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6. If the information furnished by this report does not satisfy your requirements in regard to decontamination of aircraft or Beta radiation, it is recommended that action be taken through normal channels to include any remaining requirements in the scientific program to be conducted during the most series of nuclear tests.

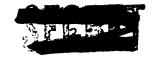
FOR THE COMMANDER:

1 Incl: Pinal Report of Huclear Applications Division

HERSCHEL D. MAHON Colonel, USAF Chief of Staff

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## HEADQUARTERS TEST AIRCRAFT UNIT APO 187, c/o Postmaster San Francisco, California

12 April 1954

#### REPORT OF DECONTAMINATION OF B-36 AIRCRAFT

1. From the experience gained following shot BRAVO in decontamination of B-% aircraft it was apparent that the techniques and utilization of personnel and equipment must be revised. Entirely too much time was used to decontaminate the aircraft and excessive radiation exposures were being accumulated by B-36 maintenance personnel who participated in the decontemination.

2. Decontamination is not 100% effective due to the nature of radioactivity and the inherent problem of completely cleaning all aircraft surfaces and engines. The aircraft washing personnel were required to receive additional radiation exposure during the maintenance phase. It was also apparent that the Task Group might be required, because of delays due to adverse weather, to accelerate the turn around period as scheduled for the original "Shot" program: Thus, the need for an effective and time saving decontamination program.

3. Equipment, personnel, and procedures used in decontamination for shot BRAVO were as follows:

a. Equipments

CLASS	STOCK
Power	
-	5001-240035-NL
	E-5-59-2
AF-29	6700-123175
AF67	7300-190100
AF06	7500-395000
AF-136	8320-818100
AF-134	8310-125000
AF-13B	8320-275000
AF-138	8320-930000
AF-13B	8320-810000
AF-13D	8340-860000
AF-13D	8340-135000
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Report of Decontamination of B-36 Aircraft, cont'd

Shield, Face	AF-13D	<b>8330-7</b> 00825
Apron, Rubber	AF-134	8310-007500-555
Gloves, Rubber	AF-13A	8310-296325
Respirator, Dust	AF-130	8330-682000
Detergent, Powder	AF-07	7300-NL
Truck, Fuel Servicing	AF- 50A	5001-770050-435

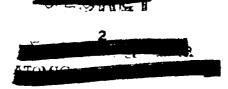
### b. Personnels

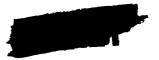
- (1) One (1) officer and two (2) NOO supervisors (Rad-Safe personnel).
- (2) Eleven (11) B-36 maintenance personnel/aircraft.
- (3) One (1) water heater operator.
- (4) Four (4) truck drivers/shift.

c. Utilizing the personnel and equipment above, the following procedures were used:

- After the completion of the mission and the aircraft had landed they were parked in an isolated area and allowed to decay for a specified length of time. In this case, the period was 20 hours after the initial exposure.
- (2) Stands were placed into position, cowling removed and a gunk-kerosene mixture in the ratio of 1:5 applied over the exterior surface of the aircraft and engines. Surfaces were scrubbed while the mixture was applied. Following this, a warm water and detergent mixture was applied to remove the emulsion formed by the gunk. This in turn was followed by a water wash to remove all residue. The surfaces of the aircraft were allowed to drain for 30 minutes and then readings were made of the radiation levels.
- (3) Maintenance personnel ware utilized throughout the decontamination process for decontamination of their aircraft, in this particular instance for 18 hours. Other personnel were used on a 12 or more hour shift basis.
- (4) AN/PDR 39C radiac instruments were used to read levels of gamma contamination. Caution must be used in making these observations as an accumulation of water in certain parts of the cowling will cause these areas to read higher following decontamination than before.
- (5) The entire procedure above was repeated for a second time. It has been found that if an aircraft is thoroughly cleaned in two (2) washings it is impossible to bring the contamination level down any noticeable degree by further washings.

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Beport of Decontamization of B-36 Aircraft, cont'd

4. Evaluation of the aircraft decontamination program following shot BRAVO revealed the following discrepancies:

a. Insufficient numbers of personnel were assigned to the decontamination of B-36 aircraft.

b. Maintenance crews assigned to the aircraft should not be used for decontamination because of the limited radiation exposure allowed during this operation.

Inmediate maintenance facilities should be available for the C. repair of decontamination equipment. Approximately six (6) hours were lost due to breakdown of equipment, all of which was new.

e. Improper scheduling of weshing crews resulted in approximately four (4) hours per aircraft lost for meal periods.

e. Adequate lighting facilities for night operations were not available.

f. Safety features for wash crews working on top of B-36 wings were not available.

5. Equipment, personnel and techniques used in decontamination for shot POMEO were as follows:

In addition to equipment listed in paragraph 3a, the following **a**. were used:

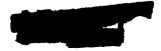
- (1) One (1) series of three (3) water heaters and one (1) series of two (2).
- (2) Night lights installed on poles.
- (3) One (1) 750 gallon oil truck for storage and dispensing of kerosene.
- (4)Trapeze type safety cable and harness.

Ъ. Parsonnel:

- One (1) officer and three (3) NCO supervisors (Rad-Safe (1)personnel).
- (2) Fifteen (15) non-aircraft maintenance personnel/6 hour shift.
- Three (3) heater operators (one per eight hour shift).
- Five (5) truck drivers per eight hour shift.
- One (1) fuel truck operator per twelve hour shift. Une (1) automotive mechanic (24 hour call).
- One (1) clerk administrative (twelve hour shift).

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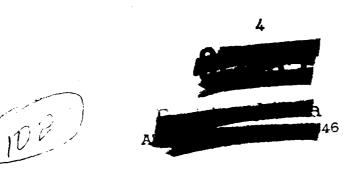
Report of Decontamination of B-36 Aircraft, cont'd

#### c. Procedures:

- (1) The first major change in technique for operation ROMEO was to allow the aircraft to decay for approximately 44 hours rather than the previous 20 hours. This reduced personnel exposure by approximately 25-44\$.
- (2) The entire procedure for utilizing of personnel was changed. Maintenance crews removed cowling and prepared the aircraft for decontamination, but did not participate in the washing. Personnel were taken from other jobs for this purpose. Wash crews were divided into four (4) grammers and put on a six (6) hour shift on a 24 hour a day basis. For the six hour shift no breaks were given. This eliminated delays previously encountered due to meals, occasional change of cloths, coffee breaks, etc. One (1) truck and equipment mechanic was kept on 24-hour call in case of breakdown.
- (3) Another improvement was the installation of "telephone pole lighting". This did away with the necessity of spot lights for night work and the consequential blinding effect.
- (4) Installation of a Trapeze type safety harness for airmon working on top of B-36 wings was a safety factor that increased the effectiveness of scrub personnel.
- (5) A minor function accomplished was the drilling of small holes in drain area of cowling which eliminated accumulation of contaminated wash water.
- (6) Supply of hot water was increased by putting two (2) more heaters into operation.

6. In summation, B-36 aircraft were decontaminated in one half to one third the time on ROMED as compared to BRAVO. Maintenance crows did not accumulate excessive doses of radiation and were able to perform maintenance without undue fatigue.

7. For specific times, dates, and intensity readings see the attached chart. (Chart #1)



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Report of Decontamination of E-36 Aircraft, cont'd

8. Chart #2 and #3 indicates the radiation exposure savings on maintenance personnal following shot ROMBO.

9. Chart #4 indicates a few details of the cloud sampling operation.

FINIS A. MITCHELL Major, USAF Chief, Nuclear Applications Division

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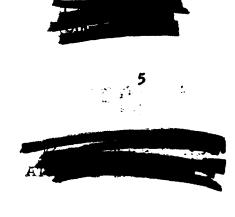


CHART I

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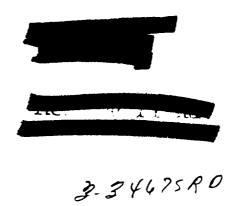
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Truck Maint Required - Minor

Minor

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CHART #2



## RADIATION EXPOSURE OF B-36 MAINTENANCE CREWS

### Aaft #1086

BRAVO (Decontamination plus Maintenance ROMEO (Maintenance Readings only) Film Badge Readings)

465 mr/hr
470 mr/hr
560 mr/mr
440 mr/hr
700 mr/hr
655 mr/hr
595 mr/hr
380 mr/hr
470 mr/mr

6425 MR total for crew

4835 mr/hr total

Saving of 25% exposure

#### CHART #3

1

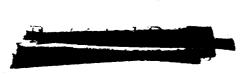
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345 mr/hr	550 mr/hr
970 mr/hr	530 mr/hr
960 mr/hr	620 mr/mr
1370 mr/hr	630 mr/hr
295 mr/hr	0
960 mr/hr	720 mr/hr
860 mr/hr	5 <b>30 mr/hr</b>
620 mr/hr	00
440 mr/hr	860 mr/hr
520 mr/hr	0
520 pr/br	0
7860 mr/hr total for crew	4440 mr/hr

Saving of 44% exposure

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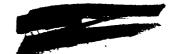


CHART #4

## SAMPLING INFORMATION B-36, #1086

Shot Name:	BRAVO (1 Mar 54)	ROMEO (27 Mar 54)
Shot Time:	0645	06 <b>30</b>
Penetration Time:	1025-1105	095 <b>1-1100</b>
Intensities during Penetration	1.5-4 R/hr	2.1-5 R/hr
Background leaving cloud	0.4 R/hr	1.5 R/hr
In cloud exposure	3.0 R	3.0 R
Time of Landings	12:05	12:00

# SAMPLING INFORMATION B-36. #1083

Shot Name:	BRAVO (1 Mar 54)	ROMEO (27 Mar 54)
Shot Time:	0645	
Penetration Time:	1114-1214	1310-1454
Intensities	3 B/har	.08 R/hr
Background leaving cloud:	1 R/h <b>r</b>	.03 R/hr
In cloud exposure:	2.45 R	.3 R
Background on landing (cockpit)	0.7 R/m	.03 B/hr
Time of landing:	1300	1554

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