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10/9/51

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N.Y.O. BUSTER JANGLE FALL OUT SURVEY
FIRST DRAFT
TO BE REISSUED BY OCTOBER 19 IN FINAL FORM

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FIELD OPERATIONS PHASE A

I. ORGANIZATION

The field organization will be comprised of two groups, 1) the airborne team and 2) the ground team. The airborne team will man the B-29 survey aircraft. The ground team will man the semi-fixed ground stations and the C-47 survey aircraft. Both of these groups will be under the direction of HQ at Washington, D.C. Communications will be maintained by telephone.

A. Airborne Team

1. Function: This team will gather information concerning the main cloud, approximately at the 85th meridian. Desirable information will be cloud shape, activity gradients and concentration, velocity and direction of cloud motion and particle sizes.

2. Operation: The team will consist of four to six NYO men based at Robbins A.F.B. Their schedule will be arranged so that each pair of flights will be manned by two observers, one in each aircraft. Observers will operate sampling equipment and maintain a log of instrument readings. Men remaining on the ground will transfer equipment between aircraft when necessary, relay cloud data to HQ, and aware in plan survey flights.

B. Ground Team

1. Function: This team will gather information concerning the cloud curtain and ground level fall out.

2. Operation: The ground team will be subdivided into two groups, each capable of independent operation. Each will consist of five Air Force personnel directed by a member of N.Y.O. Transportation for this group will be provided by a C-47 which will be equipped for survey flights. Each unit will be established at a series of three sampling stations with two men at each across the path of the cloud curtain. These stations, equipped with fall out trays, Hi Volume samplers and Cascade Impactors will be operated continuously for the duration of the passage of the cloud curtain. The C-47 will make daily low altitude (below 5,000') survey flights.

II. PREPARATION

A. Airborne Team

NYO sampling equipment listed in Schedule I will be assembled at Mitchel AFB or shipped by commercial air carrier by October 19th. NYO personnel will depart with equipment on October 22nd for Robbins AFB. At Robbins, they will equip the survey aircraft with NYO sampling apparatus and familiarize themselves with the AFOAT equipment.

B. Ground Team

NYO sampling equipment listed in Schedule II will be assembled at Mitchel AFB or shipped by commercial air carrier by October 19th. NYO personnel will depart via C-47 or commercial transport with the equipment for Wright-Patterson AFB on October 22nd. At Wright, they will be joined by 10 Air Force personnel and then ~~pick up the C-47 and~~ continue to Tinker AFB, Oklahoma City. There they will hold themselves in readiness for deployment by HQ to ~~suitable~~ sampling locations.

III. OPERATION

A. Airborne Team

1. Survey flight pattern:

Areas to be surveyed and the duration of flights will be subject to the cloud's travel and limitations of the aircraft. Basic strategy of this nature will be determined at HQ and communicated to Robbins AFB. General flight patterns are prescribed below; details of individual flights and by the observers during flights.

Flights will be made, as close as practical, normal to the cloud's path. Aircraft will operate in pairs, flying identical courses but at altitudes differing by about 10,000 feet. After having crossed the cloud in one direction, altitudes will be altered by 5,000 feet for recrossing. Thus, in a typical pattern, planes #1 and #2 would fly at 5,000 and 15,000 feet respectively while crossing in a northerly direction and then at 10,000 and 20,000 feet while crossing back in a southerly direction. Exact altitudes will be determined at HQ when the cloud's height has been estimated and/or measured. Deviation from the predetermined flight pattern to be executed will depend on the accuracy of information available concerning the cloud's location.

2. Flight Schedule:

a. Background: Two aircraft should be dispatched at least one day before the predicted arrival of the cloud to measure background ~~activity~~. If time is available, the

itinerary should include both the 85th and 95th meridian.

b. Initial Survey Flight per Shot: Two aircraft should be dispatched to either the 85th or 95th meridian, depending on suitability, to coincide with the arrival of the cloud. The function of this flight should be exploratory for the most part. The aircraft should travel well beyond the estimated position of the cloud to locate extreme lateral shear conditions. If the location of the cloud can be defined with some confidence, the remainder of the flight should be devoted to further cloud delineation by repetitive crossing at different altitudes. If survey instruments and samples yield no definitive data, the traverse should be continued substantially to the northern border of the U.S. On the return leg, altitudes should be altered as previously described.

c. Subsequent Flights: Additional flights made to survey the same cloud will be governed by information derived from the first. The most informative flight pattern would consist of repetitive cloud crossings at varying altitudes so that vertical and horizontal gradients can be measured.

3. Observer's Duties:

Each aircraft will be equipped with 1) two 1,000 c.f.m. air samplers and a 2610A Survey Meter, 2) conductivity meter, 3) Scintillometer and 4) a Cascade Impactor. The observer will be responsible for the operation of this equipment and maintaining a log of instrument readings.

Entries of the following items versus time should be made on the log sheets provided: scintillometer reading, conductivity reading, filter paper sample readings, operation of Cascade Impactor and aircraft altitude and position. It may prove unfeasible to complete all entries during the flight. It such is the case, items such as conductivity readings and aircraft altitude and position should be entered from the aircraft log after landing.

One observer on each flight will be designated in charge. The second observer will relay pertinent data to him by radio. The observer in charge will determine by his own and the second observer's data what flight pattern to recommend.

The conductivity meter will serve as an indication of the presence of radioactivity. When available, entries of aircraft position should be made on the recording chart.

The scintillometer is expected to present a more reliable measurement of radioactivity. Readings should be recorded at frequent intervals, particularly when in or near the

cloud or when changes occur. Frequency of readings will be determined by trial.

A sample should be collected with the Cascade Impactor for the duration of flight within the cloud at one altitude. If it appears that several passes can be made, the impactor should be reoperated only at the altitude at which it was first operated.

The 1,000 c.f.m. samplers will be operated simultaneously for periods of 30 minutes. Filters will be changed on alternate 15 minute periods. As each filter is removed from the sampler, it will be rolled into a cylinder and inserted in the survey meter probe. One reading should be recorded immediately and a second after a five minute wait. After this check, the filter will be placed in an envelope and identified.

B. Ground Team

When a firm estimate of the cloud's path is available, the ground team will be dispatched to three airports across the path. Ground team unit #1 will be deployed so that two men with equipment are at each airport. One of the three stations will be designated field HQ and in this station, the NYO member will establish himself with the reserve and special apparatus. As soon as the three stations have been established, HQ should be informed of the fact. Unit #2 will stand by at this field until instructed by HQ to man a second set of sampling stations.

1. Sampling Procedure - General:

Each of the ground sampling stations will be equipped with two Hi Volume samplers, a fall out tray and gummed paper frame. The HQ station will have, in addition, a Cascade Impactor which can be used on the ground and in the C-47.

Background sampling should be started immediately after the stations are established. A continuous sample with each piece of equipment should be run until two hours before the predicted arrival of the cloud. For the duration of the cloud's passage, Hi Volume samples should be collected in pairs every two hours simultaneously at all stations, and the tray and gummed paper samples collected every 24 hours. These sampling periods may be modified by HQ.

Each sample should be stapled to a separate data sheet. Samples should be air mailed to NYO twice each day from each station in the envelopes provided.

2. Sampling Procedure - Field HQ:

In addition to the samples just described, field HQ will operate a Cascade Impactor on the ground and in the air. A continuous sample should be collected on the ground between C-47 flights. The C-47 will be equipped with two Hi Volume samplers and a Scintillometer and the Cascade Impactor can also be operated on board. The aircraft will make two two-hour flights daily, preferably spaced twelve hours apart. The flight pattern will consist of repeated traverses along the line of the three ground stations. Traverses should be made alternately at 5,000' and half way between 5,000' and ground elevation. A pair of Hi Volume samples should be collected per traverse.

A log of Scintillometer readings versus time and aircraft position should be maintained.

The Berkley Portable Scaler should be used to gain a qualitative estimation of activity on the Hi Volume samples collected at field HQ, both on the ground and in the air. HQ should be informed of significant changes in activity.

Sampling will continue at all stations until ordered to cease by HQ.

3. Communications:

Communications between ground stations and between field HQ and HQ will be by telephone. Instructions regarding original deployment will originate from HQ. Further communications should originate from field HQ. Collect calls should be made to HQ once a day to transmit data and receive instructions. HQ should be informed of the field HQ telephone number as soon as the sampling stations have been established.

FIELD OPERATIONS PHASE B

The second phase of the operation covers the collection of ground level fall out throughout the area of continental United States. Fifty locations have been selected covering a random distribution of points designed to provide adequate coverage of the whole country. Through the cooperation of the U.S. Weather Bureau, these collection points have been located at Weather Bureau stations where the personnel have agreed to participate by collecting specifically defined data. Collection procedures are given in Appendix B.

In order that no single laboratory would be overloaded during the test period and to facilitate prompt evaluation and correlation of data, AEC and contractor laboratories have agreed to participate in the analytical work. The country was subdivided into sections and all collection stations within those sections will submit their samples to the designated laboratory. The laboratories are Argonne National Lab, Oak Ridge National Lab, Hanford Works, University of Rochester AEC Project and NYO Analytical Lab. All counting and recording will be on a uniform basis. Counting and recording procedures are given in Appendix C. Instructions covering the agreed procedure have been circulated to all analytical labs. Also in the interest of uniformity, identical counter tubes have been supplied to each of the stations by the New York office.

Appendix D shows the distribution of stations and the responsible analytical laboratories. A code letter beside each station indicates the type of sample which will be collected. A deviation from random distribution was dictated by the following considerations: 1) location of large cities, for population density, 2) location of photographic industry and 3) concentration on 85th meridian to tie in with Phase A. Each of the fifty stations has been send a kit of equipment according to the schedules listed in Appendix E. Each of the laboratories will submit a weekly tabulation of results to the Data Coordinator at the New York office for central correlation. Extreme findings in those areas of interest to the photographic industry are to be phoned in immediately on determination.

~~SECRET~~

APPENDIX A

EQUIPMENT - AIRBORNE AND GROUND TEAMS

Schedule I - Airborne Team

No. of Items	Designation
2	H - Cascade Impactor Kit
3	K - Scintillometer
1	M - Survey Instruments
2	N - 6 Volt Air Sampler
1	P - Dosimeter Kit
8	Q - Film Badges

Schedule II - Ground Teams (2)

No. of Items per Team	
Team 1 - 5)	E - Hi Volume Sampler Kit
" 2 - 4)	
4	G - Fall out Tray with Kit
1	H - Cascade Impactor Kit
1	I - Berkley Portable Scaler with End Window Tube ($3\frac{1}{2}$ mg/cm^2)
Team 1 only - 1	F - Aerotec Unit
" 1	K - Scintillometer
" 1	L - Sleeping Gear
1	O - Gummed Paper Kit
12	Q - Film Badges

~~SECRET~~

APPENDIX A (Con't.)

E - Hi Volume Sampling Kit

1 Carrying Case
1 Extension Cord 50'
1 Cube Tap
2 Boxes 4" Whatman #41 Filter Paper
2 Boxes Comfo All Dust Filters (100)
300 Cellophane Sample Envelopes
1 Pair Forceps
1 Glass Marking Pencil
300 Data Sheets
25 Large, Addressed, Franked Manilla Envelopes
2 Hi Volume Samplers
4 Hi Volume Sampler Heads
4 3-Wire Filter Supports
1 Stapling Machine

F - Aerotec Units (5)

G - Fall out Tray with Kit

1 Tray
1 Squeegee
1 Kit
50 Data Sheets
1 Set of Instructions
50 Plastic Sample Envelopes

H - Cascade Impactor Kit

1 Carrying Case
1 Cascade Impactor
50 Coated Aluminum Slides in File Box
1 Box 1-1/8" Whatman #41 Filter papers
15 Glassene Sample Envelopes
15 Data Sheets
1 Hudson Pump with Rotameter
1 Tripod

I - Berkley Portable Scaler - Model 8 with End Window Tube ($3\frac{1}{2}$ mg/cm^2)

K - Scintillometer

APPENDIX A (Cont'd.)

L - Sleeping Gear

2 Cots, Folding
6 Blankets

M - Survey Instruments

2 2G10A Survey Meter with AFOAT Probe
1 2G10A Survey Meter

N - 6 Volt Air Sampler

O - Gummed Paper Kit

1 Pkg. 14" x 17" X-ray Film
3 Frames
3 Pkgs. Gummed Paper (50 sheets each)
1 X-ray Exposure Holder
150 Data Sheets

P - Dosimeter Kit

4 Direct Reading Dosimeters
2 Battery Chargers

Q - Film Badges - NYO Design

[redacted]

APPENDIX B

PROCEDURE FOR COLLECTION OF PRECIPITATION AND DUST SAMPLES FOR RADIOACTIVE FALL-OUT STUDIES

by

Analytical Staff

September 12, 1951

U. S. Atomic Energy Commission
Health and Safety Division
New York Operations Office

[redacted]

The radioactivity associated with the fall-out being studied decays very rapidly so that speed in the handling of samples is essential. For all shipments, air mail is recommended where one day's transit time will be saved.

In order to correlate the radioactivity measurements with the fall-out, the date and hour of sampling and of measurement must be known for each sample. For uniformity, the use of the 24-hour time scale, rather than A.M. and P.M. notations is recommended. The time zone must be included for both collecting stations and laboratories.

The data sheets, of which a sample is attached, should be filled out completely with the pertinent information, using a separate sheet for each sample. Collecting stations will record the data on the upper half of the sheet, while the laboratories will fill in the counting data. This will aid in the collation of data from the large number of samples to be handled.

Four types of samples are to be used in the study of radioactive fall-out in this program, but not every station will collect each type.

1. Precipitation samples taken by collecting the rain or snow-fall during 24 hours on the specific area of a collecting tray. The insoluble particulate matter is filtered off for measurement.

2. Settled dust samples taken by washing down the surface of the collecting tray used for precipitation samples when no rain or snow-fall occurs. The insoluble particulate matter is filtered off from the washings for measurement.

3. Settled dust samples collected on gummed paper mounted on a metal frame. The paper is destroyed by ashing and the ash used for measurement.

4. Airborne dust samples collected by drawing known volumes of air through a filter with a high-volume air sampler. The filter is destroyed by ashing and the ash used for measurement.

The procedure for taking and handling each of these samples will be given in detail so that comparable results may be obtained at all collecting stations and laboratories.

I. Precipitation Samples [redacted]

A. Collection: The sampling trays furnished by NYO have an area of 9 square feet and are mounted on legs for ease in setting up. The tray should be erected and a two-quart Mason jar placed under the outlet. In case of heavy rain, the jar should be replaced when full, and all jars treated as one sample.

Light snowfalls may be transferred to the jar with the rubber squeegee furnished. After allowing it to melt, it is treated the same way as collected rain. It is not possible to furnish large containers, so for heavier snowfalls, two jars may be filled with snow from a smaller area than the whole tray, and the area cleared noted on the data sheet.

[illegible]: The filtration kit furnished by NYO contains a filter [illegible] aspirator to supply suction and two [illegible] of faucets. The

AMENDMENT TO INSTRUCTIONS 9/20/51
for
COLLECTION OF PRECIPITATION AND DUST SAMPLES
for
RADIOACTIVE FALL-OUT STUDIES

At the suggestion of Weather Bureau Officials it was decided to modify the method of collecting dry fallout. In order to maintain wet trays at all times their legs were recut to permit the use of the tray in a level position. Included with the tray is a small block and a piece of modeling clay. Please place the block in the drain corner of the tray and fix in place with the clay so that a small amount of water can be kept in the tray at all times. It may be necessary to plug corners and screw holes also.

The two quart mason jar used for collecting water will require blocking up in order for it to support the drain corner of the tray.

Please keep a small amount of water in the tray at all times. At the end of a collecting period the block should be removed and the tray surface squeegeed in the direction of the drain to obtain as much of the dust as possible.

A. Collection:
tray has dried out after a rain, [illegible]
that period is collected. This is done by wetting down [illegible]
with water and washing the dust into the Mason jar with the rubber squeegee furnished and more water. This may be readily accomplished with less than two quarts of water. (If it has rained, the tray washings are filtered with the collected rain as one sample).

B. Filtration: This is done exactly as for precipitation samples.

[redacted]

III. Settled Dust on Gummed Paper

A. Collection: Sheets of "Kum-Kleen" gummed paper are supplied with a metal frame which will hold the paper by its own adhesive. This frame is placed on a box or suitable support next to the collecting tray and at about the same height with the gummed side up.

The papers are changed every 24 hours whether precipitation occurs or not. The gummed face of the paper is then folded together and refolded to fit into a cellophane bag. The bag should be stapled to a data form containing the pertinent information.

Collecting stations should send the paper, bag and data sheet to the specified laboratory, by mail, and if an appreciable saving of time would result, by air mail.

IV. Airborne Dust Samples

A. Collection: Airborne dust samples are collected by drawing known volumes of air through a paper filter. The pump furnished consists of a head for holding the filter, an AC-DC 115 volt motor-blower, and a gage for determining the air flow in cubic feet per minute. The pump should be protected from rain, and may be set up at an open window, or under a suitable shelter.

The paper filter is mounted in the head with the rough, dark side out toward the entering air. The flow rate and date and hour of starting should be noted on the data sheet. Since the flow rate may decrease as dust collects, the same data must be noted at the end of the run.

The filter should be changed after every 24 hours. After removal, the filter is placed in a cellophane bag and the bag stapled to a data form containing the pertinent information.

Collecting stations should send the filter, bag and data sheet to the specified laboratory, by mail and if an appreciable saving of time would result, by air mail.

N.Y. FORM 107
(9-10-51)

[redacted]

DATA SHEET

STATION _____

CITY _____ STATE _____

TAKEN BY _____

Start Sample - Date _____ Hour _____ Time Zone _____

End Sample - Date _____ Hour _____ Time Zone _____

Wind Direction _____ Velocity _____

Weather Conditions _____

_____

☐ Precipitation

Estimated Volume Collected _____ pints

Estimated Rainfall _____ inches

Duration, from _____ to _____

☐ Settled Dust on Tray

☐ Settled Dust on Gummed Paper

☐ Airborne Dust

Sampling Rate, start _____ finish _____ ft^3/min.

General Remarks _____

_____

_____

Counting Data:

Time of Counting - Date _____ Hour _____ Time Zone _____

Total Count _____ Counting Period _____ min.

Gross Rate _____ c/m

Background _____ c/m

Net Rate _____ c/m Efficiency Factor _____ c/d

Results _____ d/m/sample

_____ d/m _____
(unit)

Final Extrapolated Value _____

(unit)

Extrapolated to - Date _____ Time Zone _____

(Use separate sheet for each sample)

[redacted]

APPENDIX C

COUNTING AND DATA RECORDING PROCEDURE FOR PRECIPITATION AND DUST SAMPLES FROM RADIOACTIVE FALL-OUT STUDIES

by

Analytical Staff

September 12, 1951

U. S. Atomic Energy Commission
Health and Safety Division
New York Operations Office

[redacted]

The radioactivity associated with the fall-out being studied decays very rapidly so that speed in the handling of samples is essential. For all shipments, air mail is recommended where one day's transit time will be saved.

In order to correlate the radioactivity measurements with the fall-out, the date and hour of sampling and of measurement must be known for each sample. For uniformity, the use of the 24-hour time scale, rather than A.M. and P.M. notations is recommended. The time zone must be included for both collecting stations and laboratories.

The data sheets, of which a sample is attached, should be filled out completely with the pertinent information, using a separate sheet for each sample. Collecting stations will record the data on the upper half of the sheet, while the laboratories will fill in the counting data. This will aid in the collation of data from the large number of samples to be handled.

Four types of samples are to be used in the study of radioactive fall-out in this program, but not every station will collect each type.

1. Precipitation samples taken by collecting the rain or snow-fall during 24 hours on the specific area of a collecting tray. The insoluble particulate matter is filtered off for measurement.

2. Settled dust samples taken by washing down the surface of the collecting tray used for precipitation samples when no rain or snow-fall occurs. The insoluble particulate matter is filtered off from the washings for measurement.

3. Settled dust samples collected on gummed paper mounted on a metal frame. The paper is destroyed by ashing and the ash used for measurement.

4. Airborne dust samples collected by drawing known volumes of air through a filter with a high-volume air sampler. The filter is destroyed by ashing and the ash used for measurement.

The procedure for taking and handling each of these samples will be given in detail so that comparable results may be obtained at all collecting stations and laboratories.

The sample collection procedure is described in a separate report, a copy of which is attached. This report describes the treatment of samples by the cooperating laboratories.

ASHING PROCEDURE

All samples are ashed before counting. The Whatman filter paper samples are ashed with the cellophane bag, while the gummed paper and air-dust filter samples are ashed without the bag. Platinum or silica dishes may be used, but platinum is preferred.

After transferring the paper to the dish, it is charred at a low temperature and then ignited for one-half hour at about 900° C in a muffle furnace or over a burner.

The ash is brushed out into a plastic dish for counting. The dish supplied is $1\frac{1}{4}$" in diameter with a 3/16" retaining wall.

COUNTING PROCEDURE

In order to compare results from various laboratories, it is necessary to standardize the counting techniques to be used. While the conditions described may not be the optimum, it is believed that they can be reproduced in all of the cooperating laboratories.

A. Sample Dish: The container recommended is a $1\frac{1}{4}$" diameter thin plastic dish with 3/16" retaining walls. It will hold the ash from all of the fall-out samples normally encountered. These dishes will be furnished by NYO, and are reusable if cleaned carefully.

B. Geiger Tube: A thin window (3.5 mg/cm^2) halogen-filled GM tube such as the Amperex 200N will be furnished by NYO. These tubes are very stable, and in an arrangement as described show a background of 10-12 counts per minute.

C. Mounting: The tube is mounted on a standard lucite holder (such as AEC #AK-3A) in a vertical lead castle (such as AEC #AL-14A). The dish is placed on a 3 mm thick aluminum shelf, spaced so that the top of the shelf is about 1.2 cm from the tube face.

D. Scaler: Any standard scaler having a scale of 64 or greater may be used. No modification is necessary, other than the insertion of a 10 megohm resistor in series with the high voltage lead to the GM tube. This may be done at the tube itself.

To eliminate the need for plateau runs, a corona discharge regulator may be inserted in the high voltage supply. A circuit diagram for this modification will be included with each tube, as well as the corona voltage regulator.

E. Standardization: The efficiency factor for converting net counts per minute into d/m is obtained by measuring the counting rate of an NBS standard of RaD and RaE plated on a palladium coated silver disc. The disc diameter is 3.8 cm and the active area has a diameter of 2.4 cm. A standard having a disintegration rate of 5000 to 50,000 d/m is recommended, and the count is taken for 64,000 total counts. The factor should be about 0.12 c/d.

F. Counter Background: The background counting rate should be measured before and after a day's run of samples. With the arrangement described, more frequent tests are unnecessary, unless a spill occurs.

G. Sample Counting: In order to maintain a constant precision of counting over most of the range to be covered, the following procedure should be used to set the minimum counting time. The maximum counting time for any sample is 30 minutes, as a practical limit, and this may be scaled down to 1 minute according to the values in the table below. The data is given for counters having background counting rates of 10, 15 and 20 c/m.

Gross Counting Rate Required for Various Counting Times

Minimum Counting Time	Background 10 c/m	15 c/m	20 c/m
30 min.	15 or less	21 or less	27 or less
20	17	23	30
10	22	30	35
5	30	35	45
2	50	60	65
1	85 or more	95 or more	100 or more

These values are meant to act as guides to minimum counting times, and not as rigid rules for counting.

For the purposes of this work, no sample should be counted less than 48 hours after the end of the collecting period. This will allow time for partial decay of thoron daughter products.

Before any tests occur, each laboratory will have several days' samples to determine the background activity level at the collecting sites. The level of significant activity has been arbitrarily set at five times this background level. (The background and sample activity levels are compared after subtraction of counter background).

When the sample is significantly higher than background, it is set aside and recounted the next day. These two values will allow correction for decay of the total activity (F.P. plus thoron daughters) and separation of the two activities. Since the data sheets were prepared before the second count was proposed, it will be necessary to use a second data sheet to record this data. If the two sheets are fastened together, it should not be necessary to record sampling data on both.

H. Calculations and Reports: The preliminary calculations follow the form recorded on the data sheets. (The final extrapolation will be performed at NYO after sufficient decay rate data has been collected.) Precipitation and settled dust samples are reported as $d/m/ft^2$ per 24 hours. Airborne dust samples are reported as d/m per cubic meter, using the average of the initial and final sampling rates.

Summary sheets are provided for tabulating the data from each site. One sheet should be used for the samples at a single site counted during a week, and the collected summaries sent to NYO at the end of the week. The mailing address is:

Mr. Hanson Blatz
U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, New York

Sufficient summary sheets will be provided so that the cooperating laboratories may keep a carbon copy if they wish. Extra data sheets will also be provided for recording the second count on samples that require it.

The individual data sheets should be sent to NYO, either weekly or at the end of the test.

I. General: It is realized that the procedure described is crude, but refinement is impossible if a large number of samples are to be handled economically. Therefore, it is important that the techniques be standardized.

The factors of self-absorption by the ash and the variation in beta energies are ignored. All results, however, will be corrected at NYO for radioactive decay. For this purpose, any decay curves which the cooperating laboratories can supply will be extremely useful. It is also planned to determine the variation in aluminum absorption data with age of the sample. Any absorption curves which cooperating laboratories can supply will be appreciated.

APPENDIX

The following extrapolation formula was supplied by Dr. K. Z. Morgan for use in correcting for the presence of ThB.

$$F = \left(\frac{T_2}{T_1}\right)^k \left[\frac{Y - Xe^{-\lambda t}}{\left(\frac{T_2}{T_1}\right)^k - e^{-\lambda t}}\right]$$

Where

T_1 = Time at sampling mid-point

T_2 = Time at first count

T_3 = Time at second count

$t = T_3 - T_2$

F = d/m for MFP at T_1

X = Total d/m at T_2

Y = Total d/m at T_3

λ = Decay constant for ThB

The value for k given in "Effects of Atomic Weapons" is 1.2, but there is evidence that the value is closer to 2 during the first few days. Therefore, extrapolations will not be made until this value is established for samples of the type used.

N.Y. FORM 107
(9-10-51)

DATA SHEET

STATION _____

CITY _____ STATE _____

TAKEN BY _____

Start Sample - Date _____ Hour _____ Time Zone _____

End Sample - Date _____ Hour _____ Time Zone _____

Wind Direction _____ Velocity _____

Weather Conditions _____

_____

☐ Precipitation
Estimated Volume Collected _____ pints

Estimated Rainfall _____ inches

Duration, from _____ to _____

☐ Settled Dust on Tray

☐ Settled Dust on Gummed Paper

☐ Airborne Dust

Sampling Rate, start _____ finish _____ ft^3/min.

General Remarks _____

_____

_____

Counting Data:

Time of Counting - Date _____ Hour _____ Time Zone _____

Total Count _____ Counting Period _____ min.

Gross Rate _____ c/m

Background _____ c/m

Net Rate _____ c/m Efficiency Factor _____ c/d

Results _____ d/m/sample

_____ d/m _____
(unit)

Final Extrapolated Value _____ d/m/_____
(unit)

Extrapolated to - Date _____ Time Zone _____

(Use separate sheet for each sample)

NY-98

SUMMARY SHEET

SECRET

COLLECTING STATION...

City......................State............Time Zone........ Tray /_/

Gummed Paper /_/

Laboratory..

City...............State.........Time Zone........

Sample Number	Start Sample Date Hour	End Sample Date Hour	Rainfall /_/ Snowfall /_/ From To	Rain-fall (inches)	Wind Direction	Wind Velocity	Airborne Dust Starting Rate(cfm)	Airborne Dust Final Rate(cfm)	First Count at Date Hour d/m	Second Count at Date Hour d/m	Extrapolated Value
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											
Remarks											

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D.R. GILSON, AD.D.
DATE 11-30-94

SECRET

APPENDIX D

WEATHER BUREAU STATIONS DESIGNATED AS COLLECTION POINTS

Brookhaven National Laboratory

A Atlantic City, N.J.
B New Cumberland, Pa.
C Hartford, Conn.
C Elkins, W. Va.
C Anacostia, Dist.of Columbia
A Norfolk, Va.
B Raleigh, N.C.
C Columbia, S.C.

University of Rochester

A Cleveland, Ohio
D Fort Wayne, Ind.
C Binghamton, N.Y.
B Rochester, N.Y.
C Burlington, Vt.
B Caribou, Maine
D Cincinnati, Ohio
D Lexington, Ky.

Oak Ridge National Laboratory

C Texarkana, Ark.
C Memphis, Tenn.
C New Orleans, La.
D Chattanooga, Tenn.
D Atlanta, Georgia
D Montgomery, Ala.
D Tallahassee, Fla.
B Tampa, Fla.
D Nashville, Tenn.

Argonne National Laboratory

C International Falls, Minn.
A St. Cloud, Minn.
B La Crosse, Wisc.
A Peoria, Ill.
D Sault Ste. Marie, Mich.
D Grand Rapids, Mich.

Hanford Works

C Medford, Oregon
A Seattle, Wash.
B Pendleton, Ore.
C Great Falls, Montana
A Pocatello, Idaho
C Salt Lake City, Utah
C Oklahoma City, Okla.
C Topeka, Kansas
C Norfolk, Neb.
B Rapid City, S. Dakota
C Bismarck, N. Dakota

U. of California - Los Angeles

A San Diego, Calif.
C Santa Maria, Calif.
B Sacramento, Calif.
B Emery Park (Tucson), Ariz.
A Del Rio, Texas
C Corpus Christi, Texas
A Abilone, Texas
C Colorado Springs, Colorado

Code:

A - 1 Tray
B - 2 Trays
C - 1 Tray and Gummed Paper
D - 1 Tray & Hi Volume Sampler

[redacted]

APPENDIX E
LIST OF EQUIPMENT FOR SAMPLING STATIONS

GROUP A - 10 Stations (1 sample per day)

1 Tray
1 Squeegee
1 Kit of equipment for filter samples
70 Data Sheets
1 Set of Instructions
70 Addressed franked envelopes
(addressed to the local analytical lab)
70 Plastic sample envelopes

GROUP B - 10 Stations (2 samples per day)

2 Trays
1 Squeegee
2 Kits
140 Data Sheets
1 Set of Instructions
70 Addressed franked envelopes
140 Plastic sample envelopes

GROUP C - 20 Stations (2 samples per day)

1 Tray
1 Squeegee
1 Kit
140 Data Sheets
1 Set of Instructions
70 Addressed franked envelopes
140 Plastic sample envelopes
1 Frame for gummed papers
70 Sheets of gummed paper

GROUP D - 10 Stations (2 samples per day)

1 Tray
1 Squeegee
1 Kit
140 Data Sheets
1 Set of Instructions
70 Addressed franked envelopes
140 Plastic sample envelopes
1 Hi Volume Sampler
70 4" diameter dust filters
70 Addressed envelopes (addressed to NYOO)

Groups A, B and C are evenly distributed geographically and intermixed but not on the 85th meridian.

Group D stations are along the 85th meridian.

[redacted]

APPENDIX F
FALL OUT TEST ORGANIZATION