



To Members of the Air Measurements Sub-Committee

I enclose the draft of the proposed Air Measurements Sub-Committee Report which as you will remember was approved in principle at our meeting this morning. Will you please let me have your detailed comments by Tuesday August 2nd.

There are a number of typographic and drafting errors in the document for which I apologise, and shall be grateful for any attempts you may make to draw my attention to these.

Throughout the document it is intended to use the letter F to replace H as the symbol for the time of burst. This will ensure uniformity between Mosaic and Buffalo.



25th July, 1955.



[REDACTED] [REDACTED]

Minutes of a Meeting held in [REDACTED]
[REDACTED] on 10th November, 1955,
to discuss handling and Servicing of Sampling and Cabin
Filters on Operations Mosaic and Buffalo

Present:-

[REDACTED] (Chairman) S.R./C.R./ [REDACTED]
I.A.M./R.A.E.
D.D. Ops/A [REDACTED]
Air Eng. 7 (C.G.)
C.S.D.E.
S.C.E.H. [REDACTED]
S.C.E.H. [REDACTED]
S.E.P./ [REDACTED]
S.E.P. [REDACTED]
(Secretary) R [REDACTED]

Action

1. The Chairman opened the meeting by making the general point that all the filters concerned, once used, were Security Material and as such should be numbered, and held by one agreed responsible person. It was agreed that [REDACTED] S.C./E.H. should be responsible for the filters, and filter storage would be under his control. He should liaise with the Senior Technical Officer of Task Force 308/5, at Operation Mosaic and with the Senior Technical Officer appointed for Buffalo, on matters concerning installation of particular filters in particular aircraft.

2. Expected Dose Rates

2.1 Aircrew. [REDACTED] said that a provisional estimate showed that based on an assumed sampling time at H + 20 minutes, and an airflow of 25 lbs per minute through the system; there was a probable factor of safety of 6 on the airflow and a factor of 2 on the dust concentration. For the aircrew with a 1½ hour flight after sampling the likely dosage from all filters (cabin and sampling) is 1 to 2 r.

2.2 Ground Crew. The following provisional figures were given by [REDACTED]

24 hours after sampling.

Port Pre-filter	0.2 r per hour at ½ metre) 4.5 r per hour at 10 c.m.)
Starboard Pre-filter	0.08 r per hour at ½ metre) 2.0 r per hour at 10 c.m.)
H.E. Filter	0.02 r per hour at ½ metre) 0.4 r per hour at 10 c.m.)
Ventilated Suit Filter	0.018 r per hour at ½ metre) 0.450 r per hour at 10 c.m.)
Air Bag Filter	0.015 r per hour at ½ metre) 0.380 r per hour at 10 c.m.)
Hk.VIII Filter	.013 r per hour at 2 metres

2 hours after sampling

Hk.VIII Filter	0.25 r per hour at 2 metres) 1.00 r per hour at 10 c.m.)
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100

/2.3

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

2.3 It was agreed that [REDACTED] /S.H.P. would state a time for the aircraft, after which it will be safe for the filters to be handled. This figure will be incorporated in C.S.D.E. amended servicing schedules. In the actual operation, it will be necessary for the [REDACTED] Health Physics representative to monitor the dose rates of the components prior to handling.

2.4 [REDACTED] stated that the Ek.III duct, being used in Buffalo only, at 2 hours will give the following doses

2 r per hour at 2 metres
130 r per hour at 1 metre.

This filter gives the greatest dose rate of any, and the technique of removal of 8 filters from it would have to be carefully considered.

3. Cabin Filters.

3.1 [REDACTED] showed examples of cabin filters and described them. Their weights are:-

Roughing Filter	14 lbs
High Efficiency Filter	56 lbs
Ventilated Suit Filter	25 lbs

3.2 Responsibility for Servicing and Handling.

3.2.1 It was agreed that installation and taking out of filters should be by R.A.F. tradesmen under [REDACTED] supervision.

3.2.2 Repacking of filters will be the responsibility of [REDACTED] /S.C.E.M.

3.2.3 [REDACTED] to provide protective clothing for R.A.F. tradesmen.

3.2.4 [REDACTED] and [REDACTED] would go through the Servicing Schedules in detail to see that all points where there was any Health Hazards are covered by special orders.

3.3 Amendments to Servicing Schedules. It was agreed that amendments to schedules would be necessary up to Minor Servicing as this would have to take place between Mosaic and Buffalo.

3.4 Servicing Team Protection. Prior to servicing an aircraft, personnel would pass through the decontamination hut where they would be issued with necessary protective clothing. This clothing would be taken off in the decontamination hut after servicing.

[REDACTED] asked whether sufficient cleaning rags had been ordered. [REDACTED] said that these would be obtained locally.

[REDACTED] also asked whether all members of servicing teams would have a blood test prior to the operations, in order to have something to check a blood count against. S.H.P. to take the matter up with [REDACTED] and R.A.F. [REDACTED] to get the opinion of Air Ministry [REDACTED]

[REDACTED] raised the question of identification of personnel when wearing respirators. [REDACTED] stated that the men would be wearing white overalls and their names could be written on their backs in washable chalk as they passed through the decontamination hut.

3.5 Air Crew Protection. Two sets of protective clothing to be carried in aircraft, in case it is necessary to force-land and re-fuel at an airfield with no decontamination facilities. These sets to be

/provided

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]
provided by [REDACTED] (S.C.E.M.) also a P.V.C. sheet to place over aircraft exit to protect crew getting out of an aircraft after a sampling run. [REDACTED]

3.6 Transportation of filters.

3.6.1 [REDACTED] R.A.F. [REDACTED] to arrange with [REDACTED] and Air Ministry for the carriage of cabin and sampling filters in the aircraft taking G.1 to Onslow; filters to go on for unloading at Pearce. [REDACTED]

3.6.2 [REDACTED] to arrange for a supply of caps for cabin filter ends after taking off the aircraft. [REDACTED]

3.6.3 [REDACTED] to be responsible for all filters after arrival at Pearce until their disposal; he is also responsible for the transportation of any filters between Pearce and Maralinga. [REDACTED]

4. Sampling Filters

4.1 Responsibility for Servicing and Handling.

4.1.1 It was agreed that it would be possible to tolerate a few minutes in close proximity to filters. The Mk.III duct for use only in Buffalo is likely, however, to have a much higher dose rate than the Mk.VIII duct.

4.1.2 Handling tools to be supplied by [REDACTED] for both Mk.III ducts and Mk.VIII ducts; [REDACTED] agreed to redesign the handling equipment for the Mk.III filters and it was agreed that there should be two tools made for every 'lead coffin' filter receptacle produced. [REDACTED]

4.2 Amendment to Servicing Schedules. The handling of the filters would be an addition to the schedules: [REDACTED] to write up after handling trials at Weston Zoyland. [REDACTED]

4.3 Transportation of Filters

4.3.1 [REDACTED] to ship out by sea transport Mk.III ducts for Buffalo. N.B. One set to remain at R.A.F. for flight trials and subsequently to go to Weston Zoyland for servicing trials. [REDACTED]

4.3.2 Mk.VIII filters to be transported with the cabin filters in aircraft carry G.1 to Australia. [REDACTED]

4.4 Storage of filters. Filters will be handled and stored at Pearce by [REDACTED] as per para.3. [REDACTED]

4.5 Handling of filters. Personnel handling filters will be given protective clothing under S.L.P./S.C.E.M. arrangements. [REDACTED]

5. Any other Business.

5.1 Pressurisation of Wing Tank. [REDACTED] produced a sample of the type of filter between 12th stage air tapping and wing tip tank, C.S.D.E. to check how long a replacement of contaminated filter would take. [REDACTED]

5.2 Electrical Tests. [REDACTED] queried the extent of sampling equipment functioning tests. It was agreed that filter actuator mechanisms should be tested on the ground: Servicing Schedules to be amended accordingly. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

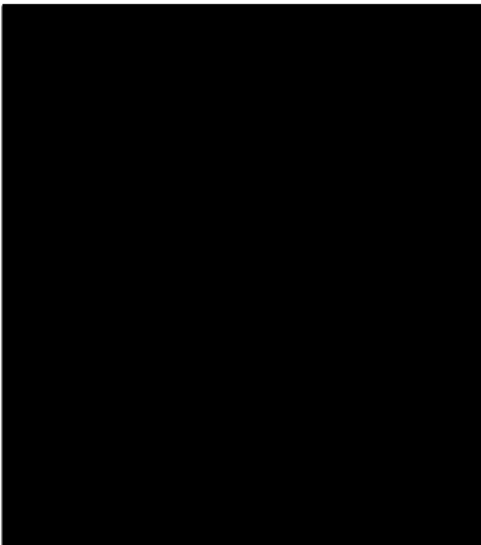
[REDACTED]

28/10



Minutes of a Special Meeting of the Buffalex Air Measurements Sub-Committee held on 13th October, 1955

Present:-



S.R./C.R.
RAF/IAM
RAF/IAM
Air Ministry
RAF/IAM
S.H./P.R.
S.H./P.R.
S.P.T.
S.P.T.
RAF/
D.G.M.S.
S.C./E.M.
S.C./E.M.
Ops. A.W.T.
Ops. A.W.T.
S.P.T.

1. Cabin Ventilation and Pressurised Suit Systems

1.1 [redacted] outlined the present position on the provision of the equipment for cabin ventilation and pressurised suit systems for the prototype B6 aircraft. These can be summarized as follows:-

Filters:- Manufactured by R.A.E. Completion date 25.10.55
Brackets etc:- Manufacture by R.A.E. Commenced 14.10.55.
completion date uncertain.

1.2 [redacted] estimate that prototype installation should be completed in the B6 Canberra by 4.11.55. This assumes that the water extractors and other fittings being manufactured by Godfreys will be ready at the latest by 28.10.55.

1.3 [redacted] expressed concern as to whether Godfreys will be able to meet this date particularly in connection with the water extractors, this equipment being vital for flying trials to be carried out.

1.4 After discussion it was agreed that [redacted] should pay an early visit to Godfreys to point out the absolute necessity of producing the extractors within the next two weeks. In the absence of a satisfactory answer he would report to the Chairman who will consider requesting the Director to take action.

1.5 The estimated timetable for equipment to be installed in the remaining six aircraft for Mosaic was given as follows:-

- (a) Main and Suit Filters, including spares - 6 sets of each plus 2 spare of each probably at rate of 1 off each per week commencing 1.11.55
- (b) Replaceable Pre-Filters - 18 pairs (assuming replacement every flight) at rate of 6 pairs commencing 1.11.55, remaining 12 pairs (of replacements) subsequently to 13.12.55.

- [REDACTED]
- (c) Brackets - Unconfirmed
 - (i) Godfrey fittings - 6 sets, delivery demanded commencing in November, completed December, 1955.
 - (ii) Installation (at B.C. Maintenance Unit) - 2 per month, commencing November i.e. completed January 1956.

1.6 [REDACTED] then outlined the consequences of the modifications that are being made to the ventilation system. These may be listed as follows:-

- (a) The flow of air to the cabin will be slightly reduced, though the reduction should be less than 10%, according to calculations by English Electric Co.
- (b) The range of the cabin-air temperature selection control which may safely be used will be restricted: "Fully cold" may not be selected as it would result in icing of the filter unit and consequent stoppage of the air flow: "Fully hot" may not be selected because air at a temperature of over 80°C will char the pack of the high-efficiency filter.
- (c) The useful life of the Godfrey cold-air unit will be reduced (by an amount to be found by rig-tests) on account of erosion caused by passage through it of microscopic glass-fibre particles if any are detached from the packs of the pre-filters. Glass wool packs must be used for these units as the temperature of the air passing through them may reach 320°C.

1.7 Turning to the ventilated suit system to be adopted, [REDACTED] said there was insufficient time to complete the design of a new system for supplying air to the Mk. II suits. As a consequence Mk. I suits will be used, together with an electrically heated suit. The air supply system for the suits will be a modification of a standard B.C. modification using a 7th stage tapping. [REDACTED] said that just enough power would be available for heating these suits if [REDACTED] was not a requirement. [REDACTED] confirmed that this equipment would not be required as 2 H.F. and 2 V.H.F. sets will be installed.

1.8 The meeting then discussed steps that might be taken if difficulties regarding supply of equipment became more serious. It was agreed that the modification adopted for a previous trial could be carried out in a short time, though it was doubtful whether approval of such modifications would be given by the R.A.E. Structures Department.

1.9 [REDACTED] was asked to consider a procedure that might be adopted if the water separators were not fitted. [REDACTED] said that the system adopted seemed considerably more complicated than that originally envisaged by [REDACTED]. [REDACTED] thought, however, that as only one or two items were holding up completion it was essential to afford high priority to them. [REDACTED] suggested that a date should be fixed, after which emergency action should be instituted if delivery dates of equipment could not be met. [REDACTED] said the question would be kept under constant review.

1.10 [REDACTED] raised the question of the number of glass wool pre-filters that will be required. On the basis of their being changed after each flight it was estimated that a minimum number of 28 will be required for Mosaic, but that 42 should be provided if possible.

1.11 [REDACTED] suggested that modifications in hand on the P.R.3. Canberra should be continued, but on a lower priority. This was agreed.

2. Other Canberra Equipment

- 2.1 [REDACTED] said that two Mk. VIII ducts had been delivered to R.A.E., and that assembly of the Mk. III ducts was still proceeding. Concerning gas sampling, no bag had yet been produced. It was hoped to obtain a small bag in seven to ten days for a bursting test.
- 2.2 [REDACTED] asked whether cold finger sampling was to be included as a requirement. [REDACTED] said that it depended whether a complete unit could be installed in a Varsity. The measurement would be restricted to Buffalo only.
- 2.3 [REDACTED] confirmed that the provision of 1320 A monitors was in hand. Commitments for the provision of barrier paint and F.24 cameras will also be met.

3. Transport of Late Equipment for Mosaic

- 3.1 [REDACTED] said that there were certain items of equipment which would not be ready to meet the latest shipping date. In order that arrangements could be made for air transport, it was essential that such items should be listed giving approximate dimensions and weight, and passed to [REDACTED]. Arrangements would then be made by him with the administrative staff of the Operation.

[REDACTED] said that he would help as far as he could to meet any commitment that arises. He pointed out, however, that available space on the Varsity aircraft will be very restricted.

4. Use of Helicopters for Air Measurements

- 4.1 [REDACTED] stated that the Operational Commander for Mosaic had requested that two helicopters be made available for air-sea rescue and other purposes. Assuming that they can be provided it had been suggested that they might also be used for crater survey. [REDACTED] said that it would be impossible for the helicopters to cover the complete aerial survey commitments that have been allocated to the Varsity aircraft, but [REDACTED] pointed out that it was the intention only to use them for crater survey. [REDACTED] said that discussions were at present proceeding between the Royal Navy and the R.A.F. as to who would supply the helicopters, and that an answer as to their availability could be expected in the course of a few days. If they can be made available they would be used on Operation Buffalo in addition.
- 4.2 [REDACTED] then outlined the equipment that it would be necessary to install in the helicopters for crater survey purposes. It would be the same as that fitted into the Varsity aircraft and could be rapidly inter-changeable between the two types. A crater survey would not be carried out until approximately D + 10; but [REDACTED] pointed out that as far as G.1. was concerned this was liable to clash with the immediate preparations for the firing of G.2. One logistic difficulty [REDACTED] referred to was the necessity of loading the equipment prior to a survey with approximately 30 lbs. of ice. The only likely source for this material is Onslow.
- 4.3 The survey will be carried out at a height of approximately 500 ft., and it was agreed that if the helicopters can be made available a detailed statement of the operational procedures should be prepared by [REDACTED] for submission to [REDACTED] for subsequent incorporation in the scientific plan.
- 4.4 As far as servicing the helicopters was concerned [REDACTED] said that an R.A.F. team is being included in the Force to cover this requirement.

4.5 [redacted] then referred to their possible use at Operation Buffalo. [redacted] said that he intended including two in this Operation for air-land rescue at Maralinga in any case. [redacted] outlined requirements that have been proposed for them at Buffalo, but it was firmly decided by the Committee that the number of two could not be increased in any circumstances. In this connection it would be the responsibility of S.P.T. to work out a system of priorities for their use. [redacted] was anxious that the general priority of their provision should be kept high, as this would enable him to stand a greater chance of acquiring them.

4.6 It was agreed that [redacted] should proceed with plans for fitting the survey equipment in the helicopters.

4.7 [redacted] said that it would be necessary to refuel them on the Islands and that the R.A.F. will be responsible for dumping quantities of fuel for this purpose.

5. Tests on Prototype Bhangmeters

5.1 [redacted] said that there were two prototype bhangmeters being developed one of which was based on gamma measurements and the other on thermal measurements. He thought that the second type was fundamentally the more sound, and asked whether the Committee could advise whether the gamma instrument should be superseded by the thermal instrument. [redacted] thought that it was not a matter for the Committee to decide. [redacted] however, stated that he was prepared to support the development of the thermal instrument to the exclusion of his gamma instrument, and it was agreed that he should write to C.R. suggesting this.

5.2 [redacted] said that a request had been made for the thermal instrument to be tried out on Mosaic. [redacted] said that he had no official knowledge of this requirement, but would agree to investigate it. In answer to [redacted] it was stated that no air commitment was required for this prototype test at Mosaic.

[redacted]

[redacted]

26th October, 1955.

Distribution:-

[redacted]