

Commander Arklay said that space models of the filters would be available in about 10 days as an completion dates of the

Action by

Wg.Cdr.
Arklay

DEFE 16/249 CRET

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Minutes of a Meeting held at the Institute of Aviation Medicine, Farnborough on Wednesday 6th July, 1955 to discuss the modifications to the Canberra Aircraft for Operations "Mosaic" and "Buffalo"

1. A meeting was held at 2.30 p.m. on Wednesday 6th July, 1955 in the Conference Room at the Institute of Aviation Medicine, Farnborough to discuss progress on the various modifications required in the Canberra aircraft to be used in Operations "Mosaic" and "Buffalo". The following were present:-

Wing Commander A. W. Eyre
Wing Commander H. P. Ruffel Smith
Air Commodore D. Wilson
Wing Commander W. Surtees
Wing Commander J. T. Arklay
Squadron Leader J. Munro
Sqn.Ldr. S. S. Dobbs.
Wing Commander E. B. Symonds
Mr. S. E. Smith
Dr. F. Morgan
Mr. G. C. Dale
Dr. D. G. Stevenson
Mr. B. W. Hawkins
Mr. T. E. Hogg
Mr. F. Whiting
Mr. A. Down
Flt.Lt. P. Clay

R.A.F./A.W.R.E. (Chairman)
I.A.M. Farnborough
Air Ministry, D.G.M.3.
Air Ministry, Ops.B.4.
Air Ministry, Air Eng.7 (C.G.)
Air Ministry, Air Eng.7 (C.G.)
Air Ministry, Ops.B.4
H.Q. Maintenance Command
A.W.R.E. (S.C/E.M)
A.W.R.E. (S.R/C.R)
A.W.R.E. (S.H/P.R.)
A.W.R.E. (S.C.E.M)
A.W.R.E. (S.D.E.)
A.E.R.E.
R.A.E. E.A.S.D.
English Electric Co. (R.A.E.)
R.A.F. A.W.R.E. S.H/P.R. (Secretary)

2. There will be two operations in 1956, namely "Mosaic" and "Buffalo" for which a total of ten (10) Canberra aircraft will be required. The ten aircraft will consist of five (5) Mark B.3 and five (5) Mark P.R.3. On Operation "Mosaic" five (5) or perhaps seven (7) Canberra aircraft will be required, and five (5) of these will be the mark B.3. Operation "Buffalo" will be held after "Mosaic", and since the same aircraft will be used on both operations it is essential for all the aircraft to be modified up to the "Buffalo" standard. Further, each aircraft will be fully modified so that if necessary it can take any of the scheduled items of equipment.

3. For the benefit of representatives not conversant with the various modifications, and items of equipment to be installed, the Chairman asked the officers responsible for the various items to give a short description of the modification when their particular item was discussed.

4. Cabin heating and cooling system, filter design and positioning

Action by

4.1 Mr. S. E. Smith said that three (3) types of filters would be required in each aircraft.

- (a) High efficiency filter
- (b) Roughing filters
- (c) Ventilated suit filters.

Squadron Leader J. Munro
Sqn.Ldr. S. S. Dobbs.
Wing Commander E. B. Symonds
Mr. S. E. Smith
Dr. E. Morgan
Mr. G. C. Dale
Dr. D. G. Stevenson
Mr. B. W. Hawkins
Mr. F. F. Hogg
Mr. F. Whiting
Mr. A. Down
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Air Ministry, Air Eng.7 (C.G.)
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Air Ministry, Ops.B.4
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A.W.R.E. (S.C/E.M)
A.W.R.E. (S.R/C.R)
A.W.R.E. (S.H/P.R.)
A.W.R.E. (S.C.E.M)
A.W.R.E. (S.D.D.)
A.E.R.E.
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- (a) A high efficiency filter
- (b) Roughing filters
- (c) Ventilated suit filters.

4.2 High Efficiency Filter. The high efficiency filter would fit into the second bay in the port mainplane. On the B.6 it would be necessary to move the turbine and compressor unit into the third bay in order to accommodate it. The filter would have a pressure drop of 10 ins. water guage, although if it became clogged this would increase by several inches. This possibility was remote.

4.3 The filter was designed for a flow rate of 8 lbs. of air per minute (equivalent to 100 c.f./m.) and would be tested to a pressure of 10 lbs/Sqn.in.

4.4 Mr. Down pointed out that when the control setting was on cold the flow rate could increase up to about 24 lbs/min. Mr. Smith said that he was not aware of this and asked Mr. Down to let him have further details since it may be necessary to change the design of the filter to cater for such a high flow.

Act
Mr. Down

4.5 Mr. Hawkins said that two units were being made for the initial installation, and provided no radical alterations were necessary these would be made available at Farnborough on 15th July, 1955. (Now the 19th July - Secretary)

Mr. Smith
Mr. Hawkins

Roughing Filters

4.6 Mr. Smith said that in the B.6 two (2) roughing filters would be installed, one after each engine isolation valve; and in the P.R.3 three (3) roughing filters, one after each engine non-return valve, and one in the cold air inlet pipe. It was assessed that under the worst conditions these filters would have a life of two flights, and therefore provision should be made for the filters to be exchanged after two flights. (Decision subsequent to the meeting - after every flight - Sec)

Mr. Smith

4.7 These roughing filters for the B.6 trial installation would be available in about 4 weeks time, and space models would be made available at Farnborough on 20th July, 1955.

4.8 It was agreed that when the aircraft were being ferried, and on flights through non active areas, all the filters should be removed and replaced by ordinary piping

Sqn.Ldr.
Dobbs

Ventilated Suit Filters

4.9 Dr. Morgan said that there was uncertainty about the yield of the "Mosaic" weapons and that provision must be made for the aircraft flying above 45,000 feet. Wing Commander Ruffel Smith said that at such altitudes, pressure, and ventilated suits were necessary; and "Get-you down procedures" must be considered. Advice on the subject should be obtained from the pressure suit unit at the R.A.E.

Wg.Cdr.
Ruffel Smith

Mr. Smith said that a suitable filter was available which would be adapted to the system when details of the aircraft modifications became available. Sqn.Ldr. Dobbs was asked to obtain details of the modifications required on the B.6 and PR.3.

Mr. Smith
Sqn.Ldr.
Dobbs.

Sampling filter design and positioning

5.1 Wing Commander Arklay gave a brief description of the three types of filters. These are:-

(a) Travelling strip

... cylindrical filter (Mark 8)

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Mr. Smith
Sqn.Ldr.
Dobbs.

5. Sampling filter design and positioning

5.1 Wing Commander Arklay gave a brief description of the three types of filters. These are:-

- (a) Travelling strip
- (b) Small cylindrical filter (Mark 8)
- (c) Tip tank filter (Mark 3)

Only one of these, namely (b) small mark 8 filter will be used on "Mosaic", and each aircraft will be modified to carry two units. All three types will be used in "Buffalo".

5.2 For types (a) and (b) the most suitable mounting position on the aircraft would be on pylons under the wing, but this would involve quite a large modification. After discussion it was decided that Wing Commander Arklay, Squadron Leader Dobbs and Mr. Whiting should investigate the problem and decide on the most suitable position. Mr. Whiting also stated that full structural and aerodynamic clearance would be required for this installation.

Wg.Cdr.
Arklay
Sqn.Ldr.
Dobbs.
Mr. Whiting

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5.3 Wing Commander Arklay said that space models of the Mark 8 and Mark 3 filters would be available in about 10 days time. He would not commit himself on completion dates of the final equipments

Action by
Wg.Cdr.
Arklay

5.4 It was also stated that the internal modifications to the aircraft would be relatively simple. An actuator cable to each filter position would be required, together with switches and indicators (a total of 4 switches and 4 indicators).

Wg.Cdr.
Arklay
Sqn.Ldr.
Dobbs.

6. Air Sampling Bag design and positioning

6.1 The proposed design of this equipment was described by Wing Commander Arklay. Air will be pumped from the 12th stage of the engine compressor into a 100 cubic ft. capacity rubber bag fitted into the bomb bay of the B.6, and into a 50 cu.ft. capacity bay in the flarebay of the P.R.3. In each case a pipe of about $1\frac{1}{4}$ ins diameter will be used, and the system will be electrically actuated. Dr. Morgan said that a direct comparison between the gas and particulate matter from the same portion of the cloud was required. Therefore, a low pressure drop filter (about $\frac{1}{4}$ in. water guage) would be fitted in the pipe line.

Wg.Cdr.
Arklay
Sqn.Ldr.
Dobbs

6.2 Wing Commander Ruffel-Smith expressed concern at the possibility of an explosion occurring should the bag fail under pressure. Wing Commander Arklay reported that the bags would be hydraulically and gas tested before installation within the temperature range -10°C up to 200°C ., and that the bag would be enclosed within a metal cage when fitted to the aircraft. It was then pointed out that the hot air supply to the bomb bay would be off, and therefore the temperature was likely to go below -10°C . Wg.Cdr. Ruffel Smith agreed to carry out flying tests to determine what the minimum temperature was likely to be.

Wg.Cdr.
Ruffel Smith

6.3 It was stated that completion dates for the bags could not be given due to a hold up in raw material. The manufacturing firm required a higher priority. Dr. Morgan agreed to investigate.

Dr. Morgan

Camera hatch positioning of equipment.

7.1 Mr. Hogg said that the electronic equipment to be fitted into the camera hatch would be enclosed in a pressurised cylinder 3 ft. long x 15 ins. diameter. The weight including the mountings would be about 1 cwt. It was agreed that the installation should be fairly simple, and that the R.A.E. should advise on the design of the mounting.

Mr. Hogg
Mr. Whiti

Contamination of the engines and aircraft skin. (This as additional to the agenda)

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Mr. Hogg
Mr. Whiting

8. Decontamination of the engines and aircraft skin. (This item was additional to the agenda)

8.1 Engines. Dr. Stevenson told the meeting that modifications and experiments were being carried out at A.W.R.E. into the possibility of decontaminating the engines by spraying a cleaning emulsion through whilst the engine was running. It was hoped that it would be possible to fit a tube around the front of the engine for injection of the fluid from a tank fitted in the bomb bay so that the decontamination could be done in flight. Air Commodore Wilson said that on the aircraft used in "Totem" most of the contamination was found to be burst into the flame chambers, and at the bottom of the bleed valves. He doubted if the emulsion would touch this. Air Commodore Wilson agreed to obtain R.A.F. reports on the subject for A.W.R.E.

Air Cdr.
Wilson

8.2 After further discussion the Chairman ruled that the subject should be discussed in detail at A.W.R.E. by the personnel directly concerned before further action was authorised.

8.3 Aircraft skin. Dr. Stevenson said that this project was well advanced, and a decontamination top coat paint was now undergoing trials on an aircraft at Farnborough. To date the best standard finish of the three available (D.T.D.900,772 and 827) was found to be D.T.D.900. Mr. Whiting said that the B.6 was sprayed to D.T.D.900, but not the P.R.3. The R.A.E. could not undertake the task of respraying the P.R.3 with D.T.D.900.

8.4 It was agreed that in the actual trial, parts of the aircraft should be left free of decontamination paint so that the effectiveness of the paint could be accurately assessed.

Sqn.Ldr. Dobbs.

9. Pressure Cabin Positioning of equipment and switches

9.1 Cloud Tracking Equipment. Mr. Dale showed the meeting the proposed equipment. It consists of a Type 1320A battery operated monitor with a sensitive geiger head. The monitor is approximately 10 ins. x 3½ ins x 10 ins. deep, and should be fitted in an antivibration mounting in a position where the dial can be seen by the Navigator. The geiger tube could be fitted on a bracket, and its position was not critical; the only limitation being that it should not be heavily locally shielded.

Mr. Dale
Wg.Cdr. Ruffel Smith

9.2 Switches. Wing Commander Ruffel Smith suggested that all the switches and indicators should be mounted together on a board and installed in a position where they could be operated by the Navigator. The meeting agreed.

Wg.Cdr. Ruffel Smith
Sqn.Ldr. Dobbs.

9.3 Dose Rate Meter. Mr. Dale said that at a previous meeting a requirement had been stated for a dose rate, meter to be installed in the pressure cabin. In his opinion such a meter would not serve any useful purpose, since the dose rate is independent of the yield of the weapon and the total dose received by the crew would depend only on the size of the cloud and the time spent within it. The crew would be carrying integrating dosimeters. The meeting agreed to accept Mr. Dale's advice, and the requirement was withdrawn.

10. Other Business

10.1 Mr. Whiting asked for the weight of every unit to be specified. The Chairman said this would be done.

all concerned

10.2 Wing Commander Symonds asked if the R.A.E. would produce drawings of the modifications carried out on the Trial Installation aircraft. The Chairman replied that Squadron Leader Dobbs would be responsible for producing the special Technical Instructions; and Wing Commander Ruffel Smith stated that where special fittings (c.g. brackets) were made for the trial installation, additional ones would be made for Headquarters Maintenance Command.

Sqn.Ldr. Dobbs
Wg.Cdr. Ruffel Smith

10.3 Wing Commander Ruffel Smith said that the Canberra fitted with wing tip tanks was limited to a mach number of 0.72

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Page No.5

10.4. The Chairman stated that the B.6 would be modified to take the F.95 camera.

Action by
Sqn.Ldr.
Dobbs.

P. Clay
(P. Clay) Flt.Lt.
S.H/P.R./A.W.R.E.

Aldermaston.
13th July, 1955.

Ref:- RAF/AWRE/TS.1277

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EXTRALEX: FILTERS FOR AIRCRAFT

DEFENSES

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Dr. P. E. Smith
Ballalex - Filters for Aircraft
Cabins and Suits for
Airmen 0231 IV

Review as at 29.9.55 of the Effects of the Introduction of
Filters into the Cabin-Air and Ventilated Suit Supplies on
E and F33 Conversions

J. Miller

N.B. Marginal notes are those of Sir Geo. Godfrey & Prta, when shown this review on 3.10.55.

26 AIRCRAFT

1. Installation of main and run line filters with P.D. characteristics like ours will probably not cause more than a 10% reduction in the flow of cabin air (ref. Saunders, Eng. Elec.) but the plastic connections in the L.P. piping must be removed.
2. The necessity for keeping the temp. of the air at the main filter inlet not higher than 80 °C will probably mean that the cabin-air temperature control will not be set as far towards "hot" as it would otherwise be at altitude. This means that the air entering the cabin will be cooler than the crew would have if given a free choice. Also a warning device to indicate that air is entering the filter at an excessively high temp. is required. (Inferred from data obtained from Eng. Elec.)
3. To prevent icing and deposition of free moisture in the main filter it will be necessary to keep the control away from "fully cold". Neither icing nor free water deposition is likely to occur at heights above 10,000'. Saunders suggests that icing is unlikely in any case to occur in hot climates.

but G, G, P. tests should show some light on joints.

Light are doing this.

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Miller

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26 Aircraft

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unlikely to occur in hot
climates. As there have been
instances of icing in Malaysia
1954 and 1955. Ref: 101
and 102. B.C. but as the temp.
is never going to be
cooled to fully cold we
agree it is unlikely in this
case. Rig tests at G.C.P.
could help here but D.C.E.
could also assist bearing
in mind the op. in question.

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4. The limitations on the control range of the cabin air supply temperature mentioned under 2 and 3 above will not make the crew uncomfortable provided that the supply of air to the mark 2 ventilated suit can be controlled as follows:

For cooling best inlet temp. is 20 °C, but conditions are tolerable - even for long periods - if this temperature does not exceed 37 °C.

For heating, in order not to overheat the pilot the air must not enter the suit above 40 °C.

Control of the suit temperature in the Godfrey system is achieved by adjusting the proportion of the suit flow which by-passes the fuel-air heat exchanger

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(This unit will still give some cooling to the suit at even when the plane is stationary on the ground, though in a hot climate the fuel would be at the high ambient temp.)

For the case of the crew being in the cockpit with the plane stationary on the ground, cooling by suit air at 50 °C would be tolerable for periods not exceeding 10 mins. If the checking-over period on the ground were to exceed this time cool air would have to be supplied to the ground connection for the rest of the time, either from a trolley connected by a short, shielded pipe, or from cylinders. (Ref: F/O Webster, I.A.M.)

5. Since the Bomber Command modification for supplying suits has been used only with mark I suits and provides no control of the temperature of the air entering the suits, there seem only to be disadvantages associated with it.

A preferable way of supplying the suits seems to be to instal a Godfrey system with the tapping downstream of the primary cooler in the cabin-air supply system, using a larger pipe than was used on the original Godfrey installation. (A tapping downstream of the O.A.U. is undesirable as cold air would not be obtainable in the event of its failure.)

6. Godfrey's tests will be of importance chiefly w.r.t. the following points:

- a. Oil deposition in and consequent clogging of primary filter;
- b. Erosion of O.A.U. by particles of glass fibre;
- c. Determination of control setting at which icing occurs with humid air intake;
- d. Determination of flows and pressure drops and temperatures in suit line for ground-level conditions, and also check on deposition of free water in vent suit filter;
- e. Checking of flow-pressure drop characteristics of filter units at elevated temperatures and pressures.

7. It seems unlikely that the flow of cabin air will be reduced at altitude to the point where full pressurisation is not maintained (inferred from information supplied by English Electric), but should failure to maintain

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little use on the bed. - Warren, G.P.)

is restriction will not required now as we G.P.) will discuss with A.M.

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d. Determination of flows and pressure drops and temperatures in suit line for ground-level conditions, and also check on deposition of free water in vent suit filter;

e. Checking of flow-pressure drop characteristics of filter units at elevated temperatures and pressures.

7. It seems unlikely that the flow of cabin air will be reduced at altitude to the point where full pressurisation is not maintained (inferred from information supplied by English Electric), but should failure to maintain full pressurisation occur the flow of air to the suits could be assisted by the placing of a restriction in the cabin-air line downstream of the primary cooler, though the absolute pressure in the cabin (and so in the suits, which are maintained at a pressure of 21lb/in^2 above cabin pressure) would fall. As pilots can fly for limited periods at a pressure even as low as 21lb/in absolute, they would presumably be able to carry on, as the air temperature at the suit inlet would not be affected.

8. Position re design and installation

The drawings for all three types of filter are in the
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Exhaust: Filters for Hurocraft
and Suits per

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hands of Mr. Chambers, R.A.E., for modification if he thinks fit and subsequent handing-over to the workshop. (Note: Installation of bimetallic strip temp. unit has been discussed with Brewer by Kaye. Final approval of this modification is required)

All the brackets (for both port and starboard side units - filters and water extractors) are being designed by R.A.E. and should be available as drawings by 5.10.55.

More information is required on the characteristics of the components of the Geoffrey ventilated suit air supply system. DETAILED INFORMATION ON THE PERFORMANCE OF THIS SYSTEM IS ESSENTIAL TO SHOW WHETHER TOLERABLE STANDARDS OF CREW COMFORT CAN BE MAINTAINED.

PR3 - Short Notes:

Installation of filters in cabin pressurisation system seems practicable if air is cooled to 30 °C at skin-cooler outlet, since ram-air would need not to be used.

Installation of suit air supply system may not be practicable, but a definite conclusion cannot yet be reached.

Design and installation:

Pre-filter cases would be exactly the same as those for the E6. So presumably would the ventilated suit filter cases.

The connections on the main filter case would be different, though the box could be the same size (at least as regards fitting). Fresh drawings would have to be started.

Fresh bracketry would be needed for all the units (filters and water extractor). This requirement has not yet even been contemplated.

PROTECTION OF AIRCREW AGAINST AW, BW AND CW HAZARDS
NOTES ON THE DISCUSSION AT C.D.E.E. PORTON, ON 22.11.55.

1. A discussion was held between Mr. Peacock, Mr. Trotman, Mr. Thomas, Mr. Butcher, Mr. Nugent, all of C.D.E.E., Miss Grimshaw, R.D.A.E.2, Mr. Gregory, R.D.A.E.4., and Mr. Maile, M.E.Department, R.A.E., with a view to finalising the draft note prepared by R.D.A.E.4 on the protection of aircrew against AW, BW and CW hazards.

2. C.D.E.E. had already made certain comments on this note in their minute dated 10th September, 1954. Going through these comments, Mr. Gregory explained that it had not been possible to obtain guidance from the doctors as to what constituted an acceptable background of cabin air contamination in the AW case. All that they were prepared to say was that during earlier trials when a Canberra had flown through an atomic cloud the degree of filtration provided by the particulate filter installed in the cabin air system had been adequate, and that in the circumstances it seemed reasonable to make similar provision in Service aircraft.

under what conditions?

3. Details of this filter had been given in the Appendix to R.D.A.E.4's note. It was understood to give a penetration with methylene blue of not greater than 0.005% at a flow of 35 cu.ft/minute. In the Canberra used for the trials, however, the flow rate through the filter was probably about 110 cu.ft/min. and Mr. Gregory enquired what the filtration efficiency of the filter was likely to be under these conditions. C.D.E.E. considered that the corresponding figure at this flow would probably be about .01% and they understood from their contacts with Aldermaston (who have now taken over the responsibility for these experimental installations from Harwell) that a penetration limit of .05% would be acceptable. Mr. Gregory considered that if this could be confirmed by the doctors it would give a firm basis on which to work.

4. Mr. Gregory explained that the use of a Service respirator with built-in R.T. which could be removed in the air and replaced by a partial pressure suit or other headpiece was not generally practicable; it was quite impossible for a pilot to perform such an operation himself in a fighter, and would be difficult in bombers. Moreover, as on many occasions aircrew would have to wear a pressure suit headpiece in any case, the obvious course was to make the headpiece serve both purposes. It was just possible that some benefit might be obtained from a Service type respirator with built-in R.T., in the case of aircraft such as transports; this had, however, already been covered in the note.

5. In their earlier comments, Porton had suggested certain alterations to paragraphs 2.2.8., 3.1 and 3.2.6 of the note. They now explained that since the note was written and their comments had been made, there had been reassessment of the CW risk which was now considered to be more serious. It had been suggested during earlier discussions that liquid contamination was the main danger and that provided protection was given for the eyes, nose and mouth, the risk from CW vapour was probably not great. This was unlikely now to be true and some further revision of the CW aspects of the note, and particularly of the paragraphs under Section 3.1 seemed desirable. C.D.E.E. agreed, therefore, to make suggestions as to how the note might be redrafted to bring it into line with latest knowledge.

6. In the light of these changed circumstances, the proposal to fit a combined particulate and charcoal filter in the air ventilated suit line and a particulate filter only in the airmix line to the oxygen system might also require revision; the addition of a charcoal filter in the latter case might now be necessary. C.D.E.E. agreed to consider this and forward their recommendations.

7. On the precautions to be taken to avoid BW and CW contamination of the oxygen system, there now appeared to be three possibilities.

1. A particulate, or possibly a combined particulate and charcoal filter, in the airmix line.

2. The sealing off of the airmix line entirely and the...

3. The tapping of the air ventilated suit supply line, downstream of the combined particulate and charcoal filter already proposed, for the airmix supply.

In the case of 1, the R.A.E. confirmed that the existing pressure drop requirements which they had previously quoted could now be relaxed and that in place of the limit of 0.25" of water back pressure at 40 litres/min, the back pressure could now be increased to 2" of water at 35 litres/min. (STP).

8. C.D.E.E. stated that with these relaxed requirements, a combined charcoal and particulate filter would probably be about 4" diameter with an overall depth of about 2". The weight should be about 8 oz. They would, however, investigate the position fully and confirm this.

9. In the case of 2, Mr. Maile considered that the provision of additional oxygen cylinders might well be acceptable and that this need not necessarily result in a great increase in weight.

10. In the case of 3, while this was practicable, it would require modification of or adjustments to the regulators to cover satisfactory operation at all altitudes and this was, therefore, probably the least desirable of the three alternatives.

11. As a result of the discussion, Mr. Gregory proposed to cover both 1 and 2 as possible means of providing the necessary protection in his note and would include details of the filter needed to meet the latest requirements in case 1 when this information was received from Porton.

12. Porton confirmed that Aldermaston were now engaged on the installation of filters in Canberras for further trials and Mr. Gregory said that he would contact them to find the latest position from their end. Porton gave the name of Mr. P. A. White and Mr. Smith as contacts at Aldermaston.

13. Mr. Gregory asked whether there was any chance of using the latest pressure suit headpieces without internal pressure, as a means of protection against BW and CW hazards on the ground, relying solely on the existing seals with the addition of a filter unit in the breathing line. This would avoid the need for developing special inflation equipment for the transit case from crew room to aircraft. He explained that the present headpieces used edge seals and that whilst these were designed to seal only against internal pressures some protection would presumably be obtained against penetration of agents from the outside.

14. C.D.E.E. stated that it was impossible to say what protection might be provided by such an arrangement without tests and Mr. Gregory undertook, accordingly, to arrange for both a BWT and an ML headpiece to be made available to them for trials. (During a further discussion on headpieces and masks later in the day, it was agreed that the Ministry of Supply would also welcome an opinion from C.D.E.E., after they had seen these headpieces, as to whether they felt they might be able to contribute to development in this field.)

15. As a small positive pressure is in any case likely to be needed in the headpiece when at readiness in the aircraft, as a safeguard against contamination Mr. Maile, R.A.E., stated that he would investigate the provision of the necessary manual control on the oxygen regulators.

16. In reply to a query from Mr. Gregory as to the effect of BW agents on the eyes, C.D.E.E. stated that they believed that it was generally accepted that there was little risk, but pointed out that there was, of course, always the danger of infection of wounds and small cuts from such agents.

17. Mr. Gregory asked if he could be advised of the weight of the 9" cube filter as fitted to Canberras, and C.D.E.E. agreed to supply this with the further information required from them as a result of this discussion.

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Ext. 474.

7th December, 1955.

A. C. Gregory.