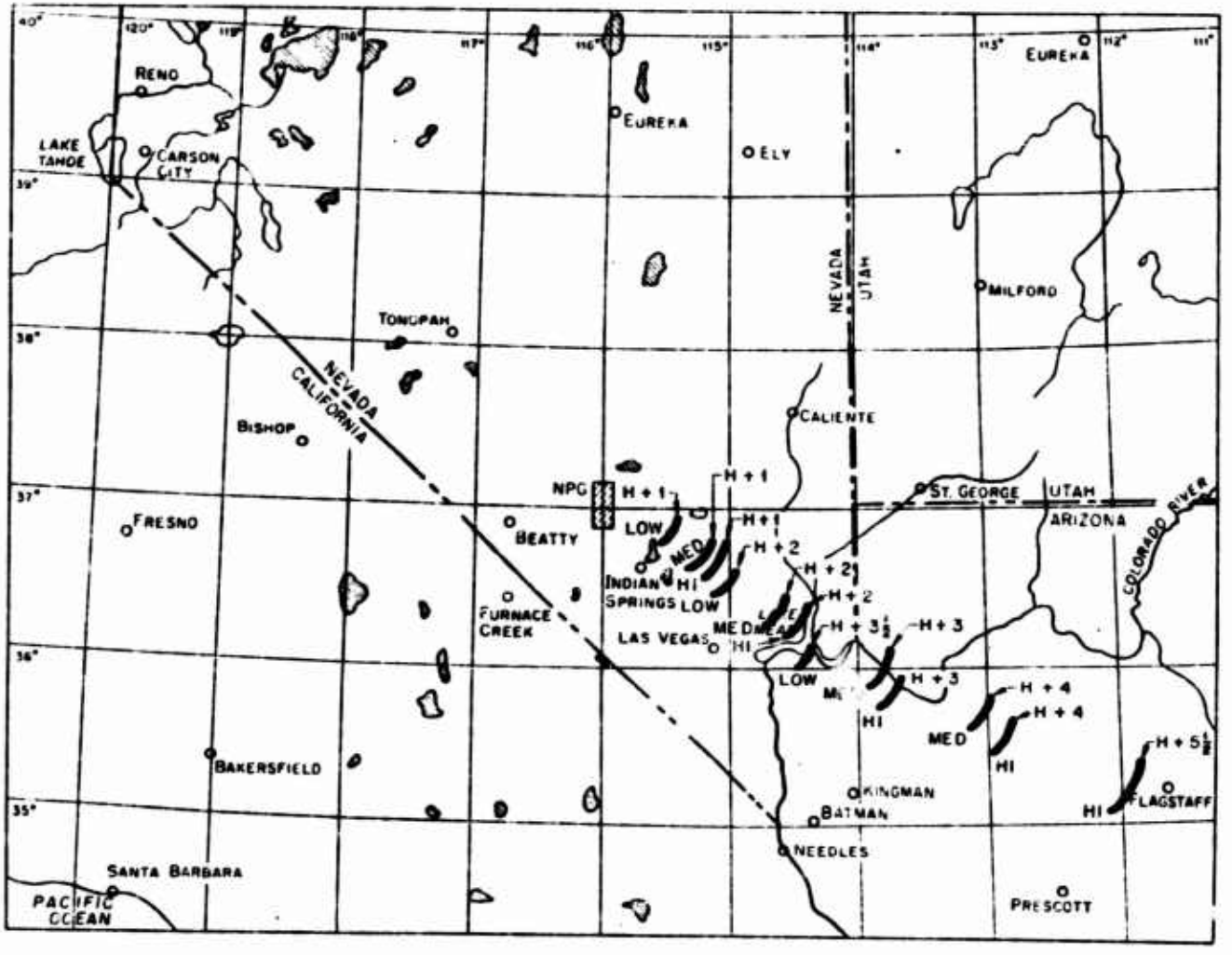

Fig. G.1 — Cloud track, Shot [illegible], 18 April 1953. Low, 12,000 ft MSL. Medium, 18,000 to 22,000 ft MSL. High, 27,000 ft MSL.

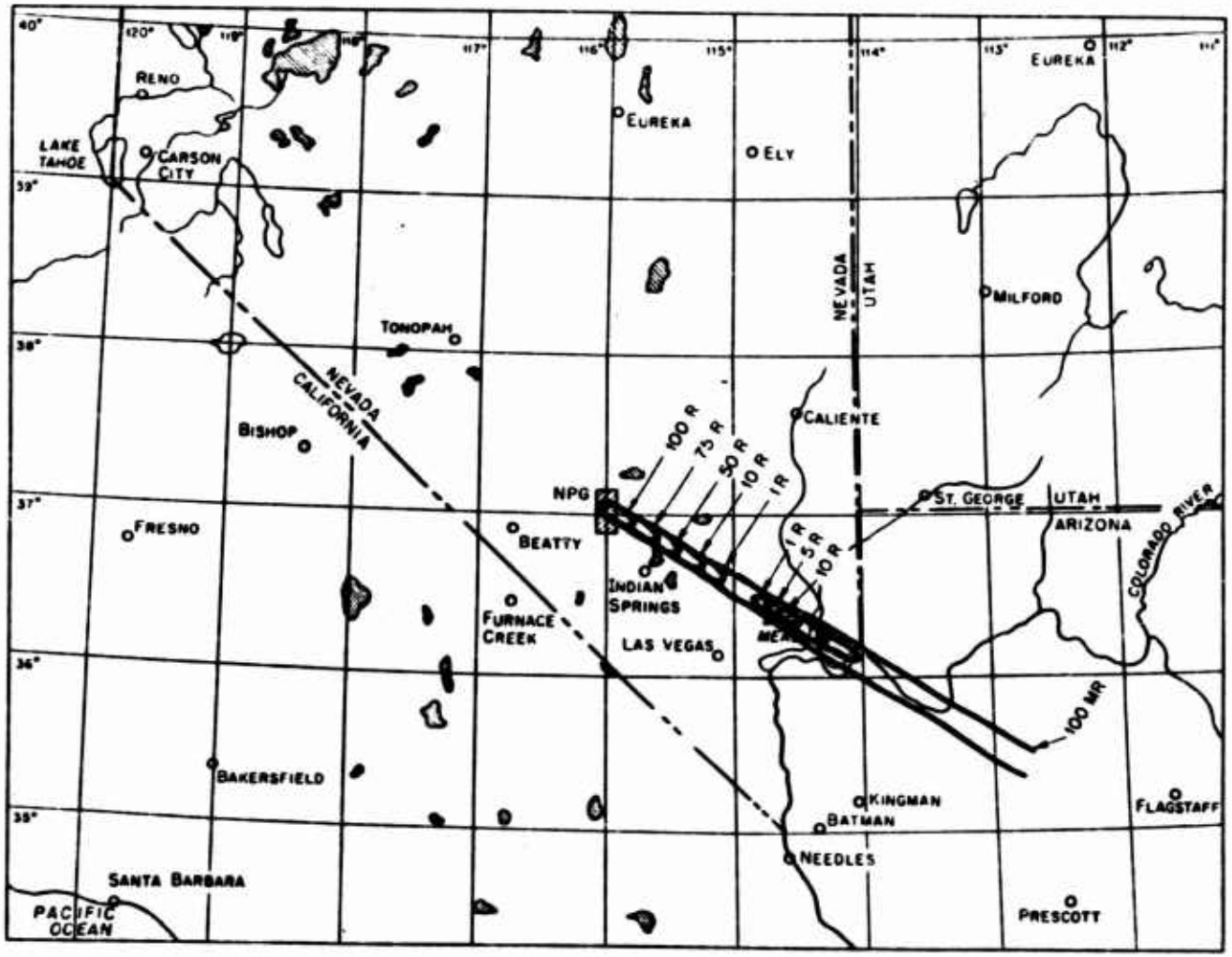

Fig. G.2—Fall-out data plot, infinite dose, Shot BADGER, 18 April 1953.

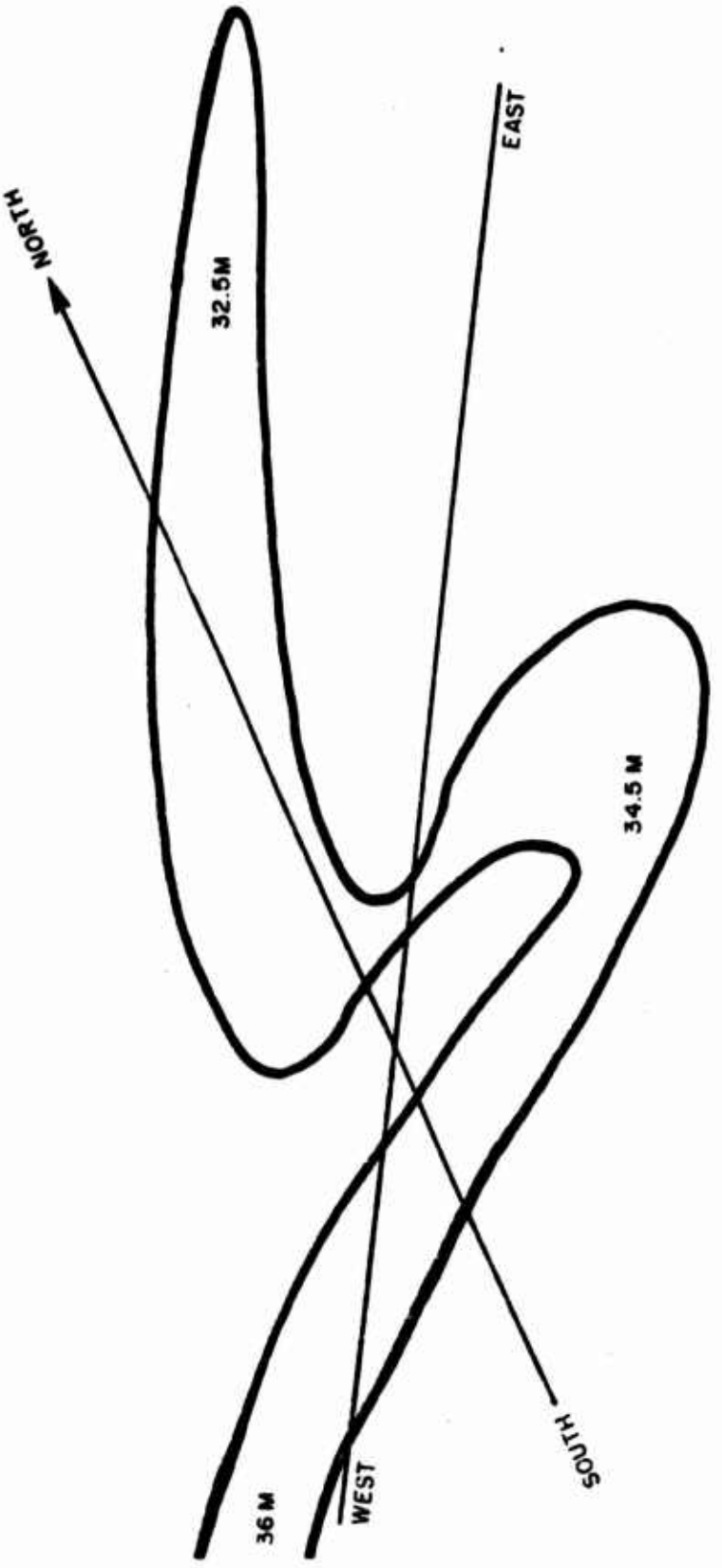

Fig. G.3—Shot [redacted], 18 April 1963; time, H+5 hr 30 min.

ANNEX H

SIMON SHOT SUMMARY

The Test Manager's weather briefing for SIMON scheduled for 0430 PST (1230 GMT), to be detonated 25 April 1953, was held at 0830 PST (1630 GMT) on the morning of 24 April 1953. The weather was forecast to be 5/10 coverage at 33,000 ft with 2/10 coverage at 16,000 ft and no precipitation within 1000 miles downstream. The winds were favorable, being from a heading of 260° at 9 knots at 10,000 ft to 270° at 48 knots at 40,000 ft. With this forecast the shot was scheduled and aircrew briefings were completed at Indian Springs Air Force Base, Nevada, and Kirtland Air Force Base, New Mexico, at 1430 PST (2230 GMT). The final Test Manager's briefing at 2200 PST verified that the device would be detonated. The weather at shot time was as forecast.

At 0430 PST (1230 GMT), the device was successfully detonated with an approximate yield of 51 kt.

The F-84 snooper aircraft reported the top of the cloud at 43,200 ft and the base of the cloud at 37,500 ft at H + 18 min.

A total of 50 test aircraft sorties were flown with participation as follows:

No.	Type	Project	Code Name
2	B-29	IBDA	Dish Rag 2 and 3
1	AD2	Navy drone	Duck·Bill Dog
2	F8F	Drone mother	Duck Bill 1 and 2
3	AD4	Armed fighters	Duck Bill 6, 7, and 8
1	P2V2	Radiac	Motor Boat
1	HRS	Army effects	Cattle Car
1	F-84	AF sampler	Cat Nip 1
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop
4	HRS	Effects	Sand Blower A, B, C, and D
1	B-50	Sampler controller	Skull Cap
10	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-18	Terrain survey	Fire Fly 2
2	L-20	Terrain survey	Ever Ready 4 and 5
1	C-47	Photo	Tin Type
1	B-29	IBDA	Dish Rag 1
8	B-50	SAC IBDA	Back Bone
7	B-47	SAC IBDA	Back Bone

Project 5.1, Navy drone, was destroyed. The aircraft, at shot time, was 1 sec late in its scheduled position of 6000 ft above terrain and 2200 ft horizontally beyond Ground Zero. According to calculations, this was within the tolerance of the anticipated yield of 35 kt ± 10 kt. Owing to the high yield, it is believed that the thermal factor weakened the wing structure, with blast damage breaking up the aircraft.

Two of Project 6.2 IBDA aircraft were in position and obtained the required information, but the third aircraft developed a fire in No. 4 engine prior to H-hour and was forced to land at Nellis Air Force Base, Nevada.

Project 6.3, which consisted of eight B-50's from Hunter Air Force Base, Georgia, and seven B-47's from MacDill Air Force Base, Florida, participated. The B-47 aircraft were approximately 1 min early and beyond Ground Zero at H-hour. The B-50's were approximately in their correct position at the time of detonation.

Project 5.9, radiac aircraft, flew a successful mission on shot morning and D + 1 day but canceled the D-day afternoon mission due to an oil leak in No. 2 engine.

As a result of propeller Technical Order, the AF [redacted]B-29 cloud samplers were grounded, and an F-84 was assigned to fly this project's sampling mission.

The cloud rose to a height of 43,500 ft, with the bulk of the cloud between that altitude and 38,000 ft. Since it was a tower shot, there was quite a bit of mixing with ground dirt and the coloration was good. This later proved to be a valuable point as cirrus formed around the radioactive cloud and it was partly obscured.

The winds were light at higher altitudes, and the first penetration was delayed until H + 2 hr 41 min. Peak intensities at this time were low, and the pilots were instructed in so far as possible to fly orbits or figure eights in the cloud until the required exposure was obtained, in this case 1.51 r.

With one exception, samples greater than the minimum were obtained. This exception was a Los Alamos Scientific Laboratory requested penetration of the lower dirt cloud, in which case it was known that required sample intensities could not be obtained. This was considered a maximum effort, and satisfaction was expressed with the samples procured.

One of the cloud trackers feathered No. 1 engine immediately after proceeding on his assigned mission of tracking the cloud at an altitude of 20,000 to 25,000 ft, aborted his mission, and landed at Nellis Air Force Base, Nevada. The second B-29 and the B-25 cloud tracker aircraft successfully completed the mission.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Seven, 1230 GMT, 25 April 1953

Cloud Cover: 5/10 clouds at 33,000 ft; 2/10 clouds at 16,000 ft
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4238 ft MSL
Burst Height: 4538 ft MSL

Pressure:	Ground Zero	870 mb
	Burst height	860 mb
Virtual Temperature:	Ground Zero	12.3°C
	Burst height	15.8°C
Actual Temperature:	Ground Zero	11.7°C
	Burst height	15.3°C
Relative Humidity:	Ground Zero	26%
	Burst height	26%
Altimeter Setting:	30.02 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	340°	05 knots
6,000	030°	08 knots
8,000	070°	03 knots
10,000	260°	09 knots
15,000	290°	09 knots
20,000	280°	26 knots
25,000	280°	20 knots
30,000	280°	41 knots
35,000	280°	36 knots
40,000	270°	48 knots
45,000	270°	30 knots
50,000	270°	24 knots

Height of Tropopause: 39,350 ft MSL

Table H.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-29	Dish Rag 2	IBDA	KAFB	0810	1045	1255	1447	
B-29	Dish Rag 3	IBDA	KAFB	0810	1050	1255	1545	
AD 2	Duck Bill Dog	Proj. 5.1	ISAFB	1142	1154			Crashed. Thermal weakened wing structure and blast impact took wings off.
F8F	Duck Bill 1	Proj. 5.1	ISAFB	1056	1116	1229	1248	
F8F	Duck Bill 2	Proj. 5.1	ISAFB	1056	1116	1230	1249	
AD4	Duck Bill 6	Proj. 5.1	ISAFB	1057	1118	1230	1249	
AD4	Duck Bill 7	Proj. 5.1	ISAFB	1057	1117	1230	1249	
AD4	Duck Bill 8	Proj. 5.1	ISAFB	1057	1117	1231	1249	
P2V2	Motor Boat	Radiac	KAFB	0830	1107	1455	1526	Canceled afternoon mission because of an oil leak.
P2V2	Motor Boat	Radiac	ISAFB	1534	1545	1629	1640	26 April 1953. Successful mission.
HRS	Cattle Car	Army liaison	Desert Rock	2105	2125	2233	2300	
F-84	Cat Nip 1	Sampler	ISAFB	1001	1015	1247	1301	B-29 samplers were grounded and were replaced by an F-84.
B-29	Cook Book 1	Cloud tracker	KAFB	0930			1308	Aborted No. 1 engine and landed at Nellis AFB.
B-29	Cook Book 2	Cloud tracker	KAFB	0940	1235	1800	2000	Satisfactory mission.
B-25	Cook Book 3	Cloud tracker	ISAFB	1246	1301	1725	1731	Received excessive amount of radiation.
C-47	Rag Mop	Terrain survey	ISAFB	1645	1657	2005	2025	Successful mission.
C-47	Rag Mop	Terrain survey	ISAFB	1647	1704	2035	2047	26 April 1953.

HRS	Sand Blower A, B, C, and D	Effects	Desert Rock	1200	1235	1310	1330	Successful mission. Aided LASL in trying to recover film in the area and ferried personnel in addition to regular mission.
B-50	Skull Cap	Sampler controller	ISAFB	1224	1235	2000	2031	
F-84	Tiger Red 1	Sampler	ISAFB	1429	1445	1600	1617	All samplers had very successful missions.
F-84	Tiger Red 3	Sampler	ISAFB	1753	1807	2011	2027	
F-84	Tiger Red 4	Sampler	ISAFB	1449	1503	1620	1631	
F-84	Tiger White 1	Sampler	ISAFB	1220	1235	1310	1322	Snooper. Reported top of cloud at 43,200 ft and main base of cloud at 37,500 ft at H + 18 min.
F-84	Tiger White 2	Sampler	ISAFB	1459	1512	1655	1709	
F-84	Tiger White 3	Sampler	ISAFB	1613	1630	1745	1754	
F-84	Tiger White 4	Sampler	ISAFB	1751	1806	2003	2021	
F-84	Tiger Blue 1	Sampler	ISAFB	1637	1652	1835	1851	
F-84	Tiger Blue 2	Sampler	ISAFB	1430	1444	1558	1611	
F-84	Tiger Blue 4	Sampler	ISAFB	1612	1617	1802	1818	
H-18	Fire Fly 2	Terrain survey	ISAFB	1240	1257	1355	1405	
L-20	Ever Ready 4	Terrain survey	ISAFB	1530	1558	1750	1810	
L-20	Ever Ready 5	Terrain survey	ISAFB	1607	1629	1705	1725	
C-47	Tin Type	Photo	ISAFB	1126	1234	1333	1353	In proper position at H-hour for a successful mission.
B-29	Dish Rag 1	IBDA	KAFB	0800	1026	1120	1202	Engine No. 4 feathered because of fire. Landed at Nellis AFB.
B-50	Back Bone	SAC IBDA	Hunter	Unknown	1140	1300	Unknown	
B-47	Back Bone	SAC IBDA	MacDill	Unknown	1123	1223	Unknown	Approximately 1 min early.
B-50	Back Bone	SAC IBDA	Hunter	Unknown	0819	1242	Unknown	Weather aircraft.
B-47	Back Bone	SAC IBDA	MacDill	Unknown	1023	1220	Unknown	Weather aircraft.

Table H.2 — MANNED SAMPLING DATA FOR SHOT Simon, 25 APRIL 1953, 1230 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 028, Tiger Red 1,	1	1411	7.0	198	0.6	0.2	20	40	Yes
	2	1431	3.0	135	1.0	1.5	24	39	No
	3	1442	5.0	160	1.4	0.4	35	40.1	No
	4	1451	7.0	200	1.8	1.0	45	40.8	No
F-84, 037, Tiger Red 3,	1	1720	0.75		0.3		10	41	Not required
	2	1840	0.5		1.09	0.15	30	41.1	
F-84, 049, Tiger Red 4,	1	1453	6.5	155	0.55	0.32	20	40.3	Yes
	2	1608	6.0	540	1.62	0.95	54	40.5	Yes
F-84, 043, Tiger White 2,	1	1615	4	700	0.65	0.7	5.7	36	Yes
	2	1635	5	1150	1.55	0.3	13	38.5	Yes
F-84, 045, Tiger White 3,	1	1653	4	730	0.5	0.19	18	40.5	Yes
	2	1721	3	945	1.65	0.5	40	40.3	Yes
F-84, 038, Tiger White 4,	1	1725	1.0	55	0.5		4.6	39	Not required
	2	1731	0.75					39	
	3	1838	0.8		1.0	0.2	11	39	
F-84, 051, Tiger Blue 1,	1	1633	1.1	105	0.6	0.1	10	39	Yes
	2	1801	1.8	650	1.5	0.5	30	40.5	No
F-84, 054, Tiger Blue 2,	1	1418	5	80	0.3	0.13	1.8	35.5	No
	2	1434	4	540	1.55	0.13	20	35.5	Yes
F-84, 046, Tiger Blue 4,	1	1548	0.9		0.5	0.07	5.2	33.5	Yes
	2	1633	0.4		0.63	0	6.0	33.5	No
	3	1649	0.2		0.66	0	5.8	35	No
F-84, 042, Cat No 1,	1	1810	0.2	65	0.26	0.05	3.4	41	Not required

Table H.3 — RADIATION RECEIVED BY PERSONNEL ON SHOT Simon, 25 APRIL 1953, 1230 GMT

Name	Position	Reading, mr
	Pilot	1975
	Pilot	2710
	Pilot	1585
	Pilot	1635
	Pilot	285
	Pilot	2210
	Pilot	2150
	Pilot	1140
	Pilot	2210
	Pilot	1745

Table H.4 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT Simon, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1028-A

		Contamination, mr/hr									
	Loading	First reading, 27 April, 1725 hr	Second reading, 27 April, 1815 hr	Third reading, 28 April, 1445 hr	Fourth reading, 28 April, 1730 hr	Fifth reading, 29 April, 1450 hr	Sixth reading, 29 April, 1750 hr	Seventh reading, 30 April, 1415 hr	Eighth reading, 1 May, 1510 hr	Ninth reading, 2 May, 1630 hr	Tenth reading, 4 May, 1450 hr
Cockpit											
Air intake (6 in. inside)	1200	30	30	23	21	18	14	14	11	8	8
Right inner landing gear door		60	60	41	32	29	23	22	17	13	12
Right wing (leading edge)		85	85	70	42	36	29	27	21	16	14
Right wing tip		48	46	37	25	22	10	12	10	8	7
Right wing tip tank		32	30	25	20	18	11	12	10	8	6
Right side turbine		110	80	65	42	36	31	28	22	20	14
Right horizontal stabilizer		58	55	37	23	20	11	11	9	7	6
Tail pipe (6 in. inside)		70	60	40	31	30	25	26	25	12	12
Left horizontal stabilizer		55	37	29	21	19	12	12	11	7	6
Left side turbine		90	65	43	38	24	29	27	21	20	13
Left wing tip tank		31	28	21	18	16	13	11	7	6	6
Left wing tip		49	28	24	22	18	12	12	12	6	6
Left wing (leading edge)		90	75	48	45	36	29	28	28	18	6
Left inner landing gear door		80	60	43	39	32	28	24	22	15	14
Dive brake		110	85	75	65	45	44	38	28	24	20

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water; after sixth reading, natural decay; after seventh reading, natural decay and flown during period; after eighth and ninth readings, natural decay.

Table H.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT Simon, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1037-A

		Contamination, mr/hr								
	Loading	First reading, 27 April, 2015 hr	Second reading, 27 April, 2120 hr	Third reading, 28 April, 1600 hr	Fourth reading, 28 April, 2125 hr	Fifth reading, 29 April, 1455 hr	Sixth reading, 29 April, 1705 hr	Seventh reading, 30 April, 1420 hr	Eighth reading, 1 May, 1515 hr	Ninth reading, 7 May, 1405 hr
Cockpit										
Air intake (6 in. inside)	800	80			42	41	38	37	26	
Right inner landing gear door		110	80	60	50	44	39	34	27	
Right wing (leading edge)		180	140	110	80	78	70	58	41	16
Right wing tip		95	90	70	40	35	30	24	18	
Right wing tip tank		80	70	46	28	20	20	18	11	
Right side turbine		240	135	100	90	80	80	60	45	18
Right horizontal stabilizer		120	60	48	45	40	27	22	16	
Tail pipe (6 in. inside)		140			70	65	44	43	41	
Left horizontal stabilizer		120	60	46	34	32	26	23	16	
Left side turbine		240	135	105	90	80	70	60	42	18
Left wing tip tank		60	40	35	27	25	17	16	10	
Left wing tip		105	65	53	35	34	29	20	19	
Left wing (leading edge)		170	120	90	80	75	60	46	37	16
Left inner landing gear door		120	80	60	49	45	38	34	26	
Dive brake		220	180	145	110	105	80	70	47	23

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water; after sixth reading, natural decay; after seventh reading, natural decay and flown during period; after eighth reading, released to KAFB for inspection and returned 6 May 1953.

Table H.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT Simon, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1038-A

	Loading	Contamination, mr/hr							
		First reading, 27 April, 1655 hr	Second reading, 27 April, 1745 hr	Third reading, 28 April, 1440 hr	Fourth reading, 28 April, 1725 hr	Fifth reading, 29 April, 1447 hr	Sixth reading, 29 April, 1745 hr	Seventh reading, 30 April, 1425 hr	Eighth reading, 1 May, 1520 hr
Cockpit									
Air intake (6 in. inside)	320	31	30	25	22	18	12	14	11
Right inner landing gear door		41	29	22	20	17	16	13	10
Right wing (leading edge)		65	49	32	32	27	22	20	16
Right wing tip		26	17	14	13	10	7	6	5
Right wing tip tank		21	16	14	11	10	5	6	5
Right side turbine		100	65	46	42	34	30	27	17
Right horizontal stabilizer		44	25	18	17	15	12	10	5
Tail pipe (6 in. inside)		80	49	30	32	28	22	25	20
Left horizontal stabilizer		41	24	16	16	14	10	10	5
Left side turbine		100	65	46	42	26	26	28	17
Left wing tip tank		19	16	11	10	10	5	6	4
Left wing tip		35	28	18	18	18	11	10	6
Left wing (leading edge)		65	51	36	35	28	22	20	17
Left inner landing gear door		50	31	20	22	18	14	14	10
Dive brake		90	80	58	50	40	33	30	21

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water; after sixth reading, natural decay; after seventh reading, natural decay and flown during period.

Table H.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1042-A

	Loading	Contamination, mr/hr				
		First reading, 27 April, 1500 hr	Second reading, 27 April, 1605 hr	Third reading, 28 April, 1435 hr	Fourth reading, 28 April, 1640 hr	Fifth reading, 5 May, 1452 hr
Cockpit						
Air intake (6 in. inside)	90	11	10	7	8	3
Right inner landing gear door		21	17	12	12	5
Right wing (leading edge)		36	25	18	20	6
Right wing tip		20	9	8	10	3
Right wing tip tank		13	8	6	8	2
Right side turbine		80	50	40	38	10
Right horizontal stabilizer		24	14	10	10	5
Tail pipe (6 in. inside)		46	42	24	27	6
Left horizontal stabilizer		25	16	10	12	4
Left side turbine		80	50	36	36	10
Left wing tip tank		9	8	6	6	3
Left wing tip		18	9	6	8	2
Left wing (leading edge)		38	27	19	20	8
Left inner landing gear door		29	20	13	14	5
Dive brake		44	42	28	25	8

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, released to KAFB for inspection and returned 4 May 1953.

Table H.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1043-A

		Contamination, mr/hr					
	Loading	First reading, 27 April, 1525 hr	Second reading, 27 April, 1700 hr	Third reading, 28 April, 1430 hr	Fourth reading, 28 April, 1645 hr	Fifth reading, 29 April, 1515 hr	Sixth reading, 29 April, 1620 hr
Cockpit							
Air intake (6 in. inside)	800	25	20	18	17	18	13
Right inner landing gear door		30	22	18	16	17	13
Right wing (leading edge)		46	30	27	23	22	18
Right wing tip		21	15	15	13	14	7
Right wing tip tank		13	10	10	10	12	6
Right side turbine		60	38	30	28	27	22
Right horizontal stabilizer		27	18	17	14	14	9
Tail pipe (6 in. inside)		43	35	26	23	20	16
Left horizontal stabilizer		29	16	15	13	12	8
Left side turbine		48	37	28	28	27	22
Left wing tip tank		13	12	12	12	13	6
Left wing tip		21	14	12	12	13	6
Left wing (leading edge)		39	28	23	22	21	16
Left inner landing gear door		29	21	17	16	17	12
Dive brake		44	45	30	26	25	20

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water.

Table H.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1045-A

		Contamination, mr/hr										
	Loading	First reading, 28 April, 1355 hr	Second reading, 28 April, 1540 hr	Third reading, 29 April, 1500 hr	Fourth reading, 29 April, 1700 hr	Fifth reading, 30 April, 1430 hr	Sixth reading, 1 May, 1500 hr	Seventh reading, 2 May, 1615 hr	Eighth reading, 4 May, 1445 hr	Ninth reading, 5 May, 1450 hr	Tenth reading, 6 May, 1525 hr	Eleventh reading, 7 May, 1400 hr
Cockpit												
Air intake (6 in. inside)	2100	110	85	47	43	35	30	22	18	15	14	
Right inner landing gear door		100	70	65	37	32	27	24	18	16	14	
Right wing (leading edge)		160	110	100	60	60	44	36	29	26	22	20
Right wing tip		90	70	65	18	16	13	10	9	8	6	
Right wing tip tank		55	40	36	26	25	16	14	13	8	8	
Right side turbine		135	85	80	60	46	38	32	25	20	19	16
Right horizontal stabilizer		110	60	60	25	21	19	13	12	12	8	
Tail pipe (6 in. inside)		95	85	80	50	49	41	24	21	18	17	
Left horizontal stabilizer		105	60	60	23	21	19	12	10	10	8	
Left side turbine		140	90	80	60	46	45	36	26	20	18	16
Left wing tip tank		55	42	42	27	26	19	16	14	10	10	
Left wing tip		80	60	60	26	22	18	14	13	11	8	
Left wing (leading edge)		150	110	95	70	60	44	35	28	27	21	19
Left inner landing gear door		100	70	70	38	34	24	25	19	17	15	
Dive brake		175	160	140	85	80	60	50	40	34	31	27

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, natural decay and flown during period; after sixth and seventh readings, natural decay; after eighth reading, natural decay and flown during period; after ninth and tenth readings, natural decay.

Table H.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1046-A

		Contamination, mr/hr	
	Loading	First reading, 27 April, 1430 hr	Second reading, 27 April, 1600 hr
Cockpit			
Air intake (6 in. inside)	250	15	12
Right inner landing gear door		11	9
Right wing (leading edge)		20	11
Right wing tip		11	5
Right wing tip tank		7	4
Right side turbine		27	19
Right horizontal stabilizer		13	6
Tail pipe (6 in. inside)		17	12
Left horizontal stabilizer		13	6
Left side turbine		30	21
Left wing tip tank		7	4
Left wing tip		10	5
Left wing (leading edge)		20	12
Left inner landing gear door		11	8
Dive brake		22	17

Note: Decontamination used after first reading, gunk, Tide, and water.

Table H.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1049-A

		Contamination, mr/hr										
	Loading	First reading, 27 April, 1810 hr	Second reading, 27 April, 2020 hr	Third reading, 28 April, 1545 hr	Fourth reading, 28 April, 2120 hr	Fifth reading, 29 April, 1545 hr	Sixth reading, 29 April, 2100 hr	Seventh reading, 30 April, 1430 hr	Eighth reading, 1 May, 1450 hr	Ninth reading, 2 May, 1600 hr	Tenth reading, 4 May, 1440 hr	Eleventh reading, 5 May, 1448 hr
Cockpit												
Air intake (6 in. inside)	2700	75	65	50	44	37	29	26	19	17	12	
Right inner landing gear door		100	60	42	36	30	28	25	22	20	14	
Right wing (leading edge)		160	95	70	60	49	44	39	30	24	22	18
Right wing tip		95	40	32	24	19	17	14	10	10	7	
Right wing tip tank		70	49	35	28	20	16	21	9	8	9	
Right side turbine		130	100	80	65	60	44	40	31	27	20	18
Right horizontal stabilizer		120	60	60	30	27	21	19	12	12	10	
Tail pipe (6 in. inside)		105	80	60	38	35	33	33	26	20	16	
Left horizontal stabilizer		115	80	63	30	27	21	29	24	10	10	
Left side turbine		125	120	90	60	48	44	40	28	28	20	18
Left wing tip tank		65	65	44	26	24	22	21	11	8	8	
Left wing tip		100	95	80	30	28	24	20	14	10	10	
Left wing (leading edge)		160	140	110	60	50	44	40	32	25	21	20
Left inner landing gear door		105	95	60	40	38	31	29	24	18	15	
Dive brake		160	150	105	80	65	58	49	35	32	25	21

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water; after sixth reading, natural decay; after seventh reading, natural decay and flown during period; after eighth and ninth readings, natural decay; after tenth reading, natural decay and flown during period.

Table H.12 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1051-A

		Contamination, mr/hr												
	Loading	First reading, 27 April, 2010 hr	Second reading, 27 April, 2115 hr	Third reading, 28 April, 1555 hr	Fourth reading, 29 April, 1945 hr	Fifth reading, 29 April, 1515 hr	Sixth reading, 29 April, 2110 hr	Seventh reading, 30 April, 1435 hr	Eighth reading, 1 May, 1456 hr	Ninth reading, 2 May, 1645 hr	Tenth reading, 4 May, 1440 hr	Eleventh reading, 5 May, 1445 hr	Twelfth reading, 6 May, 1530 hr	Thirteenth reading, 7 May, 1400 hr
Cockpit														
Air intake (6 in. inside)	1100	85	70	60	50	40	34	30	27	18	16	12	12	
Right inner landing gear door		100	80	42	42	33	28	25	21	18	13	12	11	
Right wing (leading edge)		110	100	90	80	60	48	43	33	27	24	19	18	16
Right wing tip		80	40	34	30	22	17	13	10	9	7	6	5	
Right wing tip tank		42	40	36	28	20	19	17	11	10	8	5	5	
Right side turbine		160	90	85	80	45	43	37	37	28	20	17	15	13
Right horizontal stabilizer		100	40	34	36	25	19	17	15	10	10	9	8	
Tail pipe (6 in. inside)		100	85	75	65	60	32	32	20	18	16	11	11	
Left horizontal stabilizer		100	42	36	28	25	20	18	14	10	9	6	6	
Left side turbine		140	85	85	60	45	43	38	38	30	20	16	15	13
Left wing tip tank		60	34	30	24	18	16	16	14	7	7	6	6	
Left wing tip		70	50	38	32	26	21	19	18	10	9	6	6	
Left wing (leading edge)		160	110	90	80	75	70	46	31	31	25	22	20	18
Left inner landing gear door		90	60	46	44	38	32	31	24	21	15	13	12	
Dive brake		210	160	125	120	100	90	65	50	45	36	31	29	25

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading, gunk, Tide, and water; after fourth reading, natural decay; after fifth reading, gunk, Tide, and water; after sixth reading, natural decay; after seventh reading, natural decay and flown during period; after eighth and ninth readings, natural decay; after tenth reading, natural decay and flown during period; after eleventh reading, natural decay.

Table H.13 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT SIMON, 25 APRIL 1953, 1230 GMT, AIRCRAFT NO. 51-1054-A

	Loading	Contamination, mr/hr				
		First reading, 27 April, 1710 hr	Second reading, 27 April, 1810 hr	Third reading, 28 April, 1500 hr	Fourth reading, 28 April, 1635 hr	Fifth reading, 29 April, 1540 hr
Cockpit						
Air intake (6 in. inside)	800	17	15			
Right inner landing gear door		26	17	12		
Right wing (leading edge)		38	24	19	18	
Right wing tip		20	10	6		
Right wing tip tank		12	9	6		
Right side turbine		42	24	17	16	
Right horizontal stabilizer		25	10	9		
Tail pipe (6 in. inside)		29	16			
Left horizontal stabilizer		24	10	8		
Left side turbine		41	23	17	17	
Left wing tip tank		16	9	7		
Left wing tip		20	8	7		
Left wing (leading edge)		36	24	20	18	
Left inner landing gear door		26	16	12		
Dive brake		46	34	28	25	20

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay; after third reading; gunk, Tide, and water; after fourth reading, natural decay.

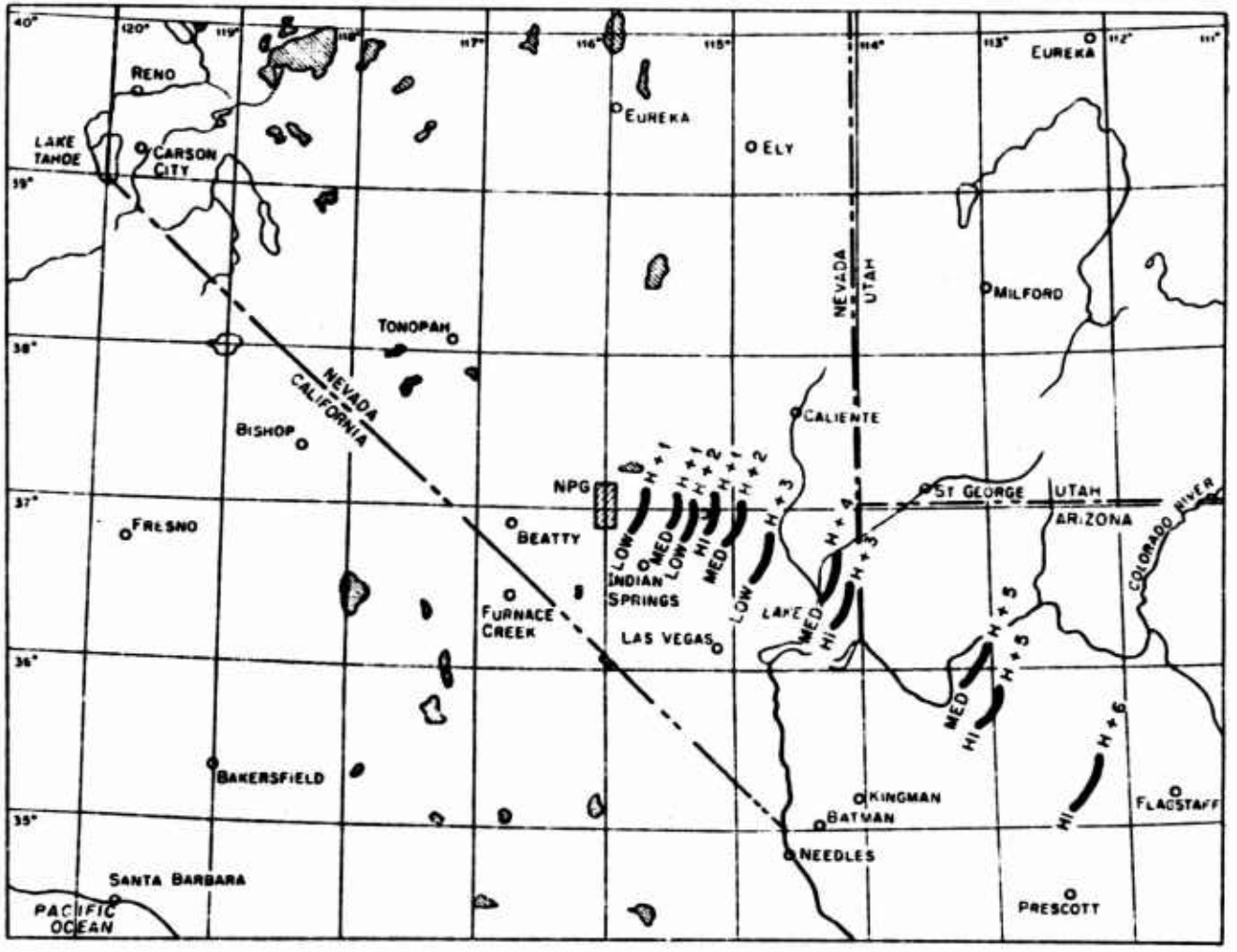

Fig. H.1 — Cloud track, Shot SIMON, 25 April 1953. Low, 12,000 ft MSL. Medium, 22,000 ft MSL. High, 40,000 ft MSL.

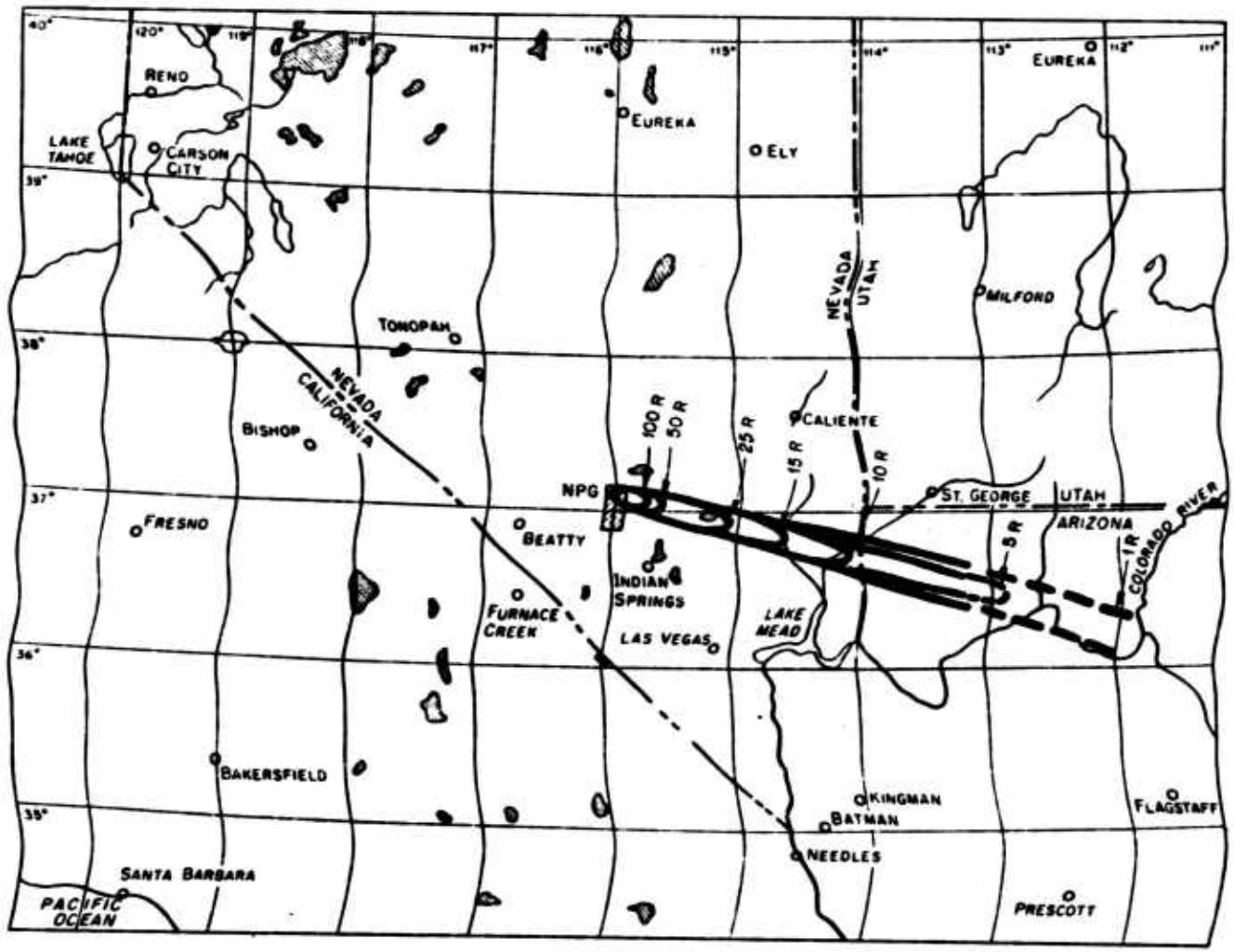

Fig. H.2 — Fall-out data plot, infinite dose, Shot SIMON, 25 April 1953.

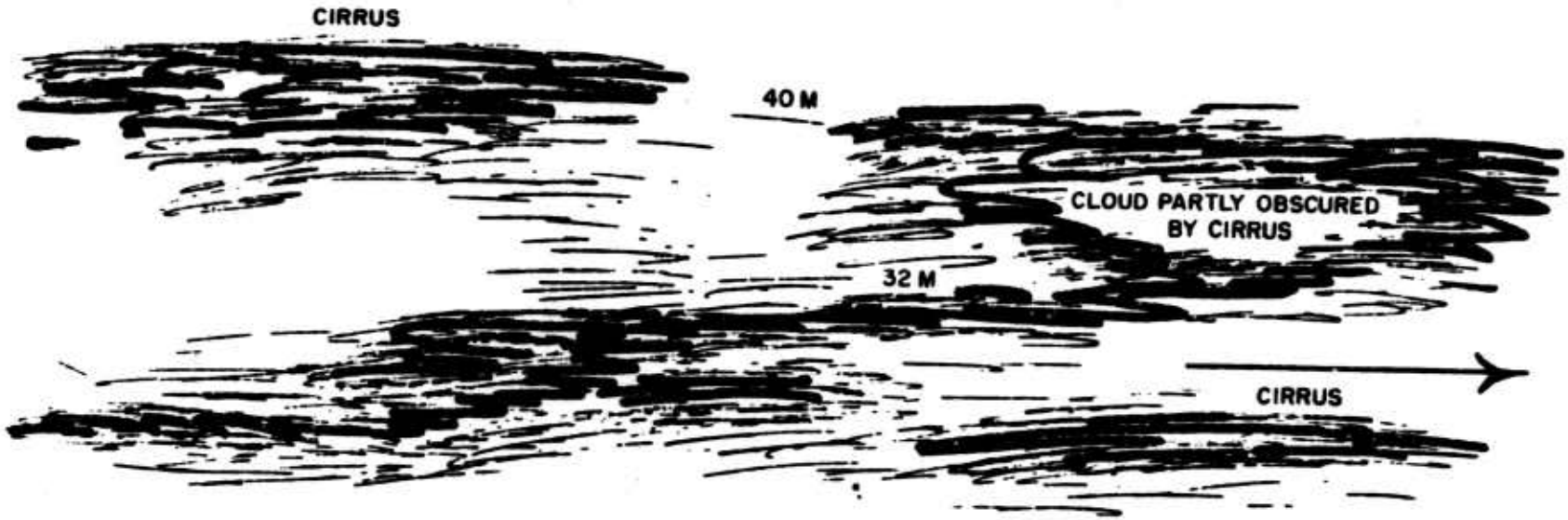

Fig. H.3—Shot Simon, 25 April 1953; time, H+

ANNEX I

EFFECTS SHOT SUMMARY

Final preparations for Effects shot were begun on 6 May 1953, with the weather briefing at 0830 PDST (1530 GMT). The weather was forecast to be 3/10 to 6/10 stratus at 16,000 to 20,000 ft and 3/10 to 6/10 cirrus at 30,000 ft. However, no decision was made at this time, and the 2200 PDST (0500 GMT) briefing was called on. Briefings were conducted at Kirtland Air Force Base, New Mexico, and Indian Springs Air Force Base, Nevada, for all participating aircrews at 1400 and 1500 hr, respectively. At the 2200 PDST (0500 GMT) weather briefing, the forecast was still 3/10 to 6/10 stratus at 16,000 to 20,000 ft and 3/10 to 6/10 cirrus at 30,000 ft, with winds generally from 220 to 230° at approximately 40 knots with a predicted heavy fall-out of radioactive particles over Salt Lake City, Utah. The shot was postponed for a 24-hr period.

On 7 May 1953, at the 2200 PDST (0500 GMT) weather briefing, the weather was forecast to be clear to thin scattered cirrus. Winds at bombing altitude were to be from 270° at approximately 75 knots, with the tropopause at 45,000 ft. The cloud was predicted to reach a height of only 40,000 ft due to the forecast high winds. The shot was scheduled to be detonated at 0830 PDST (1530 GMT) on 8 May 1953. The device was detonated at 1529:55.362 GMT on 8 May 1953, with a circular error of 837 ft south and 15 ft west. The burst height was 5555 ft MSL, 2420 ft above the terrain. The cloud reached a height of 40,500 ft, and the yield was approximately 26 kt.

The over-all air participation was very successful. The bomb carrier encountered some difficulty during the last 30 sec of the live run due to malfunction of the autopilot and a slipping bomb sight clutch. These are the main contributing factors for the large circular error received. However, the decision of the bombardier to complete the mission is considered a sound decision in that less information was lost than if he had called a negative in the last few seconds.

There were 80 test aircraft sorties flown. Participation was as follows:

No.	Type	Project	Code Name
1	B-50	Drop aircraft	Alley Cat
2	B-29	Free air blast pressure measurement	Pump Gun 1 and 2
2	QF-80	Drone	Brow Beat 2 and 3
4	DT-33	Director	Brow Beat 4, 6, 7, and 9
4	F-86	Fighters	Brow Beat 11, 12, 15, and 16
1	B-50	Project 4.1 canister phase	Wide Open
1	B-47	Project 4.1 canister phase	Polar Bear

No.	Type	Project	Code Name
3	B-29	Blast and thermal	Clay Pigeon 1, 2, and 3
1	B-36	Blast and thermal	Clay Pigeon 4
7	T-33	TAC	Leap Frog 1 through 7
4	HRS 2	Effect	Sand Blower
1	C-47	Observer	Observer
1	B-36	SAC IBDA	Back Bone weather
3	RF-80	TAC	Leap Frog 8, 9, and 10
1	B-50	Sampler controller	Skull Cap
9	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-19	Terrain survey	Fire Fly 3
1	H-18	Terrain survey	Fire Fly 2
2	L-20	Terrain survey	Ever Ready 4 and 5
1	C-45	Terrain survey	Ever Ready 3
1	C-47	Photo	Tin Type
3	B-29	IBDA	Dish Rag 1, 2, and 3
12	B-36	SAC IBDA	Back Bone
8	F-84	SAC IBDA	Back Bone
1	AD-2	Navy drone (manned)	Duck Bill Dog 2
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop

Free air blast pressure measurement aircraft (Project 1.3) were in position at H-hour, dropped 14 canisters, and received good information from each.

The drone phase (Project 4.1) aircraft had a small azimuth error and passed to one side of the cloud in their first attempted penetration. The first drone completed a 180° turn and penetrated the cloud 1 min 57 sec after the originally scheduled time, receiving excellent information on this penetration. They received a peak of better than 10,000 r/hr, which is considered better than planned for their original penetration because the rate of cloud rise was slower than had been predicted.

The canister drop phase (Project 4.1) B-50 dropped five canisters at the scheduled time, receiving excellent information from two of the five canisters. It was the opinion of the project people that three of the five canisters penetrated the cloud. However, telemetering information was received from only two of the canisters. Upon recovery of the canisters, film badge information that was received showed that the canisters received from 77 to 200 r/hr.

The canister drop B-47 (Project 4.1) was in position at the scheduled time but did not drop any canisters due to failure of operation of the bomb bay doors. It is believed the doors failed to open because of cold soaking.

The aircraft structural test (Project 5.1) received valuable information from this shot, although it was flown as a manned drone.

Blast and thermal aircraft (Projects 5.2 and 5.3) were in position at the scheduled time, and early indications are that they received sufficient information that further participation in this series of tests is not being considered.

The IBDA (Project 6.2) did not receive all the information available because two of the aircraft failed to turn on their cameras at the proper time. This was due to a misinterpretation, by the aircrews, of radio calls from the drop aircraft.

The aircraft flying missions for field test of IBDA (Project 6.3) were in position at the scheduled time and received excellent results.

The rapid aerial survey (Project 6.10) aircraft completed a successful mission.

The TAC aircraft (Project 6.11) were in position at H-hour and received excellent operational training data.

Immediately after H-hour, the H-19 completed a successful photo mission in the target area for the effects of an atomic explosion on trees and forest stands.

The Effects shot was to be a 31-kt airdrop to detonate at 1350 ft above the ground. A minimum number and quantity of samples were required since yield determination was the only radiochemical experiment planned.

Eight F-84's were flown to obtain eight particulate and three snap samples. Exposure to accomplish this was 0.13 r and in practically all cases was reached in one or two short penetrations.

Cloud tracking and terrain survey missions were completed successfully; however, these missions were not long due to light fall-out from the air burst. One of the cloud trackers aborted prior to H-hour because of the loss of No. 2 engine.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Eight, 1530 GMT, 8 May 1953

Cloud Cover: Clear
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 3078 ft MSL
Burst Height: 5501 ft MSL

Pressure:	Ground Zero	900 mb
	Burst height	825 mb
Virtual Temperature:	Ground Zero	17.0°C
	Burst height	8.3°C
Actual Temperature:	Ground Zero	16.7°C
	Burst height	8.0°C
Relative Humidity:	Ground Zero	19%
	Burst height	23%

Altimeter Setting: 29.81 in. at Ground Zero

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	190°	05 knots
5,000	230°	06 knots
6,000	270°	05 knots
8,000	320°	10 knots
10,000	260°	12 knots
15,000	260°	44 knots
20,000	250°	57 knots
22,000	250°	52 knots
25,000	250°	78 knots
30,000	240°	103 knots
35,000	240°	170 knots
40,000	240°	146 knots
45,000	Balloon out of range of wind equipment	
50,000	Balloon out of range of wind equipment	

Height of Tropopause: 39,000 ft MSL

Table I.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Alley Cat	Drop aircraft	KAFB	1015	1249	1530	1725	Began IFI at 1249; completed IFI at 1342.
B-29	Pump Gun 1	Canister drop	KAFB	1055	1333	1539	1742	Completed canister drop on time.
B-29	Pump Gun 2	Canister drop	KAFB	1145	1409	1536	1745	Completed canister drop on time.
QF-80	Brow Beat 3	Drone	ISAFB	1415	1440	1549	1604	Missed cloud on first pass; turned around and penetrated cloud on second pass and obtained excellent results.
DT-33	Brow Beat 7	Director	ISAFB	1415	1440	1549	1608	
DT-33	Brow Beat 9	Director	ISAFB	1417	1440	1549	1606	
F-86	Brow Beat 11	Fighter	ISAFB	1417	1440	1549	1606	
F-86	Brow Beat 12	Fighter	ISAFB	1417	1440	1549	1554	
QF-80	Brow Beat 2	Drone	ISAFB	1431	1455	1546	1614	
DT-33	Brow Beat 4	Director	ISAFB	1431	1455	1546	1618	
DT-33	Brow Beat 6	Director	ISAFB	1431	1455	1546	1620	
F-86	Brow Beat 13	Fighter	ISAFB	1433	1455	1546	1619	
F-86	Brow Beat 15	Fighter	ISAFB	1433	1455	1546	1619	
F-86	Brow Beat 14	Fighter	ISAFB	1433	1455	1546	1619	
B-50	Wide Open	Canister drop	KAFB	1120	1345	1535	1613	All canisters dropped as scheduled.
B-47	Polar Bear	Canister drop	KAFB	1359	1519	1540	1955	Bomb bay doors failed to open; therefore canisters were not released.
B-29	Clay Pigeon 1	Blast and thermal	KAFB	1025	1315	1539	1740	
B-29	Clay Pigeon 2	Blast and thermal	KAFB	1035	1257	1535	1725	
B-29	Clay Pigeon 3	Blast and thermal	KAFB	1045	1303	1535	1735	
B-36	Clay Pigeon 4	Blast and thermal	KAFB	1130	1349	1534	1745	
T-33	Leap Frog 1, 2, 3, and 4	TAC Proj. 6.11	George AFB	1425	1439	1538	Unknown	
T-33	Leap Frog 5, 6, and 7	TAC Proj. 6.11	George AFB	1426	1439	1538	Unknown	
HRS	Sand Blower A, B, C, and D	Effects	Desert Rock	1254	1530	1555	1615	
C-47	Observer	Observer	KAFB	1150	1430	1535	1830	
B-36	Back Bone bomber WX	SAC IBDA	Fairchild AFB	Unknown	1200	1405	Unknown	
RF-80	Leap Frog 8	Photo	George AFB	Unknown	1727	1742	Unknown	
RF-80	Leap Frog 9	Photo	George AFB	Unknown	1735	1802	Unknown	

Table I.1 — (Continued)

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
RF-80	Leap Frog 10	Photo	George AFB	Unknown	1746	1800	Unknown	
B-50	Skull Cap	Sampler controller	ISAFB	1512	1528	1950	2054	
F-84	Tiger Red 1	Sampler	ISAFB	1655	1717	1838	1908	
F-84	Tiger Red 2	Sampler	ISAFB	1719	1741	1844	1856	
F-84	Tiger Red 4	Sampler	ISAFB	1707	1728	1843	1852	
F-84	Tiger Red 5	Sampler	ISAFB	1737	1800	1942	1952	
F-84	Tiger White 1	Sampler	ISAFB	1734	1759	1912	1924	
F-84	Tiger White 2	Sampler	ISAFB	1759	1835	1945	1954	
F-84	Tiger White 3	Sampler	ISAFB	1742	1802	1942	1951	
F-84	Tiger Blue 3	Sampler	ISAFB	1523	1532	1648	1701	Snooper.
F-84	Tiger Blue 4	Sampler	ISAFB	1749	1810	1945	1954	
H-19	Fire Fly 3	Terrain survey	ISAFB	1230	1250	1903	1918	
H-18	Fire Fly 2	Terrain survey	ISAFB	1230	1250	1700	1740	
L-20	Ever Ready 4	Terrain survey	ISAFB	1705	1736	1805	1834	
C-45	Ever Ready 3	Terrain survey	ISAFB	1437	1458	1547	1558	
L-20	Ever Ready 5	Terrain survey	ISAFB	1235	1242	2021	2034	
C-47	Tin Type	Photo	ISAFB	1432	1445	1536	1545	
B-29	Dish Rag 1	IBDA	KAFB	1115	1345	1534	1750	
B-29	Dish Rag 2	IBDA	KAFB	1125	1351	1535	1740	
B-29	Dish Rag 3	IBDA	KAFB	1135	1357	1536	1745	
B-36	Back Bone bomber	SAC IBDA	Fairchild AFB	Unknown	1450	1538	Unknown	Twelve aircraft.
F-84	Back Bone fighter	SAC IBDA	George AFB	1346	1454	1540	1603	Eight aircraft.
AD2	Duck Bill Dog 2	Blast and thermal	ISAFB	1415	1424	1534	1542	
B-29	Cook Book 1	Cloud tracker	KAFB	1200	1433	1652	1925	
B-29	Cook Book 2	Cloud tracker	KAFB	1210			1420	Aborted; No. 2 engine feathered.
B-25	Cook Book 3	Cloud tracker	ISAFB	1547	1559	1812	1826	
C-47	Rag Mop	Terrain survey	ISAFB	1824	1839	2226	2247	

Table I.2 — MANNED SAMPLING DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 028, Tiger Red 1,	1	1722	5	0	0.15	0	0	37	No
	2	1750	4	5	0.25	0	0.15	38	No
F-84, 032, Tiger Red 2,	1	1755	10	130	0.2	0	5.8	38	No
F-84, 049, Tiger Red 4,	1	1745	3.5	72	0.1	0	1.0	40.5	Yes
	2	1753	10.0	50	0.18	0	2.4	41.5	No
F-84, 030, Tiger Red 5,	1	1830	12	70	0.15	0	2.1	40	Yes
	2	1835	6	35			5.0	39	Yes
	3	1839	8	72	0.35	0.05	7.5	39.5	Yes
F-84, 042, Tiger White 1,	1	1825	0.6	180	0.2	0.08	4.0	40.3	Yes
F-84, 043, Tiger White 2,	1	1843	2.2	220	0.12	0	4.2	40.8	No
	2	1849	2.5	70	0.16	0	9.4	41.3	No
F-84, 045, Tiger White 3,	1	1824	4.0	960	0.15	0.06	4.1	31	No
F-84, 046, Tiger Blue 1,	1	1827	0.5	38	0	0	0	31	No
	2	1838	3.0	360	0.15	0	5.0	31.5	No

Table I.3—RADIATION RECEIVED BY PERSONNEL ON SHOT EFFECTS, 8 MAY 1953, 1530 GMT

Name	Position	Reading, mr
	Pilot	190
	Pilot	190
	Pilot	210
	Pilot	315
	Pilot	190
	Pilot	225
	Pilot	210
	Pilot	190

Table I.4—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1028-A

	Contamination, mr/hr (reading taken 9 May, 1410 hr)
Cockpit	
Air intake (6 in. inside)	4
Right inner landing gear door	7
Right wing (leading edge)	9
Right wing tip	5
Right wing tip tank	4
Right side turbine	9
Right horizontal stabilizer	5
Tail pipe (6 in. inside)	8
Left horizontal stabilizer	4
Left side turbine	9
Left wing tip tank	4
Left wing tip	4
Left wing (leading edge)	10
Left inner landing gear door	8
Dive brake	11

Table I.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1030-A

	Contamination, mr/hr			
	Loading	First reading, 9 May, 1650 hr,	Second reading, 9 May, 1745 hr	Third reading, 11 May, 1400 hr
Cockpit				
Air intake (6 in. inside)	110	12	9	4
Right inner landing gear door		20	13	4
Right wing (leading edge)		30	19	6
Right wing tip		11	6	1
Right wing tip tank		10	4	1
Right side turbine		37	28	10
Right horizontal stabilizer		22	9	3
Tail pipe (6 in. inside)		28	18	8
Left horizontal stabilizer		20	9	4
Left side turbine		36	28	10
Left wing tip tank		9	4	1
Left wing tip		14	6	2
Left wing (leading edge)		29	18	5
Left inner landing gear door		24	15	5
Dive brake		42	30	10

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table I.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1032-A

	Contamination, mr/hr	
	Loading	9 May, 1407 hr
Cockpit		
Air intake (6 in. inside)	48	5
Right inner landing gear door		6
Right wing (leading edge)		10
Right wing tip		5
Right wing tip tank		2
Right side turbine		12
Right horizontal stabilizer		7
Tail pipe (6 in. inside)		8
Left horizontal stabilizer		7
Left side turbine		12
Left wing tip tank		3
Left wing tip		5
Left wing (leading edge)		12
Left inner landing gear door		8
Dive brake		14

Table I.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1042-A

	Contamination, mr/hr		
	Loading	First reading, 9 May, 1415 hr	Second reading, 9 May, 1700 hr
Cockpit			
Air intake (6 in. inside)	70	8	6
Right inner landing gear door		12	9
Right wing (leading edge)		18	12
Right wing tip		8	6
Right wing tip tank		6	4
Right side turbine		35	22
Right horizontal stabilizer		15	6
Tail pipe (6 in. inside)		32	17
Left horizontal stabilizer		15	7
Left side turbine		33	22
Left wing tip tank		4	4
Left wing tip		8	5
Left wing (leading edge)		19	13
Left inner landing gear door		15	11
Dive brake		28	19

Note: Decontamination used after first reading, gunk, Tide, and water.

Table I.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1043-A

	Contamination, mr/hr	
	Loading	11 May, 1350 hr
Cockpit		
Air intake (6 in. inside)	100	4
Right inner landing gear door		6
Right wing (leading edge)		9
Right wing tip		3
Right wing tip tank		2
Right side turbine		14
Right horizontal stabilizer		8
Tail pipe (6 in. inside)		11
Left horizontal stabilizer		7
Left side turbine		14
Left wing tip tank		2
Left wing tip		2
Left wing (leading edge)		9
Left inner landing gear door		6
Dive brake		10

Table I.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1045-A

	Contamination, mr/hr			
	Loading	First reading, 9 May, 1640 hr	Second reading, 9 May, 1752 hr	Third reading, 11 May, 1355 hr
Cockpit				
Air intake (6 in. inside)	50	14	12	8
Right inner landing gear door		18	14	9
Right wing (leading edge)		26	22	16
Right wing tip		8	6	4
Right wing tip tank		8	6	4
Right side turbine		24	21	12
Right horizontal stabilizer		14	7	5
Tail pipe (6 in. inside)		20	14	10
Left horizontal stabilizer		13	7	5
Left side turbine		25	20	12
Left wing tip tank		11	7	5
Left wing tip		12	9	6
Left wing (leading edge)		27	23	16
Left inner landing gear door		20	15	10
Dive brake		36	29	21

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table I.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1046-A

	Contamination, mr/hr	
	Loading	11 May, 1353 hr
Cockpit		
Air intake (6 in. inside)	80	2
Right inner landing gear door		4
Right wing (leading edge)		6
Right wing tip		2
Right wing tip tank		1
Right side turbine		10
Right horizontal stabilizer		4
Tail pipe (6 in. inside)		6
Left horizontal stabilizer		5
Left side turbine		10
Left wing tip tank		1
Left wing tip		2
Left wing (leading edge)		6
Left inner landing gear door		6
Dive brake		8

Table I.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1049-A

	Contamination, mr/hr	
	Loading	9 May, 1405 hr
Cockpit		
Air intake (6 in. inside)	30	8
Right inner landing gear door		10
Right wing (leading edge)		16
Right wing tip		6
Right wing tip tank		6
Right side turbine		14
Right horizontal stabilizer		8
Tail pipe (6 in. inside)		11
Left horizontal stabilizer		9
Left side turbine		15
Left wing tip tank		6
Left wing tip		7
Left wing (leading edge)		16
Left inner landing gear door		11
Dive brake		18

Table I.12 — F-80 AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 58698

	Contamination, mr/hr (reading taken 11 May, 1450 hr)
Dive brake	
Right air intake (6 in. inside)	3
Right wing (leading edge)	1
Right wing tip	1
Right wing tip tank	1
Right side turbine	3
Right horizontal stabilizer	2
Tail pipe (6 in. inside)	2
Left horizontal stabilizer	2
Left side turbine	3
Left wing tip tank	1
Left wing tip	1
Left wing (leading edge)	2
Left air intake	3
Nose	1

Table I.13 — F-80 AIRCRAFT CONTAMINATION DATA FOR SHOT EFFECTS, 8 MAY 1953, 1530 GMT, AIRCRAFT NO. 58644

	Contamination, mr/hr (reading taken 11 May, 1505 hr)
Dive brake	
Right air intake (6 in. inside)	10
Right wing (leading edge)	6
Right wing tip	5
Right wing tip tank	2
Right side turbine	12
Right horizontal stabilizer	6
Tail pipe (6 in. inside)	4
Left horizontal stabilizer	6
Left side turbine	10
Left wing tip tank	2
Left wing tip	4
Left wing (leading edge)	6
Left air intake	10
Nose	1

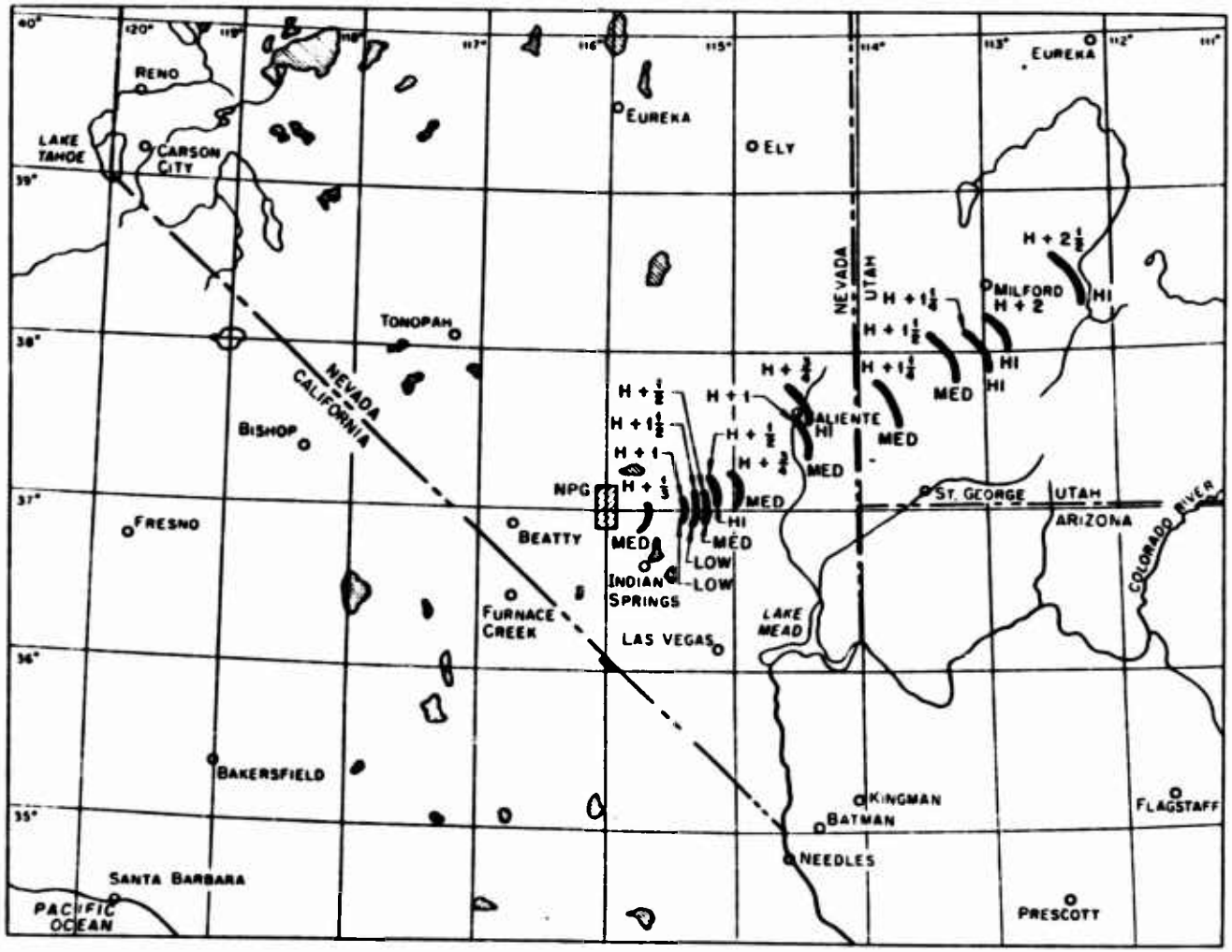

Fig. I.1 — Cloud track, Shot Effects, 8 May 1953. Low, 12,000 ft MSL. Medium, 22,000 ft MSL. High, 40,000 ft MSL.

Fig. L2—Shot Effects, 8 May 1953; time, H+2 hr 30 min.

ANNEX J

HARRY SHOT SUMMARY

The original scheduled date of 2 May 1953 was changed to 16 May 1953 immediately following the SIMON shot due to the amount of fall-out in the T-3a area.

At the Test Manager's 0830 briefing on 15 May, the shot was indefinitely delayed due to wind conditions which would have taken the cloud directly over Las Vegas, Nevada. On 16 May at 0830 it was determined that they would wait until 1430 for later weather information before delaying or scheduling the shot. The mission was again delayed at the 1430 briefing with a 1430 briefing on 17 May being scheduled. Once again it was determined that they would wait for later weather information, and a meeting was scheduled for 2200 with possibilities of a wind shift enabling a detonation on 18 May. At 2245, following this briefing, the shot was once again postponed for a 24-hr period with a scheduled weather briefing for 1430 on 18 May. The shot was tentatively called on at this 1430 briefing on the 18th with the final decision to be made at the 2200 meeting that evening. At 2245 the shot was scheduled for detonation at 0505 PDT (1205 GMT) on 19 May 1953. The weather was forecast to be 5/10 to 6/10 high cirrus from 26,000 to 30,000 ft with winds from 300° at from 40 to 70 knots. Based on the weather forecast, the Air Operations Officer informed the Test Manager that samples could not be guaranteed. The weather at sho. time was overcast at 35,000 ft MSL with winds at 10,000 ft from 210° at 18 knots and at 40,000 ft from 300° at 67 knots.

The shot was detonated at the scheduled H-hour, 0505 PDT, and the approximate yield was 32 kt.

Approximately 15 to 20 min prior to H-hour, the Project 5.1 Navy drone unit encountered difficulty in controlling their drone. The aircraft was headed straight and level for the Los Angeles area and, because of some outside frequency interference, would not respond to control signals from the ground station or the airborne mother aircraft. After several minutes of this, the frequency interference stopped and the drone again responded to control signals. The drone was brought back into orbit and placed into desired position by H-hour. A successful landing was made at Indian Springs Air Force Base. The mission was successful.

All scheduled participating aircraft were in their orbit and assigned position at H-hour. The F-84 cloud snooper reported the top of the cloud at 44,200 ft with the base at 29,000 ft.

Project 6.2 (Indirect Bomb Damage Assessment) aircraft were in position and obtained desired information for the operation.

Project 6.3 (SAC Indirect Bomb Damage Assessment) aircraft, 12 B-50's from Walker Air Force Base, were in assigned position at detonation time.

The DWET photo aircraft was also in position as assigned.

It was important that good samples be taken. An exposure of 0.8 r was calculated as necessary to obtain the samples. Ten F-84's and two B-29's were scheduled for the mission.

The first F-84 took off, climbing to the south of the cloud area, and topped the cirrus at 44,000 ft. The only part of the atomic cloud that could be seen at this altitude was a dark smudge on the top of the overcast.

Passes were made in this area. This was the only sample taken from the main part of the cloud. Five other samples were taken from a thin part of the cloud that was below the overcast, but these were of low quantity.

Four aircraft made no contact at all with the atomic cloud, and two did not take off. The sampling operation for this shot was greatly hampered due to the massive vapor cloud that completely obscured the atomic cloud. The cloud cover at shot time consisted of a thin cirrus layer at 39,000 ft MSL. At H + 20 min a layer of clouds began forming between 29,000 and 32,000 ft MSL. By H + 1 hr 20 min this vapor bank had formed around the atomic cloud, extending out for 50 to 75 miles and was solid from 28,000 to 43,000 ft MSL. Sufficient samples were obtained to do only the primary experiments.

There were 49 test aircraft sorties.

Participating aircraft are as follows:

No.	Type	Project	Code Name
1	B-50	Sampler controller	Skull Cap
10	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-18	Terrain survey	Fire Fly 2
1	C-45	Terrain survey	Ever Ready 3
1	L-20	Terrain survey	Ever Ready 4
1	C-47	Photo	Tin Type
3	B-29	IBDA	Dish Rag 1, 2, and 3
11	B-50	SAC IBDA	Back Bone
1	XBT2D	Drone	Duck Bill Dog 2
3	F8F	Mother aircraft	Duck Bill 1, 2, and 3
3	AD4	Fighters	Duck Bill 6, 7, and 8
2	B-29	Samplers	Cat Nip 1 and 2
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop
2	HRS	Effects	Sand Blower A and B
1	HRS	Army liaison	Cattle Car
1	C-47	Observer	Observer
1	C-47	Terrain survey	Rag Mop (20 May 1953)

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Nine, 1205 GMT, 19 May 1953

Cloud Cover: Scattered 18,000 ft; overcast 35,000 ft
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4009 ft MSL
Burst height: 4309 ft MSL

Pressure:	Ground Zero	874 mb
	Burst height	864 mb
Virtual Temperature:	Ground Zero	14.9°C
	Burst height	18.9°C
Actual Temperature:	Ground Zero	14.3°C
	Burst height	18.3°C
Relative Humidity:	Ground Zero	35%
	Burst height	35%
Altimeter Setting:	29.89 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	020°	05 knots
6,000	200°	20 knots
8,000	200°	26 knots
10,000	210°	18 knots
15,000	230°	21 knots
20,000	280°	38 knots
25,000	280°	54 knots
30,000	290°	60 knots
35,000	290°	63 knots
40,000	300°	67 knots

Height of Tropopause: 40,500 ft MSL

Table J.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Skull Cap	Sampler controller	ISAFB	1159	1210	1747	1808	Managed samplers very well considering cloud coverage. Rosie was mixed in with deck of cirrus.
F-84	Tiger Red 1	Sampler	ISAFB	1409	1425	1530	1552	No contact made with cloud.
F-84	Tiger Red 2	Sampler	ISAFB	1410	1427	1530	1552	No contact made with cloud.
F-84	Tiger Red 3	Sampler	ISAFB	1452	1507	1610	1637	Made three fairly successful passes.
F-84	Tiger Red 4	Sampler	ISAFB	1652	1654	1735	1801	No contact made with cloud.
F-84	Tiger White 1	Sampler	ISAFB	1649	1652	1735	1805	No contact made with cloud.
F-84	Tiger White 2	Sampler	ISAFB					Aborted.
F-84	Tiger White 3	Sampler	ISAFB	1504	1510	1630	1655	Obtained most successful samples of mission.
F-84	Tiger White 4	Sampler	ISAFB	1145	1158	1450	1505	Canceled.
F-84	Tiger Blue 1	Sampler	ISAFB	1155	1207	1243	1252	Snooper.
XBT2D	Duck Bill Dog 2	Proj. 5.1	ISAFB	1100	1120	1212	1225	Very successful mission. Approximately 1 sec late, but excellent information was obtained.
F8F	Duck Bill 1	Proj. 5.1	ISAFB	1031	1120	1212	1232	
F8F	Duck Bill 2	Proj. 5.1	ISAFB	1032	1120	1212	1232	
AD4	Duck Bill 6	Proj. 5.1	ISAFB	1034	1120	1212	1232	
AD4	Duck Bill 7	Proj. 5.1	ISAFB	1034	1120	1212	1233	
AD4	Duck Bill 8	Proj. 5.1	ISAFB	1033	1120	1212	1233	
F8F	Duck Bill 3	Proj. 5.1	ISAFB	1149	1200	1212	1235	
B-29	Cat Nip 1	Sampler	ISAFB	1519	1530	1735	1743	Both Cat Nips obtained fairly good samples.
B-29	Cat Nip 2	Sampler	ISAFB	1524	1540	1735	1801	
B-29	Cook Book 1	Cloud tracking	KAFB	0845	1117	1414	1730	No. 3 engine feathered; returned to home base.
B-29	Cook Book 2	Cloud tracking	KAFB	0855	1117	1420	1735	Completed satisfactory mission.
F-84	Tiger Blue 2	Sampler	ISAFB	1654	1656	1747	1832	Obtained fair sample on one pass.
F-84	Tiger Blue 3	Sampler	ISAFB	1257	1310	1405	1414	Obtained fair sample on one pass.
F-84	Tiger Blue 5	Sampler	ISAFB					Aborted.

Table J.1 — (Continued)

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
H-18	Fire Fly 2	Terrain survey	Helo pad	1355 1214			1320	Returned to Indian Springs at 1611.
C-47	Tin Type	Photo	ISAFB	1107	1123	1205	1220	
C-45	Ever Ready 3	Terrain survey	ISAFB	1241	1255			Made survey of area surrounding St. George, Utah.
L-20	Ever Ready 4	Terrain survey	ISAFB	1505	1520	1658	1712	
B-29	Dish Rag 1	IBDA	KAFB	0730	1005	1211	1420	All Dish Rag aircraft were in good position and obtained desired information.
B-29	Dish Rag 2	IBDA	KAFB	0740	1015	1211	1410	
B-29	Dish Rag 3	IBDA	KAFB	0750	1025	1211	1430	
B-50	Back Bone	6.3 IBDA	Walker AFB	Unknown	1130	1207	Unknown	12 aircraft. In briefed position at H-hour.
B-50	Back Bone	6.3 IBDA	Walker AFB	Unknown	0950	1207	Unknown	Snooper aircraft.
B-25	Cook Book 3	Cloud tracker	ISAFB	1218	1225	1552	1608	Completed satisfactory mission.
C-47	Rag Mop	Terrain survey	ISAFB	1605	1615	1900	1925	Satisfactory mission.
HRS	Sand Blower	Effects	Desert Rock	1152	1206	1500	1515	4 aircraft. Marine participation. Very successful.
HRS	Cattle Car	Army liaison	Desert Rock	1430	1455	1625	1640	Successful mission.
C-47	Observer	Observer	KAFB	0810	1115	1222	1250	Landed at Nellis AFB for refueling before returning to KAFB.
					20 May 1953			
C-47	Rag Mop	Terrain survey	ISAFB	1507	1515	1630	1645	Successful mission.

Table J.2—MANNED SAMPLING DATA FOR SHOT HARRY, 19 May 1953, 1205 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1037, Tiger Red 3,	1	1637	0.1				0.8	23	No
	2	1652						21.5	No
	3	1722						21	No
F-84, 1045, Tiger White 3,	1	1637	0.15	45	0.1	0	0	23	No
	2	1652	0.3	50	0.1	0	0.25	21.5	No
	3	1722	0.5	180	0.1		Inop.	21	Yes
F-84, 1054, Tiger Blue 2,	1	1825	0	0	0.39		0.02	35	NR
F-84, 1055, Tiger Blue 3,	1	1437	20		0.6	1	10	43	Yes

Table J.3—RADIATION RECEIVED BY PERSONNEL ON SHOT HARRY, 19 MAY 1953, 1205 GMT

Name	Position	Reading, mr
	Pilot	96
	Pilot	30
	Pilot	430
	Pilot	80
	Pilot	25

Table J.2—MANNED SAMPLING DATA FOR SHOT HARRY, 19 May 1953, 1205 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 1037, Tiger Red 3,	1	1637	0.1				0.8	23	No
	2	1652						21.5	No
	3	1722						21	No
F-84, 1045, Tiger White 3,	1	1637	0.15	45	0.1	0	0	23	No
	2	1652	0.3	50	0.1	0	0.25	21.5	No
	3	1722	0.5	180	0.1		Inop.	21	Yes
F-84, 1054, Tiger Blue 2,	1	1625	0	0	0.39		0.02	35	NR
F-84, 1055, Tiger Blue 3,	1	1437	20		0.6	1	10	43	Yes

Table J.3—RADIATION RECEIVED BY PERSONNEL ON SHOT HARRY, 19 MAY 1953, 1205 GMT

Name	Position	Reading, mr
	Pilot	95
	Pilot	30
	Pilot	430
	Pilot	80
	Pilot	25

Table J.4 — B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT, AIRCRAFT NO. 427324

	Loading	Contamination, mr/hr	
		First reading, 20 May, 1420 hr	Second reading, 20 May, 1940 hr
Nose		3	2
Air intake engine 3		23	16
Left turboengine 3		30	21
Right turboengine 3		26	21
Air intake engine 4		32	20
Left turboengine 4		26	16
Right turboengine 4		26	16
Right wing (leading edge)		14	11
Right scanner blister		3	
Right horizontal stabilizer		3	
Left horizontal stabilizer		2	
Left scanner blister		2	
Left wing (leading edge)		16	11
Air intake engine 1		28	22
Left turboengine 1		26	16
Right turboengine 1		20	16
Air intake engine 2		30	21
Left turboengine 2		32	20
Right turboengine 2	100	30	19
Filter box, left wing		6	4
Left wheel well door		14	8
Antenna			
Radar radome		6	4
Pitot		3	2
A-1 filter box			
Right wheel well door		12	8
Filter box, right wing		6	4
Cockpit			

Note: Decontamination used after first reading, gunk, Tide, and water.

Table J.5 — B-29 AIRCRAFT CONTAMINATION DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT, AIRCRAFT NO. 486397

	Leading	Contamination, mr/hr			
		First reading, 20 May, 1400 hr	Second reading, 20 May, 1640 hr	Third reading, 20 May, 2200 hr	Fourth reading, 21 May, 1420 hr
Nose		6	4		
Air intake engine 3		90	33	20	14
Left turboengine 3		120	34	32	16
Right turboengine 3		90	26	26	14
Air intake engine 4		130	49	38	23
Left turboengine 4		95	29	36	14
Right turboengine 4		155	23	70	12
Right wing (leading edge)		50	38	27	20
Right scanner blister		2			
Right horizontal stabilizer		6	4		
Left horizontal stabilizer		6	4		
Left scanner blister		2			
Left wing (leading edge)		60	36	25	18
Air intake engine 1		120	35	28	20
Left turboengine 1		100	34	44	17
Right turboengine 1		110	33	38	18
Air intake engine 2	300	110	27	22	14
Left turboengine 2		125	44	37	21
Right turboengine 2		140	43	35	24
Filter box, left wing		14	9		
Left wheel well door		28	18	14	10
Antenna					
Radar radome		15	10		
Pitot		6	4		
A-1 filter box					
Right wheel well door		24	15	11	8
Filter box, right wing		14	9		
Cockpit					

Note: Decontamination used after first and second readings, gunk, Tide, and water; after third reading, natural decay and water on cowlings.

Table J.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT, AIRCRAFT NO. 51-1037-A

	Contamination, mr/hr	
	Loading	20 May, 1700 hr
Cockpit		
Air intake (6 in. inside)	24	6
Right inner landing gear door		6
Right wing (leading edge)		10
Right wing tip		6
Right wing tip tank		4
Right side turbine		9
Right horizontal stabilizer		5
Tail pipe (6 in. inside)		8
Left horizontal stabilizer		5
Left side turbine		9
Left wing tip tank		4
Left wing tip		5
Left wing (leading edge)		10
Left inner landing gear door		6
Dive brake		11

Table J.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT, AIRCRAFT NO. 51-1045-A

	Contamination, mr/hr			
	Loading	First reading, 20 May, 1702 hr	Second reading, 20 May, 2305 hr	Third reading, 21 May, 1410 hr
Cockpit				
Air intake (6 in. inside)	115	16	12	10
Right inner landing gear door		19	13	10
Right wing (leading edge)		31	23	18
Right wing tip		11	8	6
Right wing tip tank		10	7	6
Right side turbine		25	16	14
Right horizontal stabilizer		16	10	8
Tail pipe (6 in. inside)		18	14	12
Left horizontal stabilizer		16	10	8
Left side turbine		26	17	14
Left wing tip tank		12	8	7
Left wing tip		14	9	8
Left wing (leading edge)		32	23	19
Left inner landing gear door		20	14	12
Dive brake		38	28	22

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table J.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT HARRY, 19 MAY 1953, 1205 GMT, AIRCRAFT NO. 51-1055-A

	Contamination, mr/hr	
	Loading	20 May, 1655 hr
Cockpit		
Air intake (6 in. inside)	30	2
Right inner landing gear door		4
Right wing (leading edge)		6
Right wing tip		3
Right wing tip tank		2
Right side turbine		6
Right horizontal stabilizer		4
Tail pipe (6 in. inside)		5
Left horizontal stabilizer		4
Left side turbine		6
Left wing tip tank		2
Left wing tip		2
Left wing (leading edge)		6
Left inner landing gear door		6
Dive brake		6

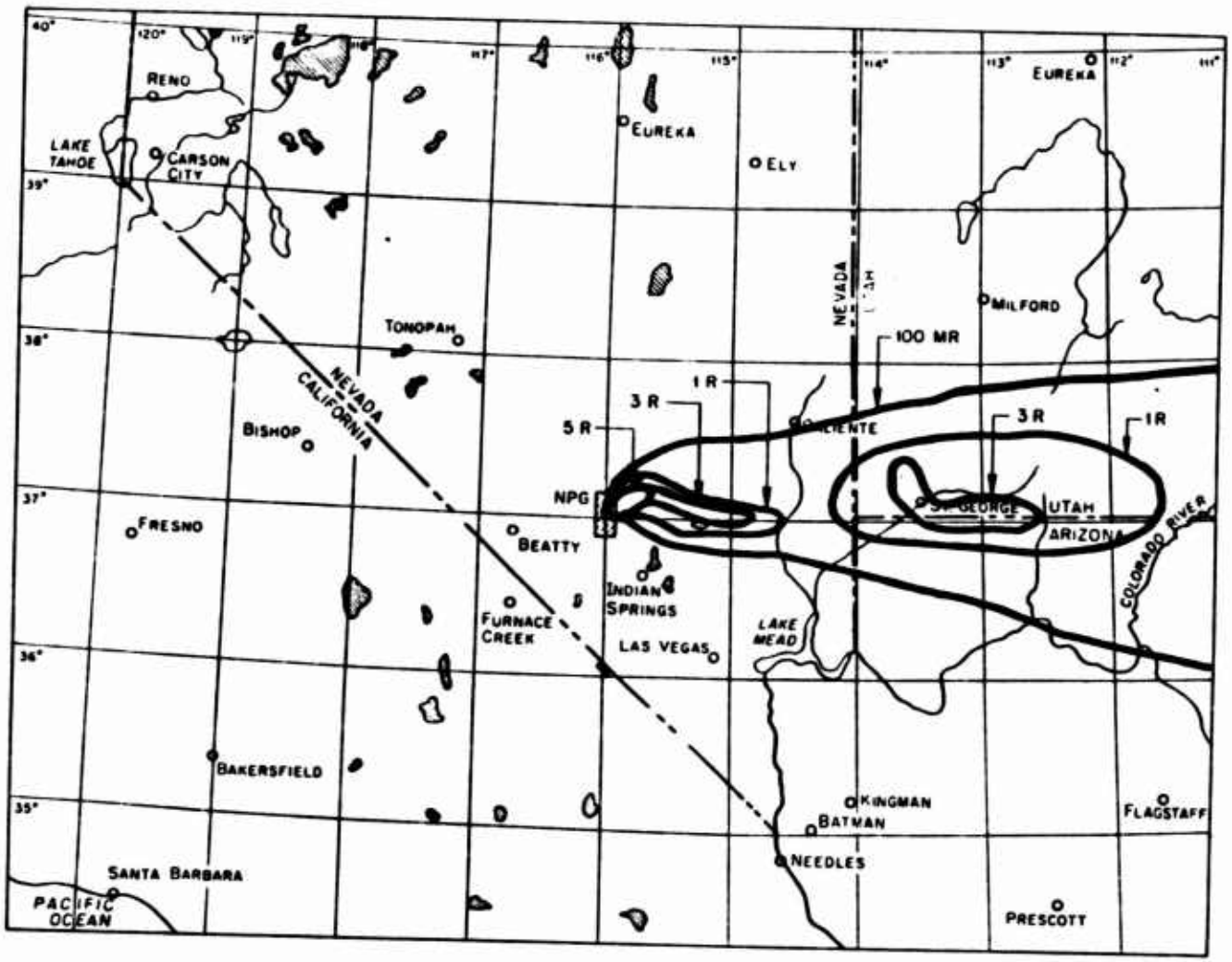

Fig. J.1 — Fall-out pattern, infinite dose, Shot [redacted], 19 May 1953.

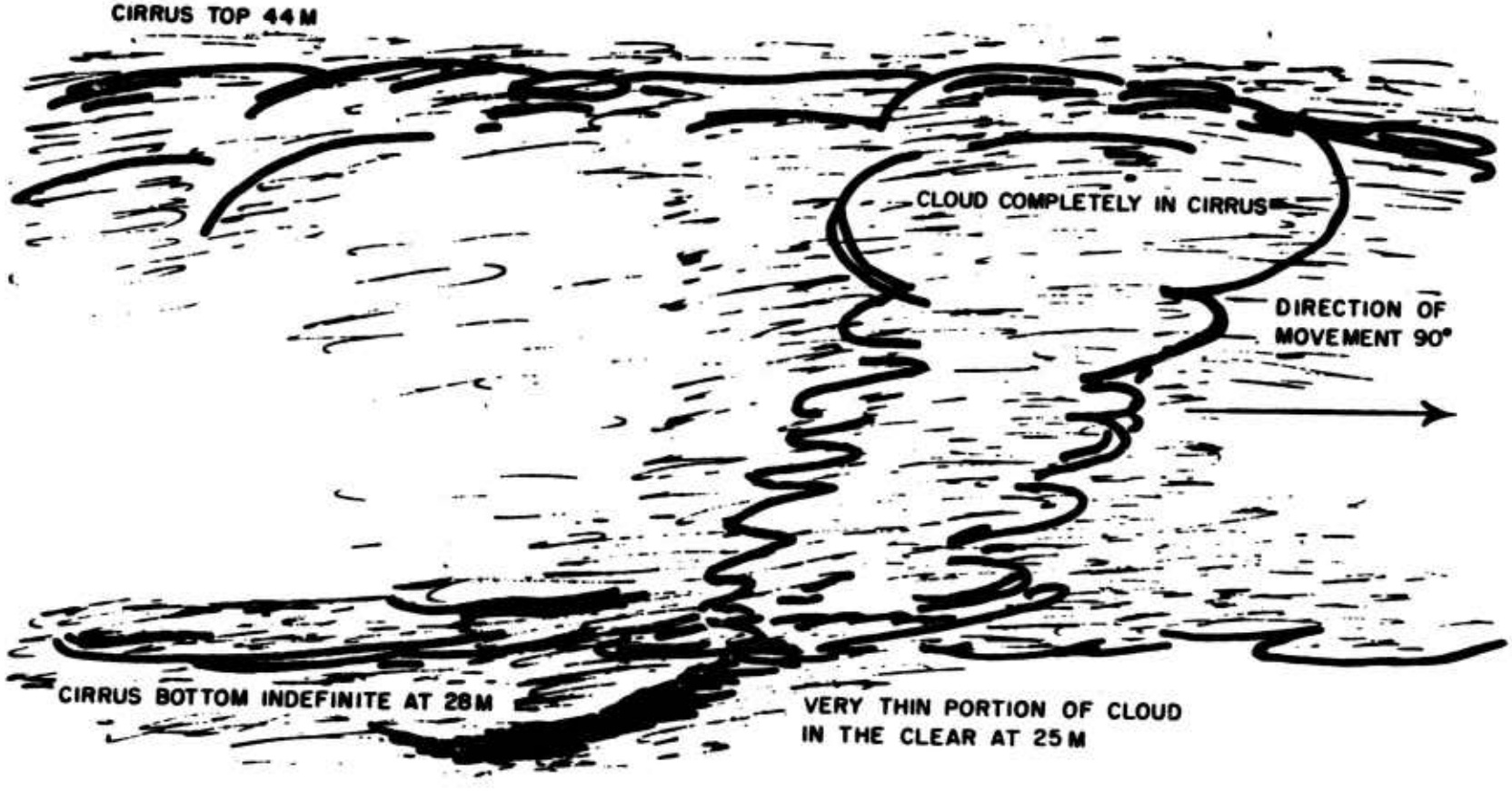

Fig. J.2—Shot [redacted], 19 May 1953; time, H+1 hr.

ANNEX K

GUN SHOT SUMMARY

The plans for the tenth shot of the Upshot-Knothole series were finalized on 24 May 1953, commencing with aircrew briefings at Indian Springs Air Force Base and Kirtland Air Force Base and the Test Manager's briefing at 1430 at the Control Point. The weather forecast for shot day, 25 May 1953, was very satisfactory with winds from the southwest and velocities up to 130 knots with clear skies.

The shot was definitely scheduled, following the Test Manager's advisory panel meeting at 2200 hr, with H-hour scheduled for 0830 PDT (1530 GMT).

The test was to be the first atomic shell to be fired from a gun. The shell was fired from a distance approximately 7 miles from Ground Zero at a burst altitude of 500 ft over Ground Zero located on Frenchman Flat. The weather at shot time was an overcast-to-broken condition in the vicinity of the Nevada Proving Grounds. These clouds were formed by a jet stream, with the base being at 34,000 ft and top at 35,000 ft. The winds were from 230° at varying velocity from 33 knots at 10,000 ft to 130 knots at 35,000 ft MSL.

The weapon was detonated at 0830:00.332 with a fireball yield of 15 kt. The circular error for the shot was 164 ft ± 15 ft, with a burst height of 524 ft ± 10 ft. The actual time of flight of the weapon was 18.65 sec.

Weather conditions prevented several of the test aircraft from participating. Surface winds at Indian Springs Air Force Base were from the south and southwest varying from 15 to 22 knots. This canceled the Project 4.1 drone participation due to the required take-off and landing direction being to the northwest, and with these ground winds the operation became too dangerous. The Project 4.1 canister drop aircraft, B-50, which was to release the canisters from 35,000 ft, was canceled due to cloud coverage and was requested to make wind runs and weather reports to the southwest, upstream in the jet stream. These reports indicated that the clouds were thinning out quite rapidly at a distance of 65 nautical miles from Frenchman Flat. At 0655, Polar Bear, B-47 Project 4.1 canister drop aircraft, was canceled due to the cloud coverage. This meant that Project 4.1 did not have any aircraft participating in this shot.

Project 5.1, Navy drone, canceled participation in this shot immediately following the shot because they had obtained all necessary data to complete their assigned project.

Project 6.2, Indirect Bomb Damage Assessment, had all three aircraft in briefed positions at H-hour.

Owing to a misunderstanding of the scheduled H-hour, 10 SAC IBDA B-36 aircraft, Project 6.3, were approximately 20 min short of their scheduled position at burst time. No radio contact was made with eight F-84 (Project 6.3) jet fighters, also scheduled to participate in this shot for this project.

The cloud cover existing at shot time was expected to cause considerable difficulty to the sampling operation. The Test Manager was informed that adequate samples could not be guar-

anteed because it was felt that a vapor cloud would form around the atomic cloud and thus bury it. This prediction proved correct. The sampling operation was confined to the lower portion of the stem since the main cloud was hidden by the vapor cloud from 28,000 to 35,000 ft MSL.

After H-hour and as the cloud drifted to the northeast, the amount of cloud cover increased and became thicker.

The sampling requirement was to fly eight F-84 samplers to obtain a fraction of 5×10^{-10} for an exposure of 0.15 r. After detonation and when the cloud had stabilized, the airborne control aircraft, Skull Cap, climbed through the overcast to determine if the cloud protruded through the cirrus deck. Nothing could be seen, and it was decided that samples would be taken from the part of the cloud which was below the cirrus deck. The overcast was an indefinite ceiling of 24,000 to 28,000 ft. Approximately $\frac{1}{8}$ of the atomic cloud was not obscured by the cirrus, and this is the part from which samples were taken. As sampling proceeded, it became more and more difficult to make contact with the atomic cloud as the vapor clouds increased and lowered. Finally, at H + 2 hr 32 min, sampling was suspended because of the distance from Indian Springs Air Force Base (300 nautical miles). The last F-84 was the only one that did not obtain a sample. Two other F-84's took samples that were below minimum requirements.

The terrain survey aircraft flew a 2-hr mission, finding only a medium amount of fallout. The cloud trackers flew a successful mission but encountered some difficulty both from high winds and clouds. The B-29 trackers operated on this mission for approximately 5 hr to complete their mission.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Ten, 1530 GMT, 25 May 1953

Cloud Cover: Scattered at 26,000 ft
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 3078 ft MSL
Burst Height: 3602 ft MSL

Pressure:	Ground Zero	901 mb
	Burst height	884 mb
Virtual Temperature:	Ground Zero	15.4°C
	Burst height	13.6°C
Actual Temperature:	Ground Zero	14.8°C
	Burst height	13.1°C
Relative Humidity:	Ground Zero	32%
	Burst height	23%
Altimeter Setting:	29.83 in. at Ground Zero	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	360°	04 knots
6,000	190°	21 knots
8,000	190°	21 knots
10,000	200°	30 knots
15,000	200°	35 knots
20,000	220°	74 knots
25,000	220°	65 knots
30,000	220°	85 knots
35,000	220°	120 knots
40,000	220°	65 knots
45,000	220°	57 knots
50,000	220°	33 knots

Height of Tropopause: 38,250 ft MSL

Table K.1—TEST AIRCRAFT OPERATIONAL DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-50	Skull Cap	Sampler controller	ISAFB	1510	1520	2000	2047	Very difficult to sample since it mixed with cirrus clouds and was also caught in jet stream.
F-84	Tiger Red 1	Sampler	ISAFB	1647	1650	1805	1809	Tiger aircraft obtained minimum samples due to clouds and high winds.
F-84	Tiger Red 2	Sampler	ISAFB	1653	1655	1825	1833	
F-84	Tiger Red 3	Sampler	ISAFB	1702	1705	1826	1832	
F-84	Tiger Red 4	Sampler	ISAFB	1719	1724	1901	1912	Blew tire on landing. Ran off end of runway with no damage to aircraft or pilot.
F-84	Tiger White 1	Sampler	ISAFB	1706	1708	1828	1901	
F-84	Tiger White 2	Sampler	ISAFB	1711	1715	1850	1912	
F-84	Tiger White 3	Sampler	ISAFB	1724	1730	1915	1945	
F-84	Tiger Blue 2	Sampler	ISAFB	1537	1540	1555	1605	
F-84	Tiger Red 5	Sampler	ISAFB	1717	1723	1901	1933	
H-19	Fire Fly	Terrain survey	ISAFB	1251	1311	1624	1625	Landed at CP at 1321.
					1730	1806	1815	Returned to ISAFB at 1921.
L-20	Ever Ready 4	Terrain survey	ISAFB	1834	1845	1948	2009	Successful mission. Both Ever Ready aircraft were used.
L-20	Ever Ready 5	Terrain survey	ISAFB	1819	1830	1858	1919	
C-47	Tin Type	Photo	ISAFB	1430	1443	1534	1545	In good position at H-hour.
B-29	Dish Rag 1	IBDA	KAFB	1055	1342	1535	1810	All Dish Rag aircraft were in satisfactory position at H-hour and obtained desired information.
B-29	Dish Rag 2	IBDA	KAFB	1105	1357	1534	1745	
B-29	Dish Rag 3	IBDA	KAFB	1115	1357	1537	1750	
B-36	Backbone	SAC IBDA	Carswell	Unknown	1445	1544	Unknown	20 min late due to misunderstanding in scheduled H-hour.

C-45	Cattle Car	Effects	ISAFB	1830	1845	1945	1949	Army Rad-Safe; successful mission.
B-29	Cook Book 1	Cloud tracker	KAFB	1210	1448	2000	1310	Cook Book 1 and 2 flew a very difficult mission; however, it was very satisfactory. Difficulty was encountered with lower cloud layer near end of mission.
B-29	Cook Book 2	Cloud tracker	KAFB	1220	1446	2000	2225	
B-25	Cook Book 3	Cloud tracker	ISAFB	1546	1650	1930	1949	Very successful mission.
C-47	Rag Mop	Terrain survey	ISAFB	1930	1950	2130	2157	Successful mission; found a fair amount of fall-out during mission.
QF-80	Brow Beat 1	Drone	ISAFB					
QF-80	Brow Beat 2	Drone	ISAFB					
DT-33	Brow Beat 3	Director	ISAFB					All Brow Beat aircraft canceled because of ground winds at Indian Springs AFB.
DT-33	Brow Beat 4	Director	ISAFB					
DT-33	Brow Beat 5	Director	ISAFB					
DT-33	Brow Beat 6	Director	ISAFB					
F-86	Brow Beat 7	Fighter	ISAFB					
F-84	Brow Beat 8	Fighter	ISAFB					
F-86	Brow Beat 9	Fighter	ISAFB					
F-86	Brow Beat 10	Fighter	ISAFB					
B-50	Wide Open	Canister drop	KAFB	1245	1325	1535	1609	Primary mission canceled because of clouds. Made WX run to SW.
B-47	Polar Bear	Canister drop	KAFB	Canceled at 1356 because of clouds				
B-17	Brow Beat 11	Drone radar checker	ISAFB	1350			1401	Canceled.
F-84	Back Bone	SAC IBDA						Did not participate due to misunderstanding in H-hour time.
B-36	Back Bone	Snooper	Carswell AFB	Unknown	1330	1540	Unknown	
C-47	Observer	Observer	KAFB	1130	1514	1533		Landed at Las Vegas for refueling.

Table K.2—MANNED SAMPLING DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude, M ft	Snap taken
F-84, 028, Tiger Red 1,	1	1720	7.5	185	0.4	0.08	0.1	28	Yes
F-84, 032, Tiger Red 2,	1	1728	8	120	0.18	0.07	2.2	31.5	Yes
	2	1740	6	72	0.22	0.07	2.8	32.5	No
F-84, 037, Tiger Red 3,	1	1735	5	45	0.05	0.1	0.5	26.5	No
	2	1749	6	50	0.05	0	2.0	26.5	
	3	1750	10	30	0.05	0.07	4.0	21	
F-84, 049, Tiger Red 4,	1	1802	4.5	900	0.2	0.1	7.8	24.5	Yes
F-84, 030, Tiger Red 5,	1	1804	1.0	18	0.01		1.0	25	Continuous
	2	1807	1.7	16	0.03		2.0	25	
	3	1815	3.0	236	0.1		2.7	24.5	
	4	1820	2.5	77	0.15	0.05	3.6	24.5	
F-84, 042, Tiger White 1,	1	1750	4	120	0.1	0.3	1.8	28	No
F-84, 043, Tiger White 2,	1	1804	5	600	0.2	0.1	10.5	23.5	No
F-84, 045, Tiger White 3,	No penetrations								

Table K.3—RADIATION RECEIVED BY PERSONNEL ON SHOT GUN, 25 MAY 1953, 1530 GMT

Name	Position	Reading, mr
	Pilot	130
	Pilot	225
	Pilot	40
	Pilot	90
	Pilot	40
	Pilot	940
	Pilot	285
	Pilot	255

Table K.4—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1028-A

		Contamination, mr/hr		
	Loading	First reading, 26 May, 1435 hr	Second reading, 26 May, 1522 hr	Third reading, 27 May, 1410 hr
Cockpit				
Air intake (6 in. inside)	220	14	13	5
Right inner landing gear door		16	13	6
Right wing (leading edge)		28	16	8
Right wing tip		13	8	4
Right wing tip tank		9	4	2
Right side turbine		20	14	8
Right horizontal stabilizer		28	8	5
Tail pipe (6 in. inside)		14	11	8
Left horizontal stabilizer		28	8	5
Left side turbine		20	13	8
Left wing tip tank		10	4	2
Left wing tip		12	7	3
Left wing (leading edge)		32	16	8
Left inner landing gear door		18	15	7
Dive brake		42	29	15

Note: Decontamination used after first reading, gunk, Tide, and water; after second reading, natural decay.

Table K.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1030-A

	Contamination, mr/hr	
	Loading	26 May, 1425 hr
Cockpit		
Air intake (6 in. inside)	60	5
Right inner landing gear door		6
Right wing (leading edge)		10
Right wing tip		4
Right wing tip tank		4
Right side turbine		9
Right horizontal stabilizer		10
Tail pipe (6 in. inside)		6
Left horizontal stabilizer		9
Left side turbine		9
Left wing tip tank		3
Left wing tip		4
Left wing (leading edge)		10
Left inner landing gear door		7
Dive brake		11

Table K.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1032-A

	Contamination, mr/hr	
	Loading	26 May, 1442 hr
Cockpit		
Air intake (6 in. inside)	70	4
Right inner landing gear door		4
Right wing (leading edge)		6
Right wing tip		4
Right wing tip tank		2
Right side turbine		6
Right horizontal stabilizer		6
Tail pipe (6 in. inside)		4
Left horizontal stabilizer		5
Left side turbine		6
Left wing tip tank		2
Left wing tip		3
Left wing (leading edge)		7
Left inner landing gear door		4
Dive brake		8

Table K.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1037-A

	Contamination, mr/hr	
	Loading	26 May, 1438 hr
Cockpit		
Air intake (6 in. inside)	60	5
Right inner landing gear door		5
Right wing (leading edge)		9
Right wing tip		4
Right wing tip tank		3
Right side turbine		8
Right horizontal stabilizer		6
Tail pipe (6 in. inside)		6
Left horizontal stabilizer		6
Left side turbine		8
Left wing tip tank		3
Left wing tip		4
Left wing (leading edge)		9
Left inner landing gear door		6
Dive brake		10

Table K.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1042-A

	Contamination, mr/hr	
	Loading	26 May, 1445 hr
Cockpit		
Air intake (6 in. inside)	70	5
Right inner landing gear door		5
Right wing (leading edge)		8
Right wing tip		5
Right wing tip tank		4
Right side turbine		10
Right horizontal stabilizer		9
Tail pipe (6 in. inside)		8
Left horizontal stabilizer		9
Left side turbine		8
Left wing tip tank		4
Left wing tip		4
Left wing (leading edge)		10
Left inner landing gear door		7
Dive brake		9

Table K.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1043-A

	Contamination, mr/hr		
	Loading	First reading, 26 May, 1457 hr	Second reading, 26 May, 1815 hr
Cockpit			
Air intake (6 in. inside)	260	20	17
Right inner landing gear door		20	11
Right wing (leading edge)		33	15
Right wing tip		16	7
Right wing tip tank		13	5
Right side turbine		30	19
Right horizontal stabilizer		38	11
Tail pipe (6 in. inside)		26	17
Left horizontal stabilizer		38	10
Left side turbine		32	17
Left wing tip tank		13	4
Left wing tip		15	6
Left wing (leading edge)		33	14
Left inner landing gear door		22	12
Dive brake		28	18

Note: Decontamination used after first reading, gunk, Tide, and water.

Table K.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1045-A

	Contamination, mr/hr	
	Loading	26 May, 1453 hr
Cockpit		
Air intake (6 in. inside)	4	4
Right inner landing gear door		5
Right wing (leading edge)		8
Right wing tip		4
Right wing tip tank		2
Right side turbine		6
Right horizontal stabilizer		4
Tail pipe (6 in. inside)		6
Left horizontal stabilizer		4
Left side turbine		6
Left wing tip tank		2
Left wing tip		4
Left wing (leading edge)		8
Left inner landing gear door		6
Dive brake		11

Table K.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 51-1049-A

	Contamination, mr/hr		
	Loading	First reading, 26 May, 1450 hr	Second reading, 26 May, 1710 hr
Cockpit			
Air intake (6 in. inside)	160	15	11
Right inner landing gear door		14	10
Right wing (leading edge)		25	12
Right wing tip		11	5
Right wing tip tank		9	3
Right side turbine		24	16
Right horizontal stabilizer		26	7
Tail pipe (6 in. inside)		19	12
Left horizontal stabilizer		26	8
Left side turbine		24	16
Left wing tip tank		8	2
Left wing tip		12	4
Left wing (leading edge)		28	14
Left inner landing gear door		15	9
Dive brake		22	14

Note: Decontamination used after first reading, gunk, Tide, and water.

Table K.12 — B-25 AIRCRAFT CONTAMINATION DATA FOR SHOT GUN, 25 MAY 1953, 1530 GMT, AIRCRAFT NO. 429157

	Contamination, mr/hr (reading taken 26 May, 1505 hr)
Nose	3
Nose wheel well	2
Oil cooler engine 2	4
Air intake engine 2	
Right wheel well	1
Right wing (leading edge)	1
Right horizontal stabilizer	1
Left horizontal stabilizer	1
Left wing (leading edge)	1
Left wheel well	1
Air intake engine 1	
Oil cooler engine 1	3
Forward entrance door	1
Pitot tube	1
Radio compass dome	1
Rear entrance door	
Cockpit	

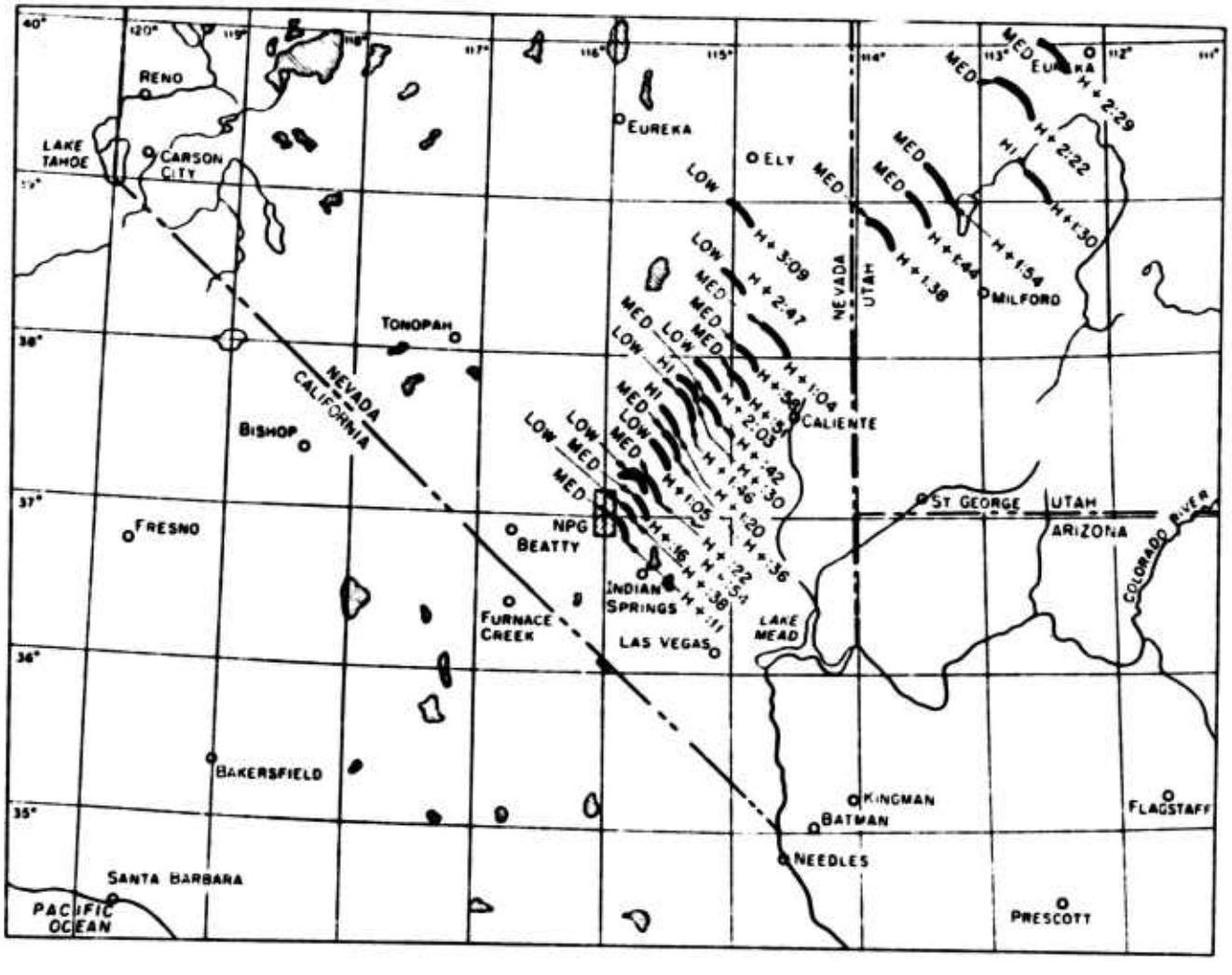

Fig. K.1 — Fall-out data plot, infinite dose, Shot Gun, 25 May 1953.

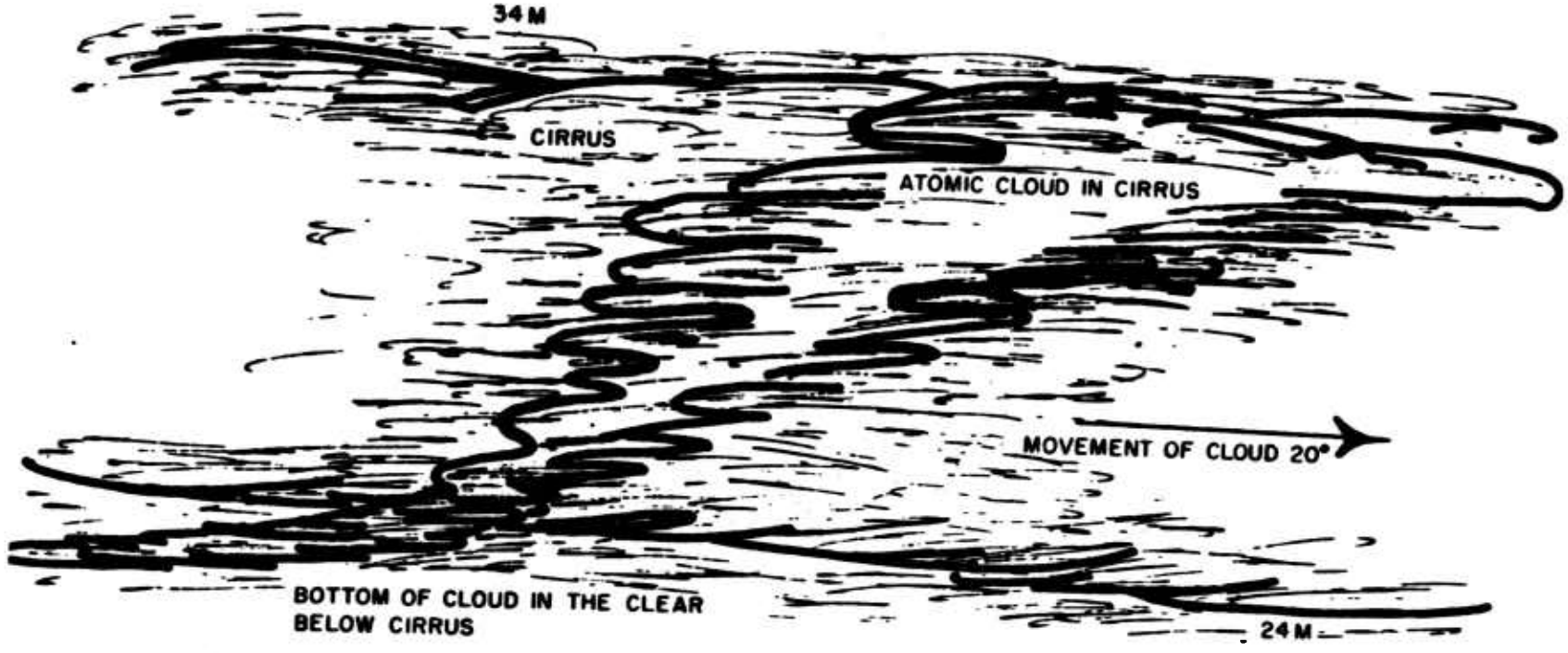

Fig. K.2—Shot Gun, 25 May 1953; time, H+3 hr.

ANNEX L

CLIMAX SHOT SUMMARY

The eleventh and final shot of the Upshot-Knothole series was detonated at approximately 0415 PDT (1115 GMT) on 4 June 1953. This shot was an airdrop released by a B-36 aircraft, obtaining a circular error of 289 ft ± 20 ft (north 232 ft and west 172 ft). The fireball yield was 61 kt, and the actual burst time was 0414:56.675. To enable this release the B-36 aircraft had to be specially modified. This modification was accomplished by the installation of an F-84 rack in the forward bomb bay. This rack includes an air pressure system which "kicks" the unit away from the aircraft at 1200 psi. This untried release system proved very successful as shown by the above-mentioned circular error.

The shot, originally scheduled for 1 June 1953, was postponed on the evening of 31 May 1953, due to the weather forecast of unfavorable winds and cloudy skies. At 2030 on 1 June 1953, in the Test Manager's weather briefing, the mission was called on with the bomb drop aircraft departing Kirtland Air Force Base, New Mexico, at 2245 hr. The weather forecast was for clear skies and with winds from 220° at 20 to 30 knots. At 0245 PDT the Test Manager postponed the shot due to a complete wind shift, which was unfavorable for the detonation of the weapon. The winds shifted to 280 and 290° at 20 to 35 knots. Immediately upon this cancellation all participating aircraft returned to their home station with a 48-hr delay confirmed.

At 2030 hr on 3 June 1953, in the Test Manager's weather briefing, the mission was called on with a forecast of clear skies and winds at 310° at 19 and 28 knots. The drop aircraft departed Kirtland Air Force Base, New Mexico, 45 min late due to an oil leak. At 0340 PDT a Mk 4 HE weapon was released from a B-50 aircraft with a burst altitude of 1350 ft. This release was made to assure that shock wave would not do structural damage to surrounding inhabitated territories. It was estimated that the detonation was 1 sec early with no accurate circular error but estimated well within 200 ft of Ground Zero.

Project 6.3 aircraft were in excellent position at detonation time. The SAC IBDA aircraft were in the proper position of 2500 ft in front of the drop aircraft at 33,000 ft MSL. The DWET photo aircraft was in orbit at 10,000 ft and 15 miles south of Ground Zero at H-hour. All aircraft returned to their home station without any damage suffered from the detonation and shock wave.

A total of 34 aircraft participated in this shot. They were as follows:

No.	Type	Project	Code Name
1	B-36	Drop aircraft	Alley Cat
1	B-50	HE drop aircraft	Preview
1	B-36	Blast and thermal	Clay Pigeon
1	C-47	Observer	Observer
1	B-50	Sampler controller	Skull Cap

No.	Type	Project	Code Name
11	F-84	Samplers	Tiger Red, White, and Blue 1, 2, 3, and 4
1	H-19	Terrain survey	Fire Fly 3
2	L-20	Terrain survey	Ever Ready 4 and 5
1	C-47	Photo	Tin Type
3	B-29	IBDA	Dish Rag 1, 2, and 3
7	B-36	SAC IBDA	Back Bone
2	B-29	Cloud trackers	Cook Book 1 and 2
1	B-25	Cloud tracker	Cook Book 3
1	C-47	Terrain survey	Rag Mop

The mission was an important one from a sampling standpoint since many radiochemical experiments were planned.

A minimum fraction of 5×10^{-10} was desired. This required an exposure of at least 0.8 r. However, it was planned that since this was the last mission any surplus exposure would be used to obtain larger samples. In all cases, quantity exceeded the minimum required.

In general, the mission could be considered the most successful one of the series. This was undoubtedly due to the perfect weather and the fact that the experience level was at its peak. The terrain survey and cloud trackers flew successful but short missions due to the small amount of fall-out and light winds.

Mercury Weather Station
Nevada Proving Grounds
Mercury, Nevada

Actual Weather Conditions for Nuclear Detonation Eleven, 1115 GMT, 4 June 1953

Cloud Cover: Clear except for cumulus clouds to east
Precipitation: No precipitation within 1000 miles downstream
Height Ground Zero: 4191 ft MSL
Burst Height: 5525 ft MSL

Pressure:	Ground Zero	867 mb
	Burst height	824 mb
Virtual Temperature:	Ground Zero	14.0°C
	Burst height	12.9°C
Actual Temperature:	Ground Zero	13.3°C
	Burst height	12.2°C
Relative Humidity:	Ground Zero	30%
	Burst height	38%
Altimeter Setting:	29.79 in. of Hg	

Winds (height above MSL, degrees from true north, and speed in knots):

Surface	045°	03 knots
6,000	360°	06 knots
8,000	020°	06 knots
10,000	140°	03 knots
15,000	170°	06 knots
20,000	280°	13 knots
25,000	310°	19 knots
30,000	310°	28 knots
35,000	270°	17 knots
40,000	250°	24 knots
45,000	280°	12 knots
50,000	270°	11 knots

Height of Tropopause: 39,060 ft MSL

Table L.1 — TEST AIRCRAFT OPERATIONAL DATA FOR SHOT CLIMAX 4 JUNE 1953, 1115 GMT

Aircraft type	Nickname	Use of aircraft	Take-off location	Take-off time	Enter area	Leave area	Landing time	Remarks
B-36	Alley Cat	Drop aircraft	KAFB	1828	0835	1120	1340	Aircraft delayed 45 min on take-off due to an oil leak. Mission was very successful, and aircraft was straight and level after breakaway at shock arrival. Pepper Can confirmed at 1107.
B-36	Clay Pigeon	Blast and thermal	KAFB	1900	0912	1120	1345	In very good position, 32,000 and 2500 ft in front of drop aircraft at H-hour.
B-50	Preview	HE drop aircraft	KAFB	1845	0900	1125	1325	Successful release of a 5000-lb HE, Mk-4 weapon. One second early and less than 200 ft CE.
C-47	Observer	Observer	KAFB	1915	1000	1125	1715	Successful mission.
B-50	Skull Cap	Sampler controller	ISAFB	1138	1159	1720	1734	Controlled samplers very well. All aircraft obtained samples by a factor of 2 better than requested by LASL.
F-84	Tiger Red 1	Sampler	ISAFB	1411	1422	1520	1541	
F-84	Tiger Red 2	Sampler	ISAFB	1428	1449	1555	1615	
F-84	Tiger Red 3	Sampler	ISAFB	1358	1419	1512	1532	
F-84	Tiger Red 4	Sampler	ISAFB	1510	1531	1650	1710	
F-84	Tiger White 1	Sampler	ISAFB	1328	1349	1405	1425	
F-84	Tiger White 2	Sampler	ISAFB	1343	1402	1430	1450	
F-84	Tiger White 3	Sampler	ISAFB	1445	1505	1613	1633	
F-84	Tiger Blue 1	Sampler	ISAFB	1108	1127	1145	1158	Snooper.
F-84	Tiger Blue 2	Sampler	ISAFB	1530	1549	1603	1623	
F-84	Tiger Blue 3	Sampler	ISAFB	1545	1605	1720	1741	
F-84	Tiger Blue 4	Sampler	ISAFB	1457	1515	1605	1628	
H-19	Fire Fly 3	Terrain survey	ISAFB					Aborted; landed at Mercury; oil leak.
L-20	Ever Ready 4	Terrain survey	ISAFB	1414	1434	1607	1637	Successful mission; obtained very low readings at 500 ft above terrain.
L-20	Ever Ready 5	Shuttle	ISAFB	1738	1758	1803	1823	Ferry personnel.
C-47	Tin Type	Photo	ISAFB	1017	1034	1120	1133	In assigned position at H-hour.
B-29	Dish Rag 1	IBDA	KAFB	1930	0940	1125	1320	All Dish Rag aircraft were in proper position at H-hour.
B-29	Dish Rag 2	IBDA	KAFB	1920	0925	1122	1334	
B-29	Dish Rag 3	IBDA	KAFB	1910	0915	1122	1323	
B-36	Back Bone	SAC IBDA	Fairchild AFB	Unknown	1040	1127	Unknown	In very good position at H-hour.
B-36	Back Bone WX	SAC IBDA	Fairchild AFB	Unknown	0835	1130	Unknown	
B-29	Cook Book 1	Cloud tracker	KAFB	0815	1024	1555	1735	Successful mission.
B-29	Cook Book 2	Cloud tracker	KAFB	0825	1034	1555	1730	Successful mission.
B-25	Cook Book 3	Cloud tracker	ISAFB	1135	1150	1610	1631	Successful mission.
C-47	Rag Mop	Terrain survey	ISAFB	1601	1632	1832	1853	Very low readings due to small amount of fall-out.

Table L.2—MANNED SAMPLING DATA FOR SHOT CLIMAX, 4 JUNE 1963, 1115 GMT

Aircraft type, serial No., nickname, and pilot	Pass No.	Entered cloud, Z-time	Peak intensity	Time in cloud, sec	Integrated dosage	Cockpit background	Wing tank reading	Altitude M ft	Snap taken
F-84, 028,	1	1436	3	35	0.04	0	0.4	34	No
Tiger Red 1,	2	1443	0.5	40	0.06	0	1	35	No
	3	1455	11	120	0.5	0.3	7.4	38	No
	4	1507	11	300	1.1	0.5	10	38	No
F-84, 032,	1	1520	7	13	0.42	0.5	10	39.5	No
Tiger Red 2,	2	1542	4	13	0.95	0.6	16	39.5	No
F-84, 037,	1	1455	15	115	1.0	0.7	17	39.5	Yes
Tiger Red 3,	2	1520	10	165	1.5	0.5	1.5	39.5	No
F-84, 049,	1	1617	5	1620	0.8	0.5	14	39	No
Tiger Red 4,									
F-84, 042,	1	1344	5	50	0.05	0.5	20	33	No
Tiger White 1,	2	1358	20		1.9	2	41	37	Yes
F-84, 043,	1	1421	30	105	0.42	1.1	0.16	41	Yes
Tiger White 2,	2	1432	20	210	1.6	2.0	34	40	No
F-84, 045,	1	1533	2.0	180	0.15	0.1	0.6	38	No
Tiger White 3,	2	1542	2.0	120	0.25	0.1	1.8	38	No
	3	1555	2.5	900	1.05	0.6	19	38	No
F-84, 054,	1	1635	1.9	1440	0.85	0.29	30	40.5	No
Tiger Blue 2,									
F-84, 055,	1	1700	3	900	0.3	0.15	9	39	No
Tiger Blue 3,									
F-84, 046,	1	1525	2	200	0.3	0.4	6	41	No
Tiger Blue 4,	2	1550	1.5	45	0.5	0.15	7.2	41	No
	3	1602	1.2	420	0.7	0.7	8.4	41.5	No

Table L.3—RADIATION RECEIVED BY PERSONNEL ON SHOT CLIMAX 4 JUNE 1953, 1115 GMT

Name	Position	Reading, mr
	Pilot	845
	Pilot	1380
	Pilot	195
	Pilot	2150
	Pilot	1840
	Pilot	240
	Pilot	1570
	Pilot	1270
	Pilot	470
	Pilot	785

Table L.4—F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1037-A

	Contamination, mr/hr		
	Loading	First reading, 5 June, 1520 hr	Second reading, 5 June, 1730 hr
Cockpit			
Air intake (6 in. inside)	2400	210	140
Right inner landing gear door		150	90
Right wing (leading edge)		230	90
Right wing tip		160	55
Right wing tip tank		80	35
Right side turbine		160	110
Right horizontal stabilizer		185	45
Tail pipe (6 in. inside)		120	95
Left horizontal stabilizer		180	45
Left side turbine		165	100
Left wing tip tank		100	33
Left wing tip		140	60
Left wing (leading edge)		240	95
Left inner landing gear door		265	50
Dive brake		265	180

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.5 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1032-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1510 hr	Second reading, 5 June, 1735 hr
Cockpit			27
Air intake (6 in. inside)	1800	170	80
Right inner landing gear door		150	85
Right wing (leading edge)		240	100
Right wing tip		150	55
Right wing tip tank		100	35
Right side turbine		160	110
Right horizontal stabilizer		200	50
Tail pipe (6 in. inside)		120	90
Left horizontal stabilizer		210	55
Left side turbine		160	100
Left wing tip tank		100	60
Left wing tip		140	60
Left wing (leading edge)		240	100
Left inner landing gear door		160	95
Dive brake		240	150

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.6 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1028-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1410 hr	Second reading, 5 June, 1635 hr
Cockpit			
Air intake (6 in. inside)	1400	120	75
Right inner landing gear door		80	55
Right wing (leading edge)		150	60
Right wing tip		85	36
Right wing tip tank		95	30
Right side turbine		60	33
Right horizontal stabilizer		130	29
Tail pipe (6 in. inside)		55	30
Left horizontal stabilizer		120	29
Left side turbine		60	34
Left wing tip tank		90	31
Left wing tip		80	30
Left wing (leading edge)		160	80
Left inner landing gear door		90	70
Dive brake		130	80

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.7 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1042-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1730 hr	Second reading, 5 June, 1930 hr
Cockpit			35
Air intake (6 in. inside)	7000	300	130
Right inner landing gear door		240	105
Right wing (leading edge)		340	110
Right wing tip		180	42
Right wing tip tank		105	65
Right side turbine		240	110
Right horizontal stabilizer		320	96
Tail pipe (6 in. inside)		180	120
Left horizontal stabilizer		340	80
Left side turbine		220	110
Left wing tip tank		160	45
Left wing tip		170	40
Left wing (leading edge)		380	120
Left inner landing gear door		280	145
Dive brake		390	195

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.8 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1043-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1522 hr	Second reading, 5 June, 1735 hr
Cockpit			36
Air intake (6 in. inside)	4000	240	160
Right inner landing gear door		240	130
Right wing (leading edge)		315	140
Right wing tip		190	50
Right wing tip tank		215	60
Right side turbine		180	85
Right horizontal stabilizer		260	90
Tail pipe (6 in. inside)		160	95
Left horizontal stabilizer		240	95
Left side turbine		180	90
Left wing tip tank		240	60
Left wing tip		205	65
Left wing (leading edge)		295	110
Left inner landing gear door		260	140
Dive brake		390	270

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.9 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT [illegible], 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1045-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1515 hr	Second reading, 5 June, 2015 hr
Cockpit			50
Air intake (6 in. inside)	2600	320	210
Right inner landing gear door		255	125
Right wing (leading edge)		350	135
Right wing tip		220	50
Right wing tip tank		220	60
Right side turbine		210	105
Right horizontal stabilizer		280	85
Tail pipe (6 in. inside)		185	100
Left horizontal stabilizer		270	90
Left side turbine		210	110
Left wing tip tank		195	70
Left wing tip		240	60
Left wing (leading edge)		360	145
Left inner landing gear door		290	150
Dive brake		420	240

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.10 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT [illegible], 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1046-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1400 hr	Second reading, 5 June, 1545 hr
Cockpit			
Air intake (6 in. inside)	260	23	6
Right inner landing gear door		41	24
Right wing (leading edge)		46	20
Right wing tip		21	7
Right wing tip tank		20	4
Right side turbine		60	45
Right horizontal stabilizer		40	18
Tail pipe (6 in. inside)		55	42
Left horizontal stabilizer		40	16
Left side turbine		70	47
Left wing tip tank		20	3
Left wing tip		20	5
Left wing (leading edge)		48	20
Left inner landing gear door		44	24
Dive brake		55	30

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.11 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1049-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1405 hr	Second reading, 5 June, 1630 hr
Cockpit			
Air intake (6 in. inside)	1400	220	60
Right inner landing gear door		160	90
Right wing (leading edge)		280	120
Right wing tip		160	60
Right wing tip tank		150	40
Right side turbine		180	110
Right horizontal stabilizer		250	80
Tail pipe (6 in. inside)		180	130
Left horizontal stabilizer		260	70
Left side turbine		180	110
Left wing tip tank		140	47
Left wing tip		170	54
Left wing (leading edge)		260	95
Left inner landing gear door		170	100
Dive brake		230	140

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.12 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1054-A

	Loading	Contamination, mr/hr	
		First reading, 5 June, 1512 hr	Second reading, 5 June, 1925 hr
Cockpit			41
Air intake (6 in. inside)	2000	260	130
Right inner landing gear door		280	155
Right wing (leading edge)		340	150
Right wing tip		230	60
Right wing tip tank		160	52
Right side turbine		320	210
Right horizontal stabilizer		280	120
Tail pipe (6 in. inside)		250	200
Left horizontal stabilizer		300	120
Left side turbine		300	205
Left wing tip tank		160	65
Left wing tip		220	65
Left wing (leading edge)		320	140
Left inner landing gear door		300	150
Dive brake		380	220

Note: Decontamination used after first reading, gunk, Tide, and water.

Table L.13 — F-84G AIRCRAFT CONTAMINATION DATA FOR SHOT CLIMAX, 4 JUNE 1953, 1115 GMT, AIRCRAFT NO. 51-1055-A

	Contamination, mr/hr		
	Loading	First reading, 5 June, 1355 hr	Second reading, 5 June, 1530 hr
Cockpit			
Air intake (6 in. inside)	170	30	20
Right inner landing gear door		21	17
Right wing (leading edge)		44	19
Right wing tip		21	6
Right wing tip tank		10	5
Right side turbine		32	22
Right horizontal stabilizer		33	10
Tail pipe (6 in. inside)		22	19
Left horizontal stabilizer		32	11
Left side turbine		33	25
Left wing tip tank		10	5
Left wing tip		20	6
Left wing (leading edge)		46	21
Left inner landing gear door		28	20
Dive brake		39	27

Note: Decontamination used after first reading, gunk, Tide, and water.

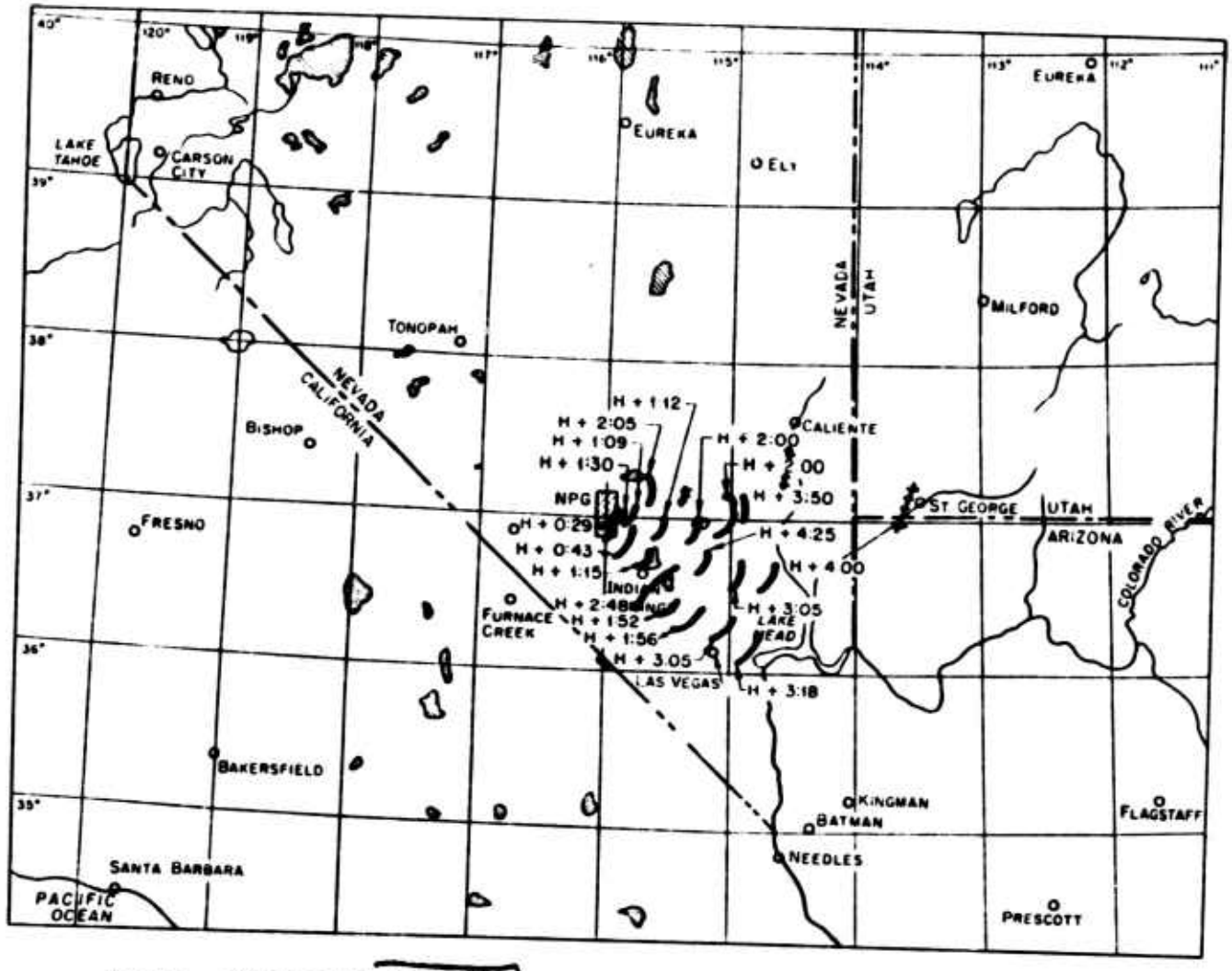

Fig. L.1 — Cloud track, Shot CLIMAX, 4 June 1953. ----, 12,000 ft MSL. ——, 18,000 ft MSL. ++++, 38,000 to 40,000 ft MSL.

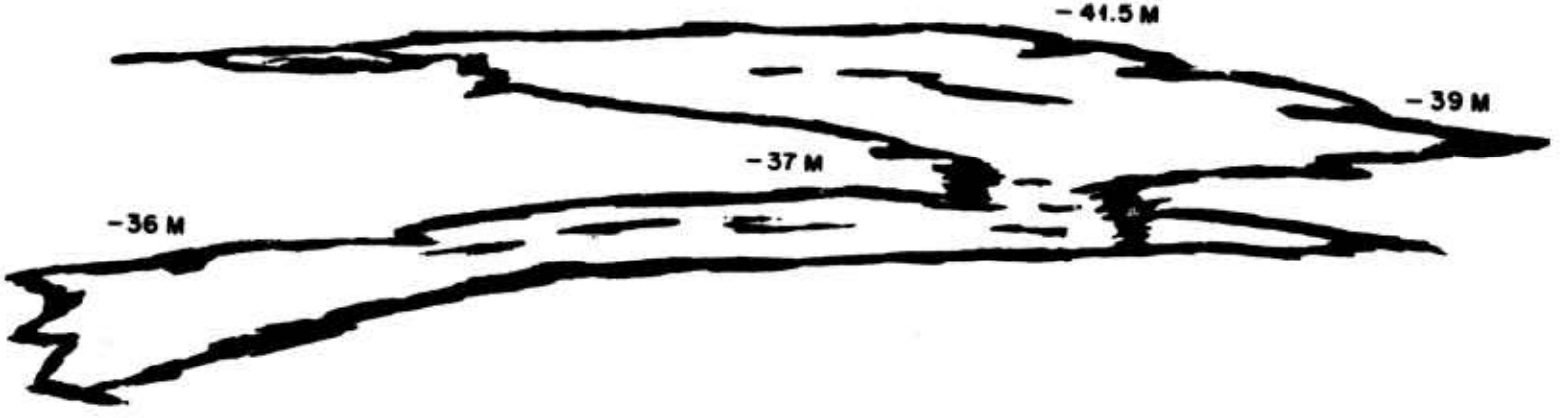

Fig. L.2—Rosie at H+3 hr, Shot CLIMAX, 4 June 1953.