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MESSAGE FORM

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NUMBER **L**
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PRECEDENCE—ACTION ROUTINE	PRECEDENCE — INFO DEFERRED	DATE— TIME GROUP 201400Z	MESSAGE INSTRUCTIONS
FROM ALDERMASTON			PREFIX GR
TO U.K.M.O.S.S.(A) MELBOURNE			SECURITY CLASSIFICATION [REDACTED] UK u/c [REDACTED] 9/2/85
INFO			ORIGINATOR'S NUMBER A.M. 136

TO [REDACTED] FROM [REDACTED]

YOUR LETTER 14TH AUGUST JUST RECEIVED. CERTAINLY I DO NOT WANT TO
 BLOCK [REDACTED] FROM MAKING HIS COMMENTS ON HEALTH AND SAFETY NOR
 FROM SAYING THAT THERE WAS SOME FALL-OUT WELL BELOW TOLERANCE LEVELS
 ON ADELAIDE OR ELSEWHERE IN AUSTRALIA. I MUST INSIST ON HIS NOT
 PUBLISHING DATA REVEALING DIAGNOSTICS OBTAINED WITH OUR INSTRUMENTS
 AND WHILE HE WAS WORKING SUBJECT TO CLASSIFICATION.

I HOPE THAT YOU AND [REDACTED] CAN FIND A SUITABLE COMPROMISE.

26/8

Page _____ of _____ pages	REFERS TO MESSAGE CLASSIFIED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DRAFTER'S NAME DIRECTOR	OFFICE	TEL No.						
FOR OPR'S USE R	DATE	TIME	SYSTEM	OPERATOR	D	DATE	TIME	SYSTEM	OPERATOR	RELEASING OFFICER'S SIGNATURE
										RANK

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23/4/85

Downgraded to
UNCLASSIFIED

From: [redacted]

Room 671,
ST. GILES COURT,

1-13 ST. GILES HIGH STREET,
LONDON, W.C.2

Our Ref: X/73/023

21st October, 1955

24/10



Telephone No.:
MUSEUM 3644
Ext: 1383

Dear [redacted]

... [redacted] sent me on Wednesday the attached draft report which he, Dewar and Herington will make to the Maralinga Committee. They intend to tidy it up when they get back to Australia and you will see that a couple of sections are missing now.

... When he came to say goodbye today, Fricay, I handed him comments given in the covering sheet which I attach.

He tells me that we will, of course, be sent copies of the final versions.

Yours sincerely,

[redacted signature block]

[redacted name block]

S.S.T.D.,
A.W.R.E.,
Aldermaston,
Berks.

31-10-55

Permanent Proving Ground
Health + Safety Regs. OTH IV

D.A.W. Trials.

25/1/55

Radiological Safety Regulations - Maralinga

You will recall that the procedure adopted up till now to clear these regulations as far as U.K. is concerned has been:

1. Regulations prepared by and discussed within A.W.R.E. and a 'Third (Provisional) Edition' reproduced.
2. 30 copies of this edition forwarded to you for circulation to the interested Departments.
3. You, as representative of the Trials Executive, forwarded copies to the various Departments for comments.
4. Replies received by you from the Departments have been forwarded here for consideration.

I should like to point out here that since these regulations must apply to Maralinga as a continuing permanent commitment, I feel that it would be constitutionally more correct if you were to act in this matter as representing C.A.W. and not the Trials Executive. This may seem trivial, but it is vital in the interests of safety and efficiency that the regulations apply not only to trials but to inter-trial periods as well, in fact, to Maralinga. Maralinga is, of course (as the Chairman of the Executive has pointed out on more than one occasion), a Ministry of Supply and not a Trials Executive concern.

I must apologise for raising this now, particularly since it is in contradiction of the covering minute which you received with the 30 copies, but it would be serious if all the work which has gone into these regulations were to be of no avail because of a slight constitutional slip.

Most of the comments received from Departments are relatively minor in nature and are acceptable to D/A.W.R.E. for incorporation into the regulations, or arise as a result of misunderstanding which can easily be explained. There is, however, one fundamental point raised by both the War Office and Air Ministry which is quite unacceptable. This is the suggestion that responsibility for authorising doses could and should be assumed by their personnel and be taken out of the hands of D/A.W.R.E. (through his Health Controller) in particular cases. This plurality of responsibility is clearly out of the question in a matter of this nature and I am assuming that you are prepared to support this view.

In view of the fact that there is not much time in which to obtain agreement from the Australian Safety Committee and get the document printed, we propose to go ahead with the preparation of the 'Fourth (Provisional) Edition' for submission to Australia. This will include the amendments arising from the comments of the various Departments in U.K. and might appropriately be passed to the Canadians, perhaps for information only.

Details of our comments on the various replies you have received are given below and I assume you will transmit these to the Departments concerned.

Replies were received from:-

The Admiralty
Ministry of Supply PDSR(D)
Ministry of Supply PDSR(A)
Ministry of Supply PDSR(G)
MRC/ARC
The Home Office
The War Office
The Air Ministry

The first four listed above agreed to the regulations without comment. The MRC reply agreed to the Regulations with the proviso that they had not yet seen Appendices 2 and 3, and on which they could not therefore comment. These Appendices have now been prepared and copies are forwarded herewith. The Home Office, War Office and Air Ministry each submitted papers agreeing to the Regulations but submitted various comments. These are dealt with in the paragraphs following.

THE HOME OFFICE

The Home Office point out that the word gamma should be inserted before radiation in line one of para. 2.2(1)a on page one. They also point out that there is an inconsistency between para. 2.2(i)a and 2.2(i)b.

It is agreed that there is an inconsistency which is due to a typographical error in para. 2.2(i)a. The figure of 0.6 Rep/week should read 1.5 Rep/week, and the second sub para. of 2.2(i)a should be deleted. This paragraph and paragraph 2.2(ii) which is also not quite clear have been re-written as follows to clarify the situation.

2.2(1) β and γ Radiation

(a) A normal working rate as defined in the current "Recommendations of the International Commission on Radiological Protection". This is at present (November 1955):

1.5 Rep/week of which the γ radiation component must not exceed 0.3 Rep/week.

The β dose to the eyes must not exceed 0.3 Rep/week.

2.2(ii) Neutron Radiation

The maximum permissible levels will be as defined in the current recommendations of the "International Commission on Radiological Protection". These are at present (November 1955):

The dose ...

The dose to the tissue 2 cm below the skin surface must be less than 30 millirads/week. This figure is given by the neutron fluxes below:

Neutrons of energy	0.25	eV	-	2000	neutrons/cm ² /sec
"	10	eV	-	2000	neutrons/cm ² /sec
"	10	KeV	-	1000	neutrons/cm ² /sec
"	0.1	MeV	-	200	neutrons/cm ² /sec
"	0.5	MeV	-	80	neutrons/cm ² /sec
"	1	MeV	-	60	neutrons/cm ² /sec
"	2	MeV	-	40	neutrons/cm ² /sec
"	3-10	MeV	-	30	neutrons/cm ² /sec

THE WAR OFFICE

The War Office submitted two comments:-

(a) War Office reference 57/Misc/8851/GSW7/Plans of the 3rd August, 1955.

Sub Para. 2(a) of this reply is included in our comments on their second statement below.

Sub Para. 2(b) the special higher integrated dose referred to in para. 2.2(i)d of the Regulations is intended to be used operationally. It is agreed that in an emergency no rigid adherence to Regulations is practicable.

Sub Para. 2(c) Red, Blue and Yellow areas are not defined by particular levels of activity but by the degree of protection required under particular circumstances.

Sub Para. 2(d) Para. 5.2(b) and (c) are worded sufficiently generally to cover the requirement to wear respirators when this may be necessary. The order to wear respirators can only be given by Health Physics personnel after a careful study of local circumstances; such circumstances cannot be legislated for in advance.

Sub Para. 2(e) Specific advice on cleansing of shoes and gloves will be given to users as necessary. It is not considered that any expansion is appropriate to these general Regulations.

Sub Para. 2(f) The concept of "personnel monitoring" is not new and has been used successfully at Atomic Energy Establishments in the U.K. and elsewhere for many years. It has also been used successfully in previous trials.

Para. 3.

The War Office's suggestion that it will be more correct to use the word "Radiological" instead of "Radiation" in the title of the Regulations has been accepted.

(b) War Office reference 57/Misc/8851/GSW7/Plans of the 18th October, 1955.

This War Office reply agrees to the Regulations and to the exposure of War Office personnel.

In Para. 2 of their comments, and in Sub Para. 2(a) of the

earlier reply, War Office suggest that the application of the lower integrated dose (Paragraph 2.2(b) of the Regulations) should be left to the officer in charge of the particular task and not to the Health Control Officer. This suggestion has been most carefully considered but is not acceptable.

The responsibility for radiological safety is vested in D/AWRE, and is one which can be exercised by him only so long as he maintains complete control over entry and work in all active areas. In the exercise of this responsibility it is incumbent upon him to keep doses received by all personnel to the minimum consistent with the carrying out of the necessary tasks. This does not imply that there will be needless restrictions. The urgency of any task will have been decided in advance by the Scientific Superintendent in consultation with the Group Leader concerned and the Health Control Officer. At this time the decision can be made whether the lower or one of the higher integrated doses is applicable. Only the Health Control Officer will be in a position to assess the varying factors (e.g. $\frac{D}{t}$ ratio) which when added together would carry a man up to the limit of the dose set.

Para. 3(a)

The War Office's suggestion that part of para. 11.1 of the regulations concerned with accidents should be rewritten is of considerable value and paragraph 11 will be rewritten as follows:

11. Accidents and FIRST AID

11.1 If anyone thinks he may have inhaled, ingested or otherwise absorbed (e.g. through cuts etc.) any active material he must at once:-

- (i) Take emergency action
- (ii) Report to the Health Control Officer or the Medical Officer (through his Officer-in-Charge if the accident occurs on duty)

11.2 If the skin is accidentally cut, or scratched, during work in ACTIVE areas the cut should be placed, if possible, under running water within 15 seconds and held there whilst the whole wound area is scrubbed with a soaped brush for at least five minutes. The flow of blood should be encouraged by mild pressure above the wound. The surrounding skin should be monitored and washing continued until this is inactive.

A sterile dressing, not a strip of dressing of the Elastoplast type, may be used as a temporary cover until qualified medical attention has been received.

The object causing the wound will be kept and tested for contamination.

11.3 If anyone spills any radioactive material he must, unless in a YELLOW area

- (i) Ask all staff to vacate the area.
- (ii) Limit the spread of contamination.
- (iii) Report immediately to Health Physics.

In a YELLOW area he must mark the boundaries of the spill and report to Health Physics.

Para. 3(b)

Most of the suggestion from the War Office in this paragraph is accepted in that the rather cumbersome preamble to para. 14.5 is clarified by the War Office wording. However, in view of the authority given to the Health Physics Adviser in para. 14.3.4 of the Regulations the change to "Trials Superintendent" instead of "Health Physics Adviser" is considered neither necessary or desirable.

Paragraph 14.5 will be rewritten as:

14.5 Officers Commanding Service Units

The Officers in Command of the various Service units and Groups engaged in the trial whether at Maralinga or elsewhere will ensure that these regulations and any instructions of the Health Physics Adviser are brought to the notice of all personnel under their command and will ensure that they are enforced.

THE AIR MINISTRY

Reference OPS/9537/B dated 19th August, 1955.

The Air Ministry's comments on the Regulations are considered below:

Sub Para. (a)

The colours allotted to the various active areas were decided after careful consideration, in particular, of the existing colour code in use in A.W.R.E. It is considered that any alteration would lead to confusion in the minds of the scientific and industrial staff drawn from A.W.R.E. who will, of necessity, be alternating between A.W.R.E. and the Range. It is of interest that these colours do in fact follow the accepted practice used on Proof and Experimental ranges where explosive firings are undertaken.

It is therefore considered that the Air Ministry's suggestion should not be accepted.

Sub Para. (b)

It is agreed that perhaps the term "the scientist" in line 7 of para. 8.1 of the Regulations is too loose and this wording will be replaced by "the originator".

Sub Para. (c)

The suggested A.M. amendment to para. 14.5 would lead to a division of responsibilities for Radiological Safety on the Range and cannot therefore be accepted. It is quite clear that the responsibility for radiological safety is at all times vested in the Director, A.W.R.E., acting on behalf of the Ministry of Supply.

However, any instructions issued by the Health Physics Adviser concerning the radiological safety would normally be fully discussed with the various interested users before they are issued.

Paragraph 14.5, because of the original cumbersome wording,

ll be rewritten as follows:

14.5 Officers Commanding Service Units

The Officers in Command of the various Service units and Groups engaged in the trial whether at Maralinga or elsewhere will ensure that these regulations and any instructions of the Health Physics Adviser are brought to the notice of all personnel under their command and will ensure that they are enforced.

I should be glad to have your agreement to the action we are taking in preparing the "Fourth (Provisional) Edition".



S.S.T.D.
for D/A.W.R.E.

A.W.R.E.,
Aldermaston, Berks.

31st October, 1955.

c.c. C.R.
S.H/P.R.
S.F.T.

Minor trials: Maralinga

0310 II

UK C/C. [redacted]

KITTENS

March 1956.

Operational Planning

Downgraded to

Copy No. of 42

See [redacted] for
[redacted]

1. INTRODUCTION

The Director has instructed that plans shall be made for a series of Kittens firings at Maralinga in the period March - June, 1956. The following paragraphs give the operational plan for this third series.

In anticipation of approval being given by the U.K. and Australian authorities concerned for these trials to be carried out each item has been discussed in detail with Australian representatives who recently visited the U.K.

They were:-

[redacted] Chief Executive Officer, Maralinga Committee
[redacted] Range Commandant
[redacted] Deputy Chief Security Officer, Dept. of Supply.
[redacted] Assistant Controller Engineering, Dept. of Supply.
[redacted] Officer Commanding the civil engineering component of the Task Force.

The effect of imposing a Kittens Operation on the Task Force commitments was fully discussed and the effort required was found by equivalent reductions elsewhere on A.R.R.E. Buffalo requirements.

2. DATE AND DURATION OF THE TRIALS

A maximum of 18 rounds will be fired over the period 1st March to 14th June, 1956. It is anticipated that the expedition will be on site not later than 1st March, 1956.

3. STAFF

The trials team will consist of 10 scientific staff. The Trials Superintendent will be [redacted] DSSR, who will be in charge of three teams, recruited as follows:-

<u>Team</u>	<u>Duty</u>	<u>Staff</u>
KR	Functioning of radioactive system	4 from DSSR
KX	Functioning of explosives system	4 from SXP
KP	Health Physics and Radiation Measurements	1 from SHFR

In addition to the above will be a Liaison Officer, [redacted] who will provide administrative support, but will only be part-time on the site, and will normally be at Salisbury as part of the Buffalo Administrative Team.

[redacted] will go ahead of the main Kittens party, and will arrive in Melbourne about 21st February, 1956.

4. SITE REQUIREMENTS

4.1 Accommodation

- Domestic - 7 tents will be required for UK personnel. It is presumed that the Task Force will provide catering and domestic support.
- Technical - The existing technical accommodation used on the previous Kittens Trials will be required. The Scientific Superintendent will so phase his work to give no interference to the Kwinana Group or the PMG who have commitments in the Kittens Area over this period.

4.2 Firing Sites

██████████ has the plans of the firing site layout and will pass them to the Australian Range Commandant when appropriate.

5. TECHNICAL ASSISTANCE.

Australian Agencies will be asked to provide:-

- (a) One man to maintain generators and battery charging equipment.
- (b) One general duties man for the first three weeks of the operation.
- (c) One cook for duty at the K site.
- (d) One Peace Officer for security and safety duties at the site.

6. TRANSPORT

- (a) ██████████ to arrange with ██████████ for the provision to the Range Commandant of six Landrovers.
- (b) A crane and driver will be required from the Task Force at the beginning and the end of the operation to lift three caravans, two cooling units, two or three Diesel generators and six Coventry Climax generators.
- (c) The six AIRE trailers now in the K area will be required: three for laboratory caravans, one for generating plant, and one for a cooling unit, leaving one spare.
- (d) The Range Commandant will arrange necessary transport for the Meteorological Officer to undertake Kitten requirements.

The transport requirements detailed above are based on the assumption that the transport of all scientific stores from Watson to Maralinga and the maintenance of the vehicles will be the responsibility of the Range Commandant.

7. POWER

7.1 Stabilised power

Six Coventry Climax generators fitted with electric starters will be required.

7.2 Unstabilised power

Two or three Diesel generators, 415v. 3-phase.

██████████ will arrange with ██████████ the delivery of the assembled generators and spares to the Range Commandant.

8. WATER

The expedition will require approximately 400 gallons of fresh water per week to be delivered to K area.

9. COOLING PLANT

The Department of Supply will, as on previous Kittens operations, be requested to supply:-

- (a) Four air cooling plants of the "Coldstream" type; two on trailers, one static for the magazine, one which may be required for the permanent magazine if completed in time.
- (b) If possible the Task Force to instal a cooler mounted over the door of the existing laboratory building.

10. METEOROLOGY

The Meteorological Officer on site will be asked, by the Scientific Superintendent, to make local observations and forecasts, as in previous K trials.

11. COMMUNICATIONS

11.1 Local

AWRE will provide:

- (a) Field telephone links between the camp, forward laboratories and firing sites.
- (b) VHF radio between forward labs, firing sites and the Landrovers. This equipment would be obtained by Dr. Dawson and operated and maintained by the Kittens team.

11.2 Site to U.K.

The use of the Range Commandant's link from site to Salisbury will be required and thence to U.K. by whatever route the Buffalo Signals Officer [redacted] will, by then, have arranged. It is estimated that traffic will be about 400 x 20-group signals in the four months. Secure messages between site and Salisbury and Melbourne will require the use of the Range Commandant's One Time Pad. In addition the Trials Superintendent will require his own One Time Pad from site to AWRE.

12. PASSAGE OF CLASSIFIED DOCUMENTS.

Classified documents for the trials staff should be sent to the Trials Superintendent and addressed:

Draycott,
Kittens
c/o UKMOSS(A)
Salisbury
South Australia.

13. ROADS

There will be no new requirements for roads, but tracks will be required for Kittens firing sites. A sketch of the requirements has been made and will be sent to the Range Commandant as part of the general engineering requirements, but this work must not be started in Kittens area before the arrival of an AWRE representative.

14. SEABORNE STORES

(a) Quantity

The estimated packed weight of scientific stores to go by sea is 23 tons. This includes fifteen 40-gallon drums of toluene packed according to Ministry of Transport Regulations.

(b) Packing and Assembly in U.K.

The majority of the stores must be assembled and packed by 31st October, 1955.

(c) Sailing Date

DAO/Trials [redacted] will book shipping space.

(d) Documentation

All consignments will bear a shipping mark consisting of the letters KK in a circle, the whole painted in yellow, and addressed to Department of Supply, Rocwat, Watson via Port Adelaide.

Three copies of Bills of Lading will be sent by air mail to Stores and Transport Branch, Department of Supply, Finsbury North. A detailed instruction on the despatch of stores will be issued by DAO/Trials.

(e) Receipt and Onward Movement in Australia

S. C. T will have the assistance of the AWRE Liaison Officer and will arrange the despatch of stores to site within the organisation arranged for the handling of Buffalo stores.

(f) Security

All stores sent by sea will be unclassified.

15. AIRBORNE STORES

(a) Quantity (packed)

H.E.	2150 lb.
R.A.	1050 lb.
Firing Kits	3000 lb.
Contingencies	400 lb.

(b) The operation will entail three special flights, the dates of which will be arranged by DAO/Trials. It seems probable that the dates of departure of these flights from U.K. will be on or about 27th February, 1955, 11th April, 1955, and 10th May, 1955.

The first flight will contain half of the H.E. (about 1000 lb), some RA (about 400 lb. including containers) and firing equipment (about 1000 lb.)

The second flight will contain the balance of the H.E. (about 1200 lb.) some R.A. (about 250 lb. including containers) and firing equipment (about 1000 lb.)

The third flight will contain the remainder of the R.A. (about 400 lb. including containers) and firing equipment (about 1000 lb.)

(c) Receipt and Onward Movement in Australia

The H.E. will be put into store under guard at Salisbury and whatever quantities are required by the Trials Superintendent will be escorted to site by rail by a Peace Officer. The R.A. and firing equipment on each flight will, if possible, be flown from Salisbury to site together with the scientific escort. If this is not possible, the scientific escort will accompany these stores by rail.

The Liaison Officer will arrange refrigerated storage at Salisbury for certain photographic materials which will arrive prior to Kittens Team and will be transferred to the site on arrival of the Team.

(d) Flying Escorts

RAF/AWRE [redacted] will be asked to arrange flights and to provide escorts. SHER [redacted] will decide whether an RAF escort, suitably trained will suffice or whether an additional scientific escort is necessary. RAF/AWRE will also arrange the return of escorts to UK and a special flight at the conclusion of the trial for the return of R.A. material if any.

16. LOCAL PURCHASE OF STORES

Liaison Officer will arrange a supply of LT detonators through [REDACTED] the disposal of surplus HE. Proposals will shortly be made for delegated purchasing powers to be given to the Range Commandant in connection with Operation Buffalo and this channel will also be used to obtain any stores to be purchased locally for Operation Kittens.

17. ADMINISTRATIVE ARRANGEMENTS

(a) Personnel Movement

The Liaison Officer will arrange the movement of all Kittens staff whilst in Australia. UK/Australia air bookings will be made only as far as Sydney, sufficient warning of arrival dates being given to the Liaison Officer to enable him to make arrangements and bookings for the onward journey.

(b) Pay and Allowances

U.K. salaries will be paid by AWRE through personal bank accounts. UKMOSS will be authorised to provide an imprest account for the Liaison Officer for payment of allowances and contingencies. This will be available through the Cashier, WRE, Salisbury.

(c) Personal Mail

Personal mail should be addressed to:-

[REDACTED]
Range Extension No.4
Box 1424H
Adelaide, SOUTH AUSTRALIA

(d) Medical Arrangements

DAO/Trials will make all arrangements with P.M.O., AWRE, for necessary inoculations and medical examinations.

(e) Passes

DAO/Trials will provide Dept. of Supply Chief Security Officer with the necessary photographs and personal data to enable him to issue site passes.

18. SAFETY

(a) Transit Safety Arrangements

(i) Explosive Packing

[REDACTED] will be responsible for ensuring that all regulations governing safety of explosives are observed in the packaging of explosive for air and rail travel.

(ii) R.A. Packing

[REDACTED] will be responsible for ensuring that all regulations governing safety of R.A. are observed in the packaging of R.A. for air and rail travel.

(iii) Transit Safety Instructions

SSTD, after consultation with RAF/AWRE, DSSR, SHPR and SXF, will issue instructions governing radiation safety and explosive safety during the transit of the R.A. and H.E. materials to site. These regulations will be applicable to all forms of transport used and will contain the actions to be taken in the event of mishaps en route.

RAF/AWRE will arrange for the instructions to be issued to the Captains of the Transport Command aircraft and will also arrange that the same instructions are available to RAAF Captains, should RAAF agree to fly the R.A. stores from Edinburgh Field to Maralinga. SAO/Trials will arrange to issue the relevant portions of these instructions to Department of Supply and Commonwealth Railways for the road and rail journey between Salisbury, Edinburgh Field and Maralinga.

(b) On Site

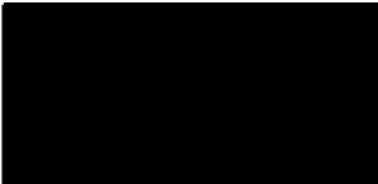
- (i) While the Kittens Group is on site, the Kittens Trials Superintendent is at all times responsible for R.A. and explosives safety.
- (ii) Regulations governing radiation safety during the expedition will be written by SHER [redacted] for issue by SSTID [redacted] to the Trials Superintendent.
- (iii) These will include appropriate regulations which will be made available to the Range Commandant after the Kittens expedition has left the site, restricting entry into areas to be defined by the Trials Superintendent.
- (iv) The site will be cleared of all explosives before the Kittens party departs.
- (v) The site will be cleared of all R.A. materials before the Kittens party departs. This may involve the arrangement of a special Transport Command flight by RAF/AWRE. The Trials Superintendent will provide provisional return dates to be confirmed by signal with at least 3 weeks notice, and will provide scientific escorts.

19. COMPLETION OF OPERATION

All stores remaining on site will be properly accounted for to the Range Commandant.

20. SECURITY

The nature and purpose of the trials will remain Top Secret. The fact that a U.K. team will be operating at Maralinga over this period is Confidential.



October, 1955.
Room 126,
Building [redacted]
AWRE Aldermaston.
Ext. 6405.

Distribution:-

- | | | | | | |
|---|-------------|------------|-------------|------------|----------|
| 1 | Director | [redacted] | D. S. S. R. | [redacted] | 2 copies |
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| 7 | S. S. R. D. | [redacted] | | | |
| 8 | S. S. T. D. | [redacted] | | | |
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R. N. (R'td).

that a further sample can be attempted if the initial samples are not satisfactory. The analysis team at PEARCE FIELD will inform the control ship whether or not this is required.

14 JAN 1955
137

9. On landing at PEARCE FIELD after sampling, the Canberra aircraft are to taxi to a selected point on the airfield where the radio-active filters are to be removed from the aircraft by R.A.F. ground crew under the guidance of A.W.R.E. health physics personnel. The crew are to remain in the aircraft on oxygen until the exits have been monitored and they are told to leave. Orders covering this phase of the operation will be issued at a later date.

Cloud Tracking

10. In the interests of radiological safety of the local Australian population and of civil aircraft which may be operating in the vicinity it will be necessary to keep track of the radio-active clouds and report their position to the Australian civil authorities. For this purpose radiation detection equipment is being fitted in the Canberra aircraft in case the cloud base is in excess of 30,000 ft. It is also being fitted in the Varsity aircraft in case the cloud base remains at medium altitude.

11. The cloud velocity due to wind is estimated at approximately 30 knots in, it is hoped, a north or north-west direction from MONTE BELLO. If the cloud follows its predicted path only one tracking sortie of two aircraft is likely to be required to locate the cloud position at H + 6 hours. By this time the cloud size is likely to be of the order of 20 nautical miles by 7 nautical miles. If the cloud tends to return towards the Australian mainland further sorties are to be flown as necessary. If the cloud base remains below 15,000 ft. two Varsity aircraft, pre-positioned at ONSLOW, are to carry out the tracking sorties.

Low Level Radiological Survey

12. As the two explosions will be tower bursts a certain amount of radio-active fall-out will occur from the atomic clouds. If the clouds traverse the Australian Continent there is a requirement to assess the area affected and the degree of contamination which has occurred. For this purpose Varsity aircraft are being modified to take radiological survey equipment.

13. Thus, two Varsity aircraft are to be pre-positioned at ONSLOW ready to conduct a radiological survey on G.1 + 1 day and G.2 + 1 day as required.

14. There is also a requirement to conduct a radiological survey of the MONTE BELLO islands after each explosion, and for this purpose the radio-active survey equipment provided for the Varsity aircraft is to be fitted into Whirlwind helicopters (which are also being used for transport service between ONSLOW and the MONTE BELLO islands and for Air Sea Rescue).

Emergency Procedures

If for any reason, an aircraft taking part in the Sampling Operations is forced to land on an airfield other than Pearce, the following procedure should be adopted :

(a) One of the following airfields should if possible be selected for emergency landing :-

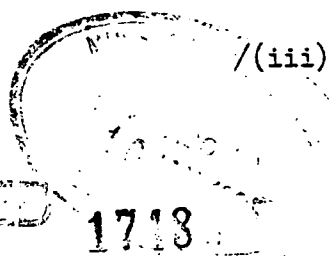
(i) Onslow

(ii) Port Hedland.

/(iii)

G.33023/JH/10/55/120

Oct 1955



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TO:- THE PROJECT HEALTH COMMITTEE

422 II
Health Committee - 14/2/55

UNITED KINGDOM ATOMIC ENERGY AUTHORITY

WEAPONS GROUP

FIRST ANNUAL REPORT ON HEALTH AND SAFETY

[Redacted]

[Redacted]

OCTOBER 1955

1749

[Redacted]



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1. INTRODUCTION

This report gives an account of Health Physics and Medical activities at A.W.R.E. for the period July 1954 - June 1955. Because of Accounting system Accident Statistics are given for the period 1st August 1954 to 3rd July 1955.

2. PERSONNEL MONITORING (EXTERNAL)

The standard type film cassette using 1 mm of Cadmium as a filter was used during this period. Films are issued on a fortnightly basis. The dosage recorded on the film is divided by two to determine the weekly dose. All significant doses are investigated to try to establish the period of time during which the dose was received. These investigations have shown that in most cases the integrated dose was received as the result of small doses spread over a period rather than a short time.

Films are carried by personnel at all times. They are normally taken home at night but if for some reason or other they have to be left in the Establishment we try to ensure that they are kept away from the effects of stray radiation. Wrist films are issued when necessary on certain operations.

TABLE I

Total number of general body films issued	...	...	...	...	...	15810
Average number of personnel receiving body film	...	...	...	...	...	610
Total number of wrist films issued	...	...	...	...	...	106
Total number of films where weekly dose was less than 0.03r	...	...	...	...	...	15781 (99.2%)
Total number of films where dosage was between 0.03 - 0.3r	...	...	...	...	...	31 (0.8%)
Number of films where weekly dose exceeded 0.3r	...	...	...	...	...	NIL
The highest cumulative body dose was	...	...	...	...	...	1.85 rntgens
The highest individual weekly dose was	....	...	...	...	...	0.3 rntgens
The highest cumulative wrist dose was	...	...	...	...	...	2.3 rep
The highest individual wrist dose was	...	...	...	...	...	0.6 rep

Blood counts, at six monthly intervals, were carried out on all persons receiving films. No divergence from the normal ranges was noted.

This policy has now been modified in line with the I.C.R.P. recommendations and apart from 40 persons exposed to potentially high levels of external radiation, blood counts will now be carried out only as part of the annual routine examination.

Neutron personnel monitoring has been carried out on an area basis rather than by the issue of special films etc to individuals.

Calculations and experiments have been made to determine safe limits for the handling and storage of fissile materials so that there will not be an unexpected neutron hazard due to approaching criticality.

[REDACTED]

3. PERSONNEL MONITORING (INTERNAL)

Urine samples are collected in a specially designed container which never enters an active area. Risk of contamination is further minimised by the fact that all staff must wash and monitor hands before giving the sample.

Normally an 8 hour sample is given i.e. (9am - 5pm) but in certain cases we take 24 hour samples as a check on methods and to better establish doubtful results from the 8 hour sample.

All staff working in active areas are categorised as to their degree of contact. Those in regular contact are checked at monthly intervals, those with lesser contact at three months, and the infrequent contacts at six monthly intervals.

Checks are taken from staff involved in or near to a spill as soon as convenient afterwards.

Urinary estimations are carried out by the Medical Division at fortnightly intervals. 338 samples were examined. No sample was higher than 20 micrograms per litre.

TABLE II

Average number of personnel on Plutonium sampling programme	...	...	263
Average number of personnel on Polonium sampling programme	...	...	147
Total number of individual Plutonium Urine samples	...	...	1831
Total number of individual Polonium Urine samples	...	...	798
No. of samples where the Plutonium excreted in 24 hours was greater than 20 μ g/m	...	...	14
No. of samples where the body burden level was greater than $\frac{1}{2}$	...	...	98
No. of individual cases where Pu excretion was greater than 20 μ g/m/24hrs	...	...	1 (0.4%)
No. of individuals with Po body burden greater than $\frac{1}{2}$	...	...	3 (2%)

The plutonium case mentioned above is continued observation of a case from the previous years, as in one of the polonium cases. The other two Polonium cases arose during the bagging up of highly contaminated waste.

Clinical and haematological observation was continued throughout the period on the 3 polonium cases and on the plutonium case without any evidence of detectable ill effects.

4.1 SOLID WASTE

The solid waste disposed at sea from Aldermaston has complied with authorization. During this period some 2860 metal containers were taken from active areas.

The general level of activity in these containers was less than 1 micro curie of α activity. This highest activity in any one container was of the order of 10 micro curies.

All containers are numbered and a record card kept for each container.

Some difficulty is being experienced for the disposal of awkwardly shaped objects in these standard bins but we have over come the problem in laboratories by introducing a slightly taller bin.

[REDACTED]

1752

[REDACTED]

We have effected some economy on the use of bins by agreeing to certain very low level waste being taken out of the large bins in their sealed paper liner placed straight into the concrete coffins.

4.2 LIQUID WASTE:-

The liquid waste disposal has complied with authorization.

During this period the total α activity (excluding Radium) discharged to Thames was 158.9 mcs and the corresponding figure for $\beta\gamma$ emitters was 62.9mcs

The average concentration discharged from site was	$\alpha - 2 \times 10^{-8}$ cu/gall
The average concentration discharged from site was	$\beta\gamma - 8.6 \times 10^{-9}$ cu/gall
The highest concentration discharged from site was	$\alpha - 6.4 \times 10^{-7}$ cu/gall
The highest concentration discharged from site was	$\beta\gamma - 2.6 \times 10^{-7}$ cu/gall

4.3 AERIAL DISCHARGE

All stacks attached to active buildings are monitored continuously. Air samples are run for 24 hours and during this period all activity discharged has complied with authorization.

2500 separate stack air samples were taken and the average concentration at the stack for Plutonium was 2.9×10^{-14} $\mu\text{C}/\text{cc}$ and for Uranium 1.3×10^{-12} $\mu\text{C}/\text{cc}$.

The total discharge was less than 36 micro curies of Plutonium and 458 micro curies of Uranium.

During this period experiments were carried out to see the effect of an aerial discharge of operating a building carrying out melting and casting operation on Uranium with no filtration. Their experiment is continuing and results to date indicate a rise in discharge activity by a factor of 30 over the filtration figures.

5. Laboratory Monitoring

5.1 Air

Fixed air samplers are installed in all active areas where there is a possibility of an airborne release. They are operated during the normal working period of 8 hours and the results are evaluated daily. Special tests are carried out where necessary by portable samplers.

During this period 7600 individual air samples were taken. Analysis of the results of these samples show that:-

- 1.7% were greater than 1 M.P.L.
- 1.5% were between 0.5 and 1.0 M.P.L.
- 12.0% were between 0.04 and 0.05 M.P.L.
- 84.8 % were below 0.04 M.P.L.

Most of the samples which were greater than 1 m.p.l. were taken at the entrance to frogmen showers. Experiments showed that the contributory factor to this airborne hazard was the release from suits during undressing.

These figures showed a marked drop as soon as the glycerine spraying technique was used prior to frogmen leaving the showers. There are indications that the use of glycerine leads to more rapid deterioration of the suits and hence should only be used when heavy contamination is anticipated.

5.2 FLOORS SURFACES ETC

The "smear test has been used during the year as our main check on surface contamination. All active areas are categorized as to their potential

[REDACTED]

contamination risk. High potential risk areas are checked every week and other areas at longer intervals.

Each smear covers an area of approximately 150 cm² and the results are expressed in d.p.m./smear.

During the year over 30,000 separate smears were taken from active areas.

An analysis of these smears shows that:-

66% were below our detectable limit i.e. 1.5×10^{-8} $\mu\text{C}/\text{m}^2$
33% varied between 5 and 300 d.p.m. i.e. between 1.5×10^{-9} and 9×10^{-7} $\mu\text{C}/\text{cm}^2$

1% varied between 300 and 20,000 d.p.m. i.e. between 9×10^{-7} and 6×10^{-5} $\mu\text{C}/\text{cm}^2$

The high levels above were all taken immediately after a spill of activity when high contamination could be expected.

The 1021 monitor is also used as a routine instrument but apart from known spills the general level of contamination in active areas has been below the limits of detectability on this instrument.

6. SITE SAFETY COMMITTEES:-

The "A" area Safety Committee which consists of the Site Safety officers, Medical officer and representatives from all Superintendencies in the "A" area has had four meetings during this period.

This committee deals with all pure Safety aspects and has no jurisdiction over R/A matters. One of its main functions has been to formulate a practicable set of fire drill regulations for active buildings. Several fire drill practices have been carried out and have proved that with slight modifications these regulations are practicable.

This committee works with the fundamental idea that all fires can be prevented if staff adopt the necessary fire preventative drills. General electrical, welding, solvent storage regulations have been drawn up and implemented.

7. TRAINING:-

In addition to specialised training given to Health Physics staff, lectures have been given to staff employed in active areas. Those include staff engaged on regular frogman operations and to engineering maintenance personnel. Each lecture was of 1 - 1½ hours duration and consisted of an explanation of basic Health Physics principles accompanied by demonstrations of the monitors in everyday use in the laboratories. Considerable interest has been shown by staff in these talks which have proved very useful in helping to ensure safer working conditions.

The Medical Division has been responsible for the training of frogmen and maintenance personnel in first aid and the medical aspects of radiation work.

8. RESEARCH ITEMS

An intense study has been made on the naturally occurring alpha and beta gamma backgrounds in air in order to be able to quickly estimate the extent of a suspected release of Plutonium in the laboratories.

In spite of variations from day to day and place to place of the order of 100 to 1 it has been possible to establish with some reliability what the

[REDACTED]

normal background should be in certain active areas, and by adopting a standard sampling time and counting procedure we can establish within 1 hour of starting the sample to what extent, if any, Plutonium has been released.

Work has been carried out on the direct plating of metabolised Polonium. Two members of our own staff who were off contact due to an incident involving them in a Polonium intake were used to supply the samples. The results were not very encouraging. Recoveries varies from 15 - 60% and at its best this technique could only be used to denote an order of intake hazard.

We have been able to obtain some useful data on Polonium excretion in man from the same personnel. A full report is to be issued.

The practicability of estimating contamination in a wound using a blood smear technique has been carried out in collaboration with the Medical Division. Unfortunately this work has been interrupted on a number of occasions by other more pressing work in each division. Results obtained so far indicate that provided the samples are prepared by a trained medical technician it is possible to reproduce results and to detect very low levels.

In the Medical Division, an improved method of leucocyte counting has been developed. An extensive examination of the normal urinary creatinine has been carried out and at present, investigations into suitable techniques for the estimation of urinary amino acids are being made.

9 ACCIDENT STATISTICS

These accident statistics are based on the work of the industrial staff because it is impossible to get an accurate assessment of man-hours worked by non-industrial and scientific staff. It does however, represent a fair picture of the health and safety of work at A.W.R.E. since the industrial staff constitute by far the greater proportion of employees exposed to working hazards.

The number of industrials on the strength rose from 1,534 to 2,717 during the period and at present, 5.88 per cent of these are registered disabled persons.

Total accidents	2,074
Total lost-time accidents	25
Total man hours worked	5,925,000
Total hours lost through lost-time accidents	4,963
Frequency rate	0.42
Severity rate	74
Injury rate	35

These lost-time accidents were of the type found in industry generally

Among the minor accidents were a number in which there was a possibility of contamination with plutonium. After full investigation of the circumstances and the nature of the injury, in none of these cases was it considered necessary to carry out excision and subsequent urine analyses confirmed these decisions.

Only one serious accident occurred during the year. This was sustained by a scientific assistant when an explosion took place in a chemistry laboratory with resultant severe damage to an eye.

10 NON-RADIOACTIVE TOXIC HAZARDS

10.1 Clinical observation, including six monthly x-rays and vital capacity measurements was continued on a group of persons exposed to beryllium. There was no evidence of any ill effects.

[REDACTED]

Atmospheric estimations have been carried out and the majority of these were well below one microgram per cubic metre. Out of a total of 215 estimations, 8 only showed figures exceeding the permissible level of two micrograms per cubic metre, the actual figures being, 6.2, 3.8, 3.7, 3.3, 3.3, 2.8, 2.7, 2.3, µg per cubic metre.

10.2 T.N.T.

Statutory monthly examinations are made on all persons working with T.N.T. There has been no evidence of any toxic manifestations but two persons have been removed from this work because of recurrent dermatitis and two because of excessive obesity.

10.3 Other non-toxic hazards which are kept under special observation include work involving the use of lead, mercury, chromium, cyanide fluorocarbons etc.

11 MAJOR SITE HAZARDS

During the year, a plan of action to be taken in the event of a major emergency involving the release of radioactive materials has been prepared by a committee of persons directly interested and this has been approved by the Group Management Committee.

12 CONCLUSIONS

It is considered that the state of health and safety at A.W.R.E. is very satisfactory and this is largely the result of the friendly co-operation of the scientific and engineering staff. The fact that Health Physics surveyors are readily available in all active areas and able to provide immediate assistance to scientific staff on Health Physics problems has proved of great value.

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UNCLASSIFIED

9/7/54

Project Health Committee



D168/c2

422 II Health Committee

8th July, 1954.

I think I should let you know, in case it has not reached your ears already, of our intention to set up a Project Health Committee within the Army Authority. The Committee will consist of three members, each to be - Sir [Name], Professor [Name], and Prof [Name], President of the [Name]. It will act as a representative of the Research, Industrial and Non-Industrial Groups of the Authority, and Sir [Name] is the Chair.

We hope that through this Committee we shall be able to secure the best advice of the committee in bringing to bear on all the public questions likely to be of use. I enclose for you, in case it is of any use, the General Notice which will be sent to you.





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Cloud (Gas) Sampling

SRCR/144.

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ACTIVE MATERIAL CONCENTRATION IN TOTEL-I CARRERA FLIGHT.

Radio-Active Sampling
0312 I

B./A.E.R.E.,
Bldg. [Redacted]
A.E.R.E.

1. In view of the many estimates made of the weight concentration of active material in weapon clouds, a value calculated from the T-I flight may be of interest.

2. A Mk. 3 G-filter collected totally $(1.2 + 0.2)10^{14}$ fissions in 9.2 seconds at 14,000 ft. at H + 9 mins. For a filter of this type mounted in the same fashion, 1430 kg. of air were found to pass in 120 mins. at this altitude. According to H.G. Stewart of A.E.R.E. the specific activity of particles found on the filter was equivalent to 2.10^{16} fissions/c.c. of debris, or, assuming a density of 4-5, about $4-5 \cdot 10^{15}$ fissions/gm. of debris.

3. Hence we collected $(1.2 + 0.2) 10^{14} / 5 \cdot 10^{15}$ gm. = 24 ± 4 ngn. of active solids in 1.32 kgm of air; i.e. the weight concentration was 13 ± 2 ngn./kg. of air at 14,000 ft. at H + 9 mins.



(B.P./C.R.)

Bldg. [Redacted]
A.E.R.E.

27.10.55.

- c.c. C.R. (for information)
- S.S.R.D. "
- S.S.T.D. ✓ "
- S.H.P.R. "
- S.W.P. "
- S.C./E.H. "
- File 144.



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Mosex (55)/M.4

25/2/85

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ATOMIC WEAPONS TRIALS EXECUTIVE

OPERATION MOSAIC

Minutes of a meeting held in Room 243, St. Giles Court, on
Wednesday, 2nd November, 1955

PRESENT:-

[REDACTED]

Ministry of Supply (Chairman)

Admiralty

[REDACTED]

Air Ministry

[REDACTED]

Ministry of Defence

[REDACTED]

A.W.R.E.

[REDACTED]

Commonwealth Relations Office

[REDACTED]

Ministry of Supply

War Office

[REDACTED]

IN ATTENDANCE WERE:-

Admiralty

[REDACTED]

War Office

[REDACTED]

H. M. Treasury

[REDACTED]

Air Ministry

[REDACTED]

A.W.R.E.

[REDACTED]

Ministry of Supply

[REDACTED]

Lord President's Office

[REDACTED]

Item 1. MINUTES OF PREVIOUS MEETING

1. The minutes of the previous meeting were confirmed.

Matters arising were:

(i) Australian administrative assistance (para.12)

██████████ in reply to a question from ██████████ said that details of the administrative assistance which the Australians would provide were now available, and would be sent to the Treasury.

Item 3. PUBLICITY ARRANGEMENTS (Mosex(55)/P.8)

2. At this point ██████████ joined the meeting.

3. The Executive considered Mosex (55)/P.8. The following points were made:-

(i) Para.1 "minimum interference" to be altered to read "no interference", and the words "and the maintenance at all times of security requirements" to be added at the end of the paragraph.

(ii) Para.4 Last sentence to read: "The Executive are asked to agree that, if in these circumstances the Australians wish to allot some of the limited accommodation to the Australian press, we would be pleased to discuss it with them."

(iii) A new paragraph should be inserted covering relations with the press at Pearce and other airfields.

(iv) Para.5 The Admiralty would provide a naval photographer, darkroom, etc. in H.M.S. Narvik. This photographer could take pictures from the ship and have them processed, thus relieving the scientific staff of this duty. Furthermore, the photographs after censoring would become available at Onslow earlier than any pictures taken by the scientific staff. The Operational Commander would make a helicopter available as convenient to take the photographs from H.M.S. "Narvik" to the mainland.

(v) Still photographs only should be taken by the press and the Naval photographer. Cine-cameras would not be allowed.

(vi) Para.7 The Ministry of Defence wish to be informed as early as possible, of all intended announcements in view of our relations with the U.S.A. in this field.

(vii) Para.8 ██████████ considered that the draft statement would be better divided into two portions.

(viii) Para.9 The word "Ministries" should read "Ministers".

4. The Executive agreed that Mosex(55)/P.8 should be re-drafted in the light of this discussion and that ██████████ would assist in this. The paper would be considered at the next meeting.

5. At this point ██████████ and ██████████ left the meeting.

Item 2. PROGRESS REPORTS

6. ██████████ reported that he had received the requirements of the Safety Committee for meteorological stations. These were

- [REDACTED]
- (i) A weather ship some 600 miles west of the Monte Bellos, in position by 15th March, 1956. 9/4
 - (ii) A weather station on Christmas Island, in operation by 15th March, 1956. 9/4
 - (iii) Daily weather flights from Darwin from 17th February, 1956.

7. [REDACTED] said that the Admiralty were examining the possibility of providing a weather ship to be in position by 15th March, and would discuss the matter as necessary with A.W.R.E.

8. [REDACTED] further reported that:

- (i) The "Flash" signal organisation is well in hand.
- (ii) H.M.S. Narvik is at present fully manned and undergoing trials, and should sail according to programme.
- (iii) H.M.A.S. Warrego had made good progress in surveying and marking channels. H.M.S. "Tarangi" had completed the laying of moorings.
- (iv) [REDACTED] had returned from Australia. His report indicated that, of the buildings, services, etc. on the inlands, much more was available than had been expected. This would enable the tonnage of stores, e.g. aggregate, to be reduced.

9. [REDACTED] reported that Sqdn. Ldrs. [REDACTED] had completed a tour of airfields in Western Australia and their report showed that

- (i) Onslow was not in good shape. So far as accommodation was concerned, the R.A.N. had offered to accommodate the R.A.F. contingent in Onslowtown;
- (ii) The runways at Port Hedland were in good condition;
- (iii) Pearce can provide one half of the total M.T. requirement, thus reducing the R.A.F. shipment required.

10. [REDACTED] said that the rehearsals being carried out were all proceeding satisfactorily except for the tower rehearsals at Foulness which were lagging slightly. Group reports would be available soon.

11. [REDACTED] said that, although no formal reply had been received from the Australian Safety Committee about the conditions proposed by A.W.R.E., there were other indications that they would be acceptable, and A.W.R.E. was optimistic

Item 4. EXPENDITURE BY DEPARTMENTS

12. In reply to an enquiry by [REDACTED] the Air Ministry and the War Office confirmed that they were reconsidering their programmes and estimates in accordance with Mosex(55)/P.7.

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Summary of Action

Secretary - Para. 4

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MINING AND OILS TRADING CORPORATION

OPERATIONS DIVISION

Minutes of a meeting held in Room 243, St. Giles Court, on Wednesday,
2nd November, 1955

PRESENT:

[Redacted]

Admiralty

[Redacted]

Air Ministry

[Redacted]

Ministry of Defence

[Redacted]

Commonwealth Relations Office

[Redacted]

War Office

[Redacted]

Ministry of Supply

[Redacted]

A. I. R. E.

[Redacted]

IN ATTENDANCE:

War Office

[Redacted]

Air Ministry

[Redacted]

Lord President's Office

[Redacted]

A. I. R. E.

[Redacted]

Treasury

[Redacted]

Ministry of Supply

[Redacted]

[Redacted]

als)
v. was
not

Item 1 MEMBERS OF THE PRESS ASSEMBLY

1. The minutes of the previous meeting were confirmed. Matters arising were:

(a) Cost in target response programme (Para. 3)

It was confirmed that the target response programmes were being re-examined in the light of a request from the D.R.C. that they should be reduced in scale.

(ii) Introduction of the Services (para. 6)

The War Office reported that the paper circulated as Buffalex (55)/2113, covering proposals for the troop indoctrination exercise, was now before the Executive Committee of the Army Council. If approved it would then be submitted to Chiefs of Staff.

Item 2 PUBLICITY ARRANGEMENTS

2. The Executive had before it Buffalex(55)/P.14 describing the proposed arrangements for publicity and press representation. The paper was discussed in detail, and the following points arose:-

- (i) Paragraph 1 Add at end "and the maintenance at all times of security requirements."
- (ii) Paragraph 4 A decision was required on the question whether the press could be given facilities to be present at more than one explosion. The planners should examine and report before the next meeting on the capacity for meeting likely press demands in the light of such factors as transport, accommodation and water supplies.
- (iii) Paragraph 5 It was noted that the planned Canadian participation in the operation would put the Canadian press in a category requiring special consideration.
- (iv) Paragraph 7 It was suggested that a positive announcement on the use of animals would be preferable to a forced admission. The Lord President's Office would consider what action should be taken

Item 3 ANY OTHER BUSINESS

(i) Financial Estimates

██████████ said that the Treasury were most concerned about the presentation of estimates for the operation, particularly on the target response programme for which the Treasury had not yet had submissions from Departments concerned.

The Air Ministry and the War Office representatives confirmed that estimates were being re-examined in the light of the Treasury's letter of the 17th October,

(ii) Movement of Personnel by Air

The Executive considered and approved Buffalex(55)/P.15.

██████████ agreed the proposals on behalf of the Treasury.

(iii) Completion Date for Maralinga Construction

In response to a question from ██████████ (Trials) said that progress to date on the construction of Maralinga was

██████████

[REDACTED]

not unsatisfactory, and there was no immediate reason to expect that the range would not be completed on time.

Summary of Action

A.W.R.E. - Para.2(ii)

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ATOMIC WEAPONS TRIALS EXECUTIVE

OPERATION MOSAIC

Minutes of a meeting held in Room 243, St. Giles Court, on
Wednesday, 2nd November, 1955

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[REDACTED]

Ministry of Supply (Chairman)

Admiralty

[REDACTED]

Air Ministry

[REDACTED]

Ministry of Defence

[REDACTED]

A.W.R.E.

[REDACTED]

Commonwealth Relations Office

[REDACTED]

Ministry of Supply

[REDACTED]

War Office

[REDACTED]

IN ATTENDANCE WERE:-

Admiralty

[REDACTED]

War Office

[REDACTED]

H. M. Treasury

[REDACTED]

Air Ministry

[REDACTED]

A.W.R.E.

[REDACTED]

Ministry of Supply

[REDACTED]

Lord President's Office

[REDACTED]

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(iv) Para.5 The Admiralty would provide a naval photographer, darkroom, etc. in H.M.S. Narvik. This photographer could take pictures from the ship and have them processed, thus relieving the scientific staff of this duty. Furthermore, the photographs after censoring would become available at Onslow earlier than any pictures taken by the scientific staff. The Operational Commander would make a helicopter available as convenient to take the photographs from H.M.S. "Narvik" to the mainland.

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- [REDACTED]
- (i) A weather ship some 600 miles west of the Monte Bellos, in position by 15th March, 1956. (9/4)
 - (ii) A weather station on Christmas Island, in operation by 15th March, 1956. 9/4
 - (iii) Daily weather flights from Darwin from 17th February, 1956.

7. [REDACTED] said that the Admiralty were examining the possibility of providing a weather ship to be in position by 15th March, and would discuss the matter as necessary with A.W.R.E.

8. [REDACTED] further reported that:

- (i) The "Flash" signal organisation is well in hand.
- (ii) H.M.S. Narvik is at present fully manned and undergoing trials, and should sail according to programme.
- (iii) H.M.A.S. Warrego had made good progress in surveying and marking channels. H.M.S. "Tarangi" had completed the laying of moorings.
- (iv) [REDACTED] had returned from Australia. His report indicated that, of the buildings, services, etc. on the inlands, much more was available than had been expected. This would enable the tonnage of stores, e.g. aggregate, to be reduced.

9. [REDACTED] reported that Sqdn. Ldrs. [REDACTED] had completed a tour of airfields in Western Australia and their report showed that

- (i) Onslow was not in good shape. So far as accommodation was concerned, the R.A.N. had offered to accommodate the R.A.F. contingent in Onslowtown;
- (ii) The runways at Port Hedland were in good condition;
- (iii) Pearce can provide one half of the total M.T. requirement, thus reducing the R.A.F. shipment required.

10. [REDACTED] said that the rehearsals being carried out were all proceeding satisfactorily except for the tower rehearsals at Foulness which were lagging slightly. Group reports would be available soon.

11. [REDACTED] said that, although no formal reply had been received from the Australian Safety Committee about the conditions proposed by A.W.R.E., there were other indications that they would be acceptable, and A.W.R.E. was optimistic

Item 4. EXPENDITURE BY DEPARTMENTS.

12. In reply to an enquiry by [REDACTED] the Air Ministry and the War Office confirmed that they were reconsidering their programmes and estimates in accordance with Mosex(55)/P.7.

Health + Safety
Reg. OTH IV
Tele: MUSEM 3644
Ext: 183

O.B.F., R.E. (Retd.)

MINISTRY OF SUPPLY,
Room 671,
St. Giles Court,
St. Giles High Street,
London, W.C.2.

Our Ref: IX/72/09

Copy to: [redacted] A.W.R.E.

7th November, 1955

Director of Weapons and Development,
War Office,
Whitehall, S.W.1.

Radiological Safety Regulations - Meralins

The 4th Edition of these Regulations has now been prepared and is being sent to Australia for agreement. This edition includes the following amendments which will take account of the comments forwarded in your 57/Misc/885 V.C.S.(W) 7 (Plans) of 3rd August and 18th October.

War Office Comments of 3rd August

Sub-paragraph 2(a) is included in the comments on your second statement below.

Sub-paragraph 2(b). The special higher integrated dose referred to in paragraph 2.2(1) (d) of the Regulations is intended to be used operationally. It is agreed that in an emergency no rigid adherence to Regulations is practicable.

Sub-paragraph 2(c). Red, Blue and Yellow areas are not defined by particular levels of activity but by the degree of protection required under particular circumstances.

Sub-paragraph 2(d). Paragraph 5.2(b) and (c) are worded sufficiently generally to cover the requirement to wear respirators when this may be necessary. The order to wear respirators can only be given by Health Physics personnel after a careful study of local circumstances; such circumstances cannot be legislated for in advance.

Sub-paragraph 2(e). Specific advice on cleaning of shoes and gloves will be given to users as necessary. It is not considered that any expansion is appropriate to these general Regulations.

Sub-paragraph 2(f). The concept of "personal monitoring" is not new and has been used successfully at Atomic Energy Establishments in the United Kingdom and elsewhere for many years. It has also been used successfully in previous trials.

Paragraph 3. Your suggestion that it would be more correct to use the word "Radiological" instead of "Radiation" in the title of the Regulations has been accepted.

War Office Comments of 18th October

In paragraph 2 of these comments and in paragraph 2(a) of the reply of 3rd August, the suggestion is made that the application of the lower integrated dose (paragraph 2.2 (b) of the Regulations) should be left to the Officer in Charge of the particular task and not to the Health Control Officer. This suggestion has been most carefully considered but is not acceptable.

1768

[REDACTED]

The United Kingdom is responsible for radiological safety on the range. During trials this responsibility is exercised by the Director, A.W.R.E., on behalf of the Minister of Supply, and in inter-trial periods by the Commandant, Haralinga. This responsibility is one which can be exercised only so long as complete control is maintained over entry and work in all active areas. In the exercise of this responsibility it is incumbent upon D.A.W.R.E. to keep the doses received by all personnel to the minimum consistent with the carrying out of the necessary tasks. This does not imply that there will be needless restrictions. The urgency of any task will have been decided in advance by the Scientific Superintendent in consultation with the Group Leader concerned, and the Health Control Officer. At this time the decision can be made whether the lower or one of the higher integrated doses is applicable. Only the Health Control Officer will be in a position to assess the varying factors (e.g., B/γ) which when added together would carry a man up to the limit of the dose set.

Paragraph 3(a). The suggestion that part of paragraph 11.1 of the Regulations concerned with accidents should be rewritten is of considerable value and paragraph 11 has been rewritten as follows:-

11. Accidents and FIRST AID

11.1 If anyone thinks he may have inhaled, ingested or otherwise absorbed (e.g., through cuts, etc.) any active material he must at once:-

(i) Take emergency action.

(ii) Report to the Health Control Officer or the Medical Officer (through his Officer-in-Charge if the accident occurs on duty).

11.2 If the skin is accidentally cut, or scratched, during work in ACTIVE areas the cut should be placed, if possible, under running water within 15 seconds and held there whilst the whole wound area is scrubbed with a soaped brush for at least five minutes. The flow of blood should be encouraged by mild pressure above the wound. The surrounding skin should be monitored and washing continued until this is inactive.

A sterile dressing, not a strip of dressing of the Elastoplast type, may be used as a temporary cover until qualified medical attention has been received.

The object causing the wound will be kept and tested for contamination.

11.3 If anyone spills any radioactive material he must, unless in a YELLOW area

(i) Ask all staff to vacate the area.

(ii) Limit the spread of contamination.

(iii) Report immediately to Health Physics.

In a YELLOW area he must mark the boundaries of the spill and report to Health Physics.

[REDACTED] /Paragraph 3(b)

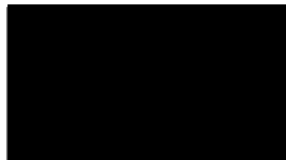
(contd.)

Paragraph 3(b). Most of your suggestion in this paragraph is accepted in that the rather cumbersome preamble to paragraph 14.3 is clarified by your wording. However, in view of the authority given to the Health Physics Adviser in paragraph 14.3 (iv) of the Regulations the change to "Trials Superintendent" instead of "Health Physics Adviser" is considered neither necessary nor desirable.

Paragraph 14.5 will be rewritten as:-

"14.5 Officers Commanding Service Units

The Officers in Command of the various Service units and Groups engaged in the trial whether at Maralinga or elsewhere will ensure that these regulations and any instructions of the Health Physics Adviser are brought to the notice of all personnel under their command and will ensure that they are enforced."



Downgraded
UNCLASSIFIED

Your Ref: RAF/AWRE S.1282.
SRCR/150/17.

4/15/8
1/2/85
Boffa
Sedel

4/14
14-2-85

'COLD FINGER' SAMPLING EQUIPMENT

Radio Active Sampling
0312 I

[Redacted]

R.A.F./A.W.R.E.,
Bldg. D.29,
A.W.R.E.

1. Purpose. The installed apparatus will be used to collect a sample of water at an altitude of some 20,000' by the cloud-tracking aircraft at 'Buffalo'.
2. Method. A 'cold finger', kept below the dew point of air at the altitude sampled by a refrigerant of dry ice with trichlorethylene, produces a condensate of atmospheric water vapour which is then removed by warming the finger and collecting in a receptacle; and the cycle is repeated until about 100 grams of condensate are obtained.
3. Equipment. Two types are being considered: -
 - (a) an adaptation of the system described in D.R.B. (Canada) Research Report IR-115 using equipment normally available in this country, except that, so far as possible, the same type of condenser unit and inlet will be used.
 - (b) since the above equipment needs about 15 gallons of dry ice-trichlorethylene mixture, which is both heavy and bulky, we are investigating the possibility of mechanical refrigeration, drawing the power from the normal aircraft supplies. In view of the time scale this development is unlikely.

Whichever system is chosen, it is intended that it will be mounted on a complete rack which can be bolted to the normal fixing mechanism for seats and/or equipment in a 'Varsity' aircraft, and designed to withstand a forward acceleration of 15 times gravity. Entry of ambient air to the apparatus
/will

[Redacted]




probably be by some form of scoop or inlet through a convenient window, escape hatch, etc. and returned outside by the same method. Installed in this air line will be a simple type of filter, which can either be periodically withdrawn and soamed or continuously monitored by means of a type 1320 battery-driven monitor. The power supply from the aircraft required is likely to be:-

for (a) less than 1 KW.

and for (b) several KW, probably less than the 4-5 KW available.

4. Procedure. The aircraft will fly until the cloud is detected by the instruments installed by S.H.P.R., circulation of the cooling fluid will begin, and semi-continuous checks will be made on the activity picked up on the filter (say, for 1 min. every 10). A detailed action sequence will be provided when the design form of equipment is decided. Samples will be transported to the U.K. in sealed glass bottles, into which the condensate is run during the sampling operation.



S.R./C.R.,
Bldg. 
A.W.R.E.,
Aldermaston.

9.11.55.

c.c. C.R.,
S.S.T.D. ✓
File 150/17.



1772

RAF Operations - ~~Operations~~

Arrangements

3 copies in 1277

11/2/85 L

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C182
VII

Miss. of
meetings -
Mosaic

Minutes of a Meeting held in Conference Room
D.29, A.W.R.E., Aldermaston on 10th November, 1955,
to discuss Handling and Servicing of Sampling and Cabin
Filters on Operations Mosaic and Buffalo

Present:-



- (Chairman) S.R./C.R./A.W.R.E.
- I.A.M./R.A.E.
- D.D.Ops/A.W.T.
- Air Eng. 7 (C.G.)
- C.S.D.E.
- S.C.E.M./A.W.R.E.
- S.C.E.M./A.W.R.E.
- S.H.P./A.W.R.E.
- S.H.P./A.W.R.E.
- (Secretary) R.A.F./A.W.R.E.

Downgraded to
UNCLASSIFIED



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.M. 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 1 1/2 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 1/2 metre) 4.5 r per hour at 10 c.m.)
Starboard Pre-filter	0.08 r per hour at 1/2 metre) 2.0 r per hour at 10 c.m.)
H.E. Filter	0.02 r per hour at 1/2 metre) 0.4 r per hour at 10 c.m.)
Ventilated Suit Filter	0.018 r per hour at 1/2 metre) 0.450 r per hour at 10 c.m.)
Air Bag Filter	0.015 r per hour at 1/2 metre) 0.380 r per hour at 10 c.m.)
Mk.VIII Filter	.013 r per hour at 2 metres

2 hours after sampling

Mk.VIII Filter	0.25 r per hour at 2 metres) 1.00 r per hour at 10 c.m.)
----------------	---

2.3 It was agreed that A.W.R.E./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 A.W.R.E. Health Physics representative to monitor the dose rates of the components prior to handling.

2.4 [redacted] stated that the Mk.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 1/2 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 A.W.R.E. supervision.

3.2.2 Repacking of filters will be the responsibility of A.W.R.E./S.C.E.M.

3.2.3 A.W.R.E. 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 [redacted] and R.A.F./A.W.R.E. 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.

provided by A.W.R.E. (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.

3.6 Transportation of Filters.

3.6.1 [redacted] R.A.F./A.W.R.E. to arrange with [redacted] (S.P.T.) 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.

3.6.2 [redacted] (S.C.E.M.) to arrange for a supply of caps for cabin filter ends after taking off the aircraft.

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.

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 A.W.R.E. [redacted] for both Mk.III ducts and Mk.VIII ducts; [redacted] and [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.

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.

4.3 Transportation of Filters

4.3.1 A.W.R.E. 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.

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

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

4.5 Handling of Filters. Personnel handling filters will be given protective clothing under S.H.P./S.C.E.M. arrangements.

5. Any other Business.

5.1 Pressurisation of [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.

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.

M.3. A/626/55.

29/1/55

Operation Mosaic - Decontamination requirements

RAF Operations - Arrangements
Mosaic Oia III

Dawson
TO

To: Al. Ministry / D.D. Ops. (A.S.T.) 7

Reference your memo of 3rd November.

1. Your paragraph 1 contains an interpretation of the purpose and results of [redacted] visit which differs from ours. [redacted] was briefed on the purpose and proposed methods of decontamination at Pearce and the intention was that his visit should assist in the formulation of a complete plan rather than be the occasion of presenting it. I am informed that the mission was successful in this respect, that a layout was agreed, that the matters which were left open for final settlement were minor and that these are largely covered by subsequent signal (Mosex 50; copy attached).
2. A detailed reply to your paragraphs 2 and 3 prepared by the Group Leader in charge of decontamination is attached.

[redacted]

Aldermaston

11th November, 1955.

cc. S.S.T.D., RAF/AWRE, [redacted] (2).

MOSAIC: DECONTAMINATION OF AIRCRAFT

Paragraph numbers refer to those in
the original minute.

2. We understand that the Australian authorities have agreed to the international tolerances on drinking water contamination. All liquid effluent, which after allowing a reasonable decay time will be below this tolerance level will be pumped out to soak away in a shallow hole or trench. All solid waste below the tolerance figure will be burnt, buried or otherwise disposed of. All solid waste above the tolerance figure will be sealed in steel drums and transhipped to Maralinga for subsequent disposal on Buffalo. Most of the active waste will be in the form of sludges which can be packed in petrol drums.

Active liquids will be treated to precipitate chemically the activity as a sludge; otherwise they will be diluted to tolerance or if highly active, shipped to Maralinga in drums.

- 3.(a) The degree of contamination of the sampling aircraft at any given time is likely to be only a little higher than on Totem I. The contamination is not easy to assess accurately as we were unable to measure the Totem Canberra before decontamination. On previous experience it is unlikely that the radiation level will be serious enough to require control of approach to the aircraft even on the first day.

The contamination of tracking aircraft will depend largely on the course of the aircraft through or near the cloud. Contamination should be only slight, if any, and much less than on the Lincoln used on Totem.

- (b) The degree of contamination which may be dealt with at Pearce Field should not require any specification. If the aircraft have returned to Pearce, they must be serviced before further flight. We have undertaken to leave Pearce Field in a radiologically clean condition, that is, within the tolerance levels already agreed by the Australians, and allowing reasonable decay times. We shall therefore take all necessary precautions and decontamination measures.

In the event of removal of the Barrier Paint proving necessary, we are confident that it can be achieved with the aid of our P.V.C. catchment sheets and that if any is split on the thin oil-bound sand surface which we shall lay on runway surfaces, it can be shovelled up and disposed of.

It is unlikely that any serious contamination will be washed off the planes in the event of rain. As a precaution, a thin layer of oil-bound sand will be laid under the aircraft at points where water will drip off the planes.

It should be stressed that there will be no hosing of active aircraft and consequent widespread drift of contaminated spray. All treatments are local hand scrubbing methods.

- (c) If any aircraft is unduly "hot" it will have to be cleaned whether it has the barrier paint on or not. The one with the paint can be cleaned far more easily and quickly. The degree of contamination of painted aircraft should not differ significantly from that of unpainted ones.

- [REDACTED]
- (d) We understood that the Austrians preferred Amberley for major decontamination and that the facilities at Pearce were primarily as an insurance against an emergency condition. We had anticipated that normally only minor decontamination to ease servicing would be carried out at Pearce.

If the Australians had agreed to the use of Pearce for all major decontamination (Barrier Paint stripping), then there would be no necessity to fly the aircraft to Amberley. We are however arranging only limited facilities at Pearce, suitable for emergency and minor decontamination. For major decontamination of all aircraft we would prefer a concreted area, although the dimensions need only be a little larger than the shadow of the aircraft.

- (e) Amberley will be needed for final major decontamination, assuming that only minor work is done at Pearce. 20 RAF personnel were requested on the basis of all 12 aircraft being contaminated and requiring stripping in a reasonable time.
- (f) It is unlikely that any serious contamination of the fuselage and engine nacelles will occur. Local spots, ducts, etc., may have to be dealt with by normal cleaning methods but the quantity of contamination, especially after a week or so, will probably be negligible.

[REDACTED] 55
 DOWNGRADED TO [REDACTED] 29/1/83

[REDACTED] SRCR/144.

RAF Operations - Arrangements
 Mosaic 0182 VI

AIRCRAFT SAMPLING AT 'MOZAIC'.

[REDACTED]
 S.S.T.D.,
 Bldg. [REDACTED]
 A.W.R.E.

1. It has been stressed by [REDACTED] quite rightly, that we must not allow the clouds to go to such a height that we risk not getting a fair sample. Calculations made by [REDACTED] indicate that, even on the assumption of 3-4 nominal, we should not have any very significant chance of the centre of the G.2. cloud exceeding 50,000', with a depth above and below this level of some 5-6,000'; hence on these figures, there is little likelihood that we should not be able to make the sampling runs envisaged. However, in case the cloud should rise extremely rapidly, so that at, say, 15 mins. there is the possibility that the centre would be beyond reach, [REDACTED] has suggested that the crews should carry some form of dose-rate measuring equipment which would allow them to fly a chord through the cloud, and thence to estimate the dose rate to be encountered should they fly through the centre. At this point, opinions seem to diverge somewhat. S.H.P.R. believes that the dose-rate at any point away from the edge is virtually independent of weapon yield and, at 20 minutes, should be in the neighbourhood of 2,800 r/hour; he therefore believes that there is no practical necessity for carrying any form of recording instrument. However, he would be glad to confirm that the dose-rate is near that predicted; it should lie somewhere in the range $3,000 \pm 1,000$ r/hour.

2. Therefore, it is necessary to decide (a) whether a complete rack of measuring and recording equipment, or some simple battery-operated monitor (Type 1155A modified) should be carried, (b) whether the air crew should base their flight path on the readings of these instruments, or on information signalled to them from the ship.

3. In the latter case, it would be necessary to appoint someone on the ground to assess the height and size of the cloud, on which the exposure time of a given flight path depends, and inform the air crew of the diameter at, say, minute intervals; a simple graph can connect this figure with the

/overall

[REDACTED]

overall dose to be expected. This would then allow the pilot to decide, without reference to instruments, what attack he should make on the cloud centre.

It is also necessary to have some ground-based height and distance measuring equipment, for the further reason that the orbiting aircraft can then be kept at an altitude consistent with that expected at 25 minutes. We have asked for two orthogonal runs to be made at heights of cloud centre \pm 2,000 ft; on more mature consideration, an alternative acceptable on sampling grounds can be framed to give an additional margin of safety. Since any elongation will be downwind and hence not clearly visible from the ship, the present ideas might entail at least one a/c being in the cloud for an uncomfortably long period. It is now, therefore, proposed to make two parallel runs crosswind with the same vertical spacing; the distance from the estimated centre being decided as in para. 3.

This ground-controlled procedure has the added advantage that the pilot and crew are not confronted with a psychologically embarrassing reading of several thousand r per hour, when they know that the maximum dose is only 25 r. In any case, I am assured by R.A.F./A.W.R.E., after consultation with R.A.E. Farnborough, that it is now next to impossible to fit any large equipment into the Canberras, partly on the grounds of physical size, but chiefly since there is no power available to run any large electronic items and any modifications would now require clearance, etc. which might set everything back 6 weeks.

If this concept of ground control is acceptable to [REDACTED] with the possibility of carrying a simple battery-operated monitor of the type described, then I think there is no difficulty at all in organizing this at a very short notice, but the general consensus of opinion is that any large-scale electronic equipment would require high-level intervention and priority to get it installed.

/OVER

PJC.

Both sides to be used

R.O.F. Form 2a

Minutes to be numbered consecutively

Q.P. No.

Ref. to

SRGR/144.

Downgraded to

UNCLASSIFIED

L
2/85

Subject {

AIRCRAFT SAMPLING AT 'MOSAIC'.

3 pages

Radio-Active Sampling
0312 I

S.S.T.D.
Bldg.
A.W.R.E.

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[REDACTED]

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/OVER



Both sides to be used

R.O.F. Form 2a

Minutes to be numbered consecutively

Q.P. No.....

Ref. to.....

Subject {

AIRCRAFT SAMPLING AT 'MOAIC' (contd:)

7. Perhaps the various recipients of this letter would comment on the points made here so that an agreed method can be worked out. It is realised that, in addition to the height uncertainty, the cloud may take unforeseeable shapes and that, therefore, some degree of improvisation might in the event be necessary; nevertheless, all would probably agree on getting the most rational plan made now.



(S.R./C.R.)

Bldg.
A.W.R.E.,
Aldermaston.

14.11.55.

c.c. R.A.F./A.W.R.E.

S.H./P.R.
 (C.M.E. Kelvin House).





AIRCRAFT SAMPLING AT 'MOZAIC' (contd.)

7. Perhaps the various recipients of this letter would comment on the points made here so that an agreed method can be worked out. It is realised that, in addition to the height uncertainty, the cloud may take unforeseeable shapes and that, therefore, some degree of improvisation might in the event be necessary; nevertheless, all would probably agree on getting the most rational plan made now.



(S.R./C.R.)

Bldg.
A.W.R.E.,
Aldermaston.

14.11.55.

c.c. R.A.F./A.W.R.E. ✓



S.H./P.R.



Both sides to be used

R.O.E. F. [redacted]

09/1/8

Minutes to be numbered consecutively

Q.P. No.

Ref. to

76

Subject {

M. 3. A/633/55.

RAF Operations - Arrangements
Mosaic 0182 VI

[redacted]
Bldg. [redacted]

--- Many thanks for letting me see your file which I return herewith. I agree that [redacted] paper, Appendix E, does contain a little more information than it need in view of its large circulation. However, I do not think much harm is done. For example, paragraph 4 refers only to the analysis of radio active fission products and not to the more important tasks for which the sampling is being done. Similarly, the height estimate given in paragraph 5 is misleadingly definite and we shall not, in fact, have estimates for either bursts until the time of the event.

I notice that you have queried paragraphs 13 and 15. As regards paragraph 13, I do not think that this has been put in as an A.W.R.E. requirement, but I have no objection to its remaining in. If the cloud track passed over the mainland it will be a very good idea to get such a survey done. If it does not, the aircraft are unlikely to get any significant results, but politically it might be an advantage to be able to say that the survey had proved that there had been no effects from fall-out. The task of photographing the crater area and providing a vertical Mosaic is one that I had not heard of and would not have requested although I expect it will be of some interest if it is done. I have not yet found anybody here who has asked for this job. Do you happen to know how it cropped up?

I notice you have also queried paragraph 17. This is a particular instance of a quotation of dates which, at this stage, I do not think can be at all firm; however, for the purpose for which the document has been prepared the dates given may be satisfactory. I would not choose to raise the issue at this stage since it seems almost inevitable that later on we shall be asking for a complete revision of all the dates that were estimated a few months ago.

/On a

DOWNGRADED TO

[redacted]



On a purely operational matter, is it in your opinion safe for the two aircraft to enter the cloud simultaneously even though they are intended to be separated by a vertical height of 4,000 feet? I do not wish to appear to be casting aspersions on the ability of the R.A.F. to keep to prescribed heights but I recall that at Totem it seemed subsequently that a mistake in height had been made and also that [redacted] said that conditions in the cloud were very turbulent. I should have thought that it would be safer to arrange that the aircraft sampled in sequence; this would presumably result in only a few minutes delay between the transits, but would ensure that a collision in the cloud was quite impossible.

B.A.A.

A.W.R.E.
Aldermaston

15th November, 1955.



Copy 40 to [redacted]
Announcement of trials in
Maralinga + Monte Bello.



Inward Telegram to Commonwealth Relations Office

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

RPTD: U.K. HIGH COMMISSIONER IN NEW ZEALAND (SAVING)

D: Canberra 15.55 hours 15th November, 1955

R: 08.50 hours 15th November, 1955

UPGRADED TO
UNCLASSIFIED
MOD 2/52

CYPHER

No. 1168

UK C/O [redacted] 24/1/55

Addressed Commonwealth Relations Office No. 1168,
repeated U.K. High Commissioner in Wellington No.93 Saving.

Your No. 1210.

ATOMIC TESTS

1. Australian Government are not in favour of insertion of word "significant" in (c). They point out that its inclusion may give rise to difficulties of interpretation since expenditure regarded as significant by Australia may not be so considered by United Kingdom.

2. They agree to insertion in (a).

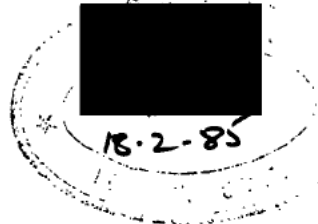
3. Please advise me what reply I should return.

Copy to:-

D.I

MOSAIC DISTRIBUTION

ALLOTTED TO DEFENCE DEPT.



Ops 1900 60A

DOWNGRADED TO

AF/CMS-558/64 PEI

DCAS/L2098

DDP (Int)



6th November, 1955.

Thank you for your letter of 31st October.

I entirely agree with you that there must be a serving officer as advisor to [redacted] during operation "Buffalo" who can translate requests made by [redacted] into orders to the military forces taking part in the trials. Since the Royal Air Force provides by far the biggest share of the support for these trials, the R.A.F. should provide the officer required.

There is a further consideration which makes such an appointment essential. The Australians have already asked us to define the channels of control and administration of our forces taking part in operations "Mosaic" and "Buffalo". Obviously we cannot take large military forces to Australia without first reaching complete agreement on who is to be responsible for their administration and discipline whilst they are in Australia. We are already looking into this problem and for operation "Mosaic" there should not be any difficulty. There is already an Operational Commander who will be responsible for the forces taking part in the trial (Commodore Bartlett). A similar appointment is necessary for operation "Buffalo".

The small elements of the Royal Australian Air Force and the Royal Canadian Air Force taking part in "Buffalo" have already agreed that their personnel may be nominated to fill officer and other ranks posts in the R.A.F. Task Force and it seems to me that the R.A.F. Task Force Commander, who will be an Air Commodore, could well be the Operational Commander for "Buffalo". He could be appointed to the Task Force now, take part in the planning and thus be in a position to give first hand advice when required during the operation. I do not think an additional officer of Air Vice-Marshal rank is necessary nor do I consider that the scale of the operation warrants a Task Force Commander or Operational Commander higher than Air Commodore. If this is agreed it would not be

/necessary

[redacted]

K.C.B.

Controller of Atomic Weapons,
Ministry of Supply,
St. Giles Court,
St. Giles High Street,
London, W.C.2.

1788

R

[REDACTED]

necessary to attach a special Air Officer to the Ministry of Supply or to Aldermaston.

The presence of V.I.P.s. at Maralinga during the shot firing should not in any way interfere with the method of control which I have suggested above nor should the administration of the Maralinga Range present any difficulty. Agreement for operational control of the airstrip during the intensive flying phase when shot firing is taking place can always be reached amicably, between the "Buffalo" Operational Commander and the Australian Authorities and I assume that the status of the Range Commandant will be defined well before the trials take place.

I am copying this to [REDACTED] and [REDACTED] but not to Aldermaston.

Copies to:-

[REDACTED]
D.C.I.G.S.

[REDACTED] D.C.N.S.

A.C.A.S. (Ops) ✓

[REDACTED]

1789

FORWARDED TO RAF Operations - Arrange

Mosaic 0162 VI

29/1/85

Building [REDACTED]

At a meeting held on 10th November, 1955 to discuss the handling and servicing of sampling and cabin filters on Operations Mosaic and Buffalo, the question of pre-trial blood counts for R.A.F. personnel involved in such handling and servicing of radioactive equipment was raised. It was felt by the meeting that this was a matter on which advice should be sought and the Health Physics representatives were asked to obtain the A.W.R.E. attitude on the desirability of such blood counts.

I should therefore be most grateful if you will inform me of your opinion on this subject so that I may pass it on to the Committee and to R.A.F./A.W.R.E.

Building [REDACTED]

A.W.R.E.,

Aldermaston.

18th November, 1955.

W6/HPE/S[REDACTED]

C. C. [REDACTED]

RAF Operations - Arrangements

Mosaic 0182 VI

SSTD/Trials/8

Your ref. SRCR/144.

DOWNGRADDED TO



RS

23/1/85

SR/CR.

Building

Cloud Sampling at Mosaic.

Referring to your minute of November 14th 1955, (the first sentence of which left me quite speechless) I offer the following comments:

1. Using the latest (1954) U.S. information in my possession and the results of a recent conversation with [redacted] about cloud heights and sizes, I would assess the chance of the Mosaic clouds ascending beyond the operational height of the Canberra as negligible.

2. It is, of course, for RAF/AWRE to advise on all operational aspects of this, but as a layman I am alarmed at the prospect of a pilot who is careering around the sky at high speed being expected to take decisions based on instrument readings almost before the needle has come to rest, or to take action at the last moment on receipt of somewhat unreliable information from the ground.

If 1 above is acceptable then 2 need not apply.

Building [redacted]
A.W.R.E.,
Aldermaston.

[redacted]
S.S.T.D.

21st November, 1955.

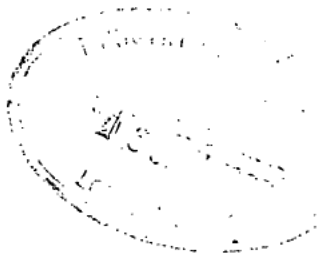
c.c.

RAF/AWRE

[redacted] SH/PR

1388

From: [REDACTED]



E100

Our Ref: XI/72/09

Tele: MUSEum 3644
Ext: 1383

21st November, 1955

Dear [REDACTED]

I attach a copy of a letter I have just received from [REDACTED] at Australia House. I should be very glad of your comments on this letter. For my part I think this is a matter where we should apply a test of the need to know. I cannot see any reason for [REDACTED] to visit A.W.R.E. except possibly in connection with the three items indicated by the Department of Supply. However, let me know what you think so that I may reply to [REDACTED]

Yours sincerely,

[REDACTED]

[REDACTED]
S.S.T.D.,
A.W.R.E.,
Aldermaston,
Berks.

1792

[REDACTED]

(During subsequent discussion with [REDACTED] it was established that an optical method of determining range involving coincidence of image would be almost impracticable).

6. It was agreed that [REDACTED] the Naval Staff Meteorological Officer, should be asked to meet the commitment of staff for operating the met. theodolite and for communicating the information to Narvik. An attempt would also be made to follow the cloud track using the G.L. No.3 Mk. 7 radar set on Hermite Island, largely to check whether radar following is practicable.
7. On receipt of the information in Narvik, [REDACTED] will estimate the height of the cloud centre and the deployment of the aircraft will be communicated over the VHF channel. Such instructions will be given in plain speech so that no coding procedure will be necessary.
8. [REDACTED] will advise the Operation Commander the height at which the aircraft should be deployed in the neighbourhood of the Islands just prior to their sampling sorties.
9. Provided that the cloud does not rise above the operational height of the Canberra aircraft (50,000 ft.) in the 20 to 25 minutes after firing (the time at which the sampling sorties will be made), the two aircraft will pass through on parallel paths 2,000 ft. above and below the centre. It may be necessary on safety considerations to stagger the aircraft in time as well as in height. The track of the aircraft will be cross-wind in order to ensure that the sorties will be along the shortest axis of the cloud.
10. In the event of the cloud rising above 50,000 ft. in twenty minutes, the aircraft would be asked to make an earlier sortie along a chord, details of which would be communicated to the Captains by the Operational Commander.
11. It was agreed that [REDACTED] should look into the possibility of fitting dose-rate meters in the aircraft, in spite of a decision at the sixth meeting of the Buffalex Air Measurements Sub-Committee that they should not be installed.

Building [REDACTED]
A.W.R.E.,
Aldermaston.

22nd November, 1955.

Distribution:-

Those Present
C.R.
S.S.T.D. ✓
S.P.T.
Group Captain [REDACTED]

1793

23/11

14-2 65

Downgraded to
U. S. S. R. - Radio-Active
Sampling

Ref: SPT/41/4

MOSAIC

0312 I

Notes of a discussion held in [redacted] Office, Building D3, on 11th November 1955 to discuss the deployment of sampling aircraft in relation to expected cloud heights

1. Present:-

[redacted]

S.L.T.
S.W.P.
S.W.P.
S.R./C.R.
RAF/AWRE
S.P.T.
S.P.T.

2. [redacted] said that the purpose of the meeting was to discuss the action necessary either before the firing or immediately afterwards to enable information to be passed to the sampling aircraft regarding the heights at which transits must be made through the cloud.

3. [redacted] said that the major difficulty in assessing the exact cloud height as a function of time after the explosion lay in whether there was condensation of water vapour or not. Humidity of the upper atmosphere was a difficult measurement to make with radio sonde apparatus and consequently he was of the opinion that no very accurate forecast of cloud heights could be given before the firings. Estimates would be given of probable heights assuming (i) no condensation and (ii) condensation of water-vapour, and whether (i) or (ii) seemed more probable. For purposes of cloud sampling, it would be very desirable if not essential to measure the heights during and towards the end of the ascents and to receive these measurements in time to advise the aircraft where to sample.

4. Based on expected yields of G.1. and G.2., [redacted] gave the following approximate estimates of cloud heights with the conditions stated.

	G.1.		G.2.	
	No Condensation	Condensation	No Condensation	Condensation
Height (ft)	16,000	35,000 to 40,000	21,000	45,000 to 50,000
Duration of rise (mins)	5 to 10	15	8 to 12	15 to 20

5. The meeting then discussed methods for determining the rate of rise of the clouds in the period between firing and deployment of sampling aircraft. It was agreed that azimuth and elevation readings of the top of the cloud should be taken at H.1. by a met. theodolite, values being passed to the control room in Narvik at minute intervals using the scientific R/T channel. The slant range of the cloud top would be measured by a naval rangefinder.

179

Both sides to be used

Form

29/1/55

Minutes to be numbered consecutively

Q.P. No.

Ref to

RAF/AWRE/TS.1295

2

Subject

Operation Mosaic

RAF Operations - Arrangements

- Mosaic 0182 VI

DOWNGRADED TO

C.R/A.W.R.E.,
Aldermaston

1. Thanks for your comments on Appendix "B" to the Air Plan for Mosaic. I am glad that you don't think Mosaic has really given anything away.

2. I agree that nothing is lost in making a ground radiological survey after both G.1 and G.2 and that such a procedure would have political advantages.

3. We have written to the Air Ministry and asked them why the crater photography was included in Mosaic. With the F.24 Camera, which will be fitted to the Varieties used in Mosaic, probably little of value would be achieved. We have, however, asked Air Ministry to initiate a trial installation of the F.49 survey camera in order that its use may be approved for the last three Varieties being provided for Buffalo. It is hoped that the F.49 camera will enable the contours of the Buffalo craters to be measured photographically and fairly accurately.

4. Regarding your query on vertical separation and the time of entry of sampling Canberras, [redacted] has spoken to [redacted] who will be the Wing Commander (Trials) at Mosaic and Buffalo and who is assembling and training the Sampling Force, and in [redacted] opinion, it will be perfectly safe for two Canberras to fly into cloud simultaneously, at a separation distance of 4,000ft.

[redacted]
Group Captain
Officer Commanding
RAF/A.W.R.E.

Date. 22.11.55

Aldermaston.

CONFIDENTIAL TO

CONTACT: R.445 for Aircraft
Cabins and Suits for
Airman - 0931 IV
7/Stores/4161/RDAE.4/ACG.

u/c
23/1/55

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 [redacted] 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, [redacted] 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.

What about
radiation?

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 [redacted] 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. [redacted] considered that if this could be confirmed by the doctors it would give a firm basis on which to work.

4. [redacted] 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, [redacted] 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 air mix 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 air mix line.
2. The sealing off of the air mix line entirely and the breathing of pure oxygen throughout the period of emergency.

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

12. [redacted] confirmed that Aldermaston were now engaged on the installation of filters in Canberras for further trials and [redacted] said that he would contact them to find the latest position from their end. [redacted] gave the name of [redacted] and [redacted] as contacts at Aldermaston.

13. [redacted] 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 [redacted] undertook, accordingly, to arrange for both a BW 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 [redacted] 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 [redacted] 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. [redacted] 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 his discussion.

R.D.A.E.4,
Room 128,
St. Giles Court.
Ext. 474.
7th December, 1955.

1797

UK C/C
24/11/55
copy to [redacted]
2

Outward Telegram from Commonwealth Relations Office

TO: U.K. HIGH COMMISSIONER IN AUSTRALIA

RPTD: U.K. HIGH COMMISSIONER IN NEW ZEALAND (SAVING)

(Sent 01.00 hours, 23rd November 1955)

CYPHER
No. 1435

DOWNGRADED TO
UNCLASSIFIED

Addressed U.K. High Commissioner in Canberra No.1435,
repeated U.K. High Commissioner in Wellington No.95 Saving.

MOD 2/53

Your telegram No. 1168.

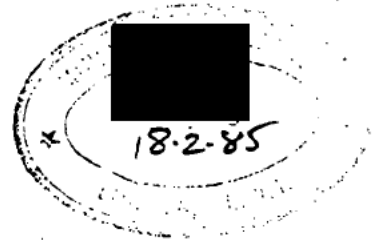
ATOMIC TESTS

Our only intention in suggesting insertion of word "significant" was to avoid meticulous accounting with object of ensuring that no additional cost however small should fail to be debited against United Kingdom Government. It would not be our intention to argue over interpretation of word "significant". On this understanding we hope you can persuade Australians to accept suggested insertion.

Copy to:-

D.I

MOSAIC DISTRIBUTION



DEFENCE DEPT.

DE 55/56/29

Announcement of Trials in
Marabunga + Monte Bello.

0181



Downgraded to
CONFIDENTIAL

S.
[Redacted]

From:- Central Medical Establishment,
Royal Air Force,
Kelvin House,
Cleveland Street, London, W.1

Radio - Active
Sampling
0312 I

To:- [Redacted] S.R.C.R.,
Building [Redacted]
A. W. R. E.,
Aldermaston, Berks.

Date:- 25th November, 1955

Ref.:- CME/157/42

[Redacted]

AIRCRAFT SAMPLING ON "MOSAIC"

With reference to SRCR/144 14/11/55, I am in fair agreement with paragraphs 1-4 and with the general recommendations stated in paragraph 6. I do not agree however with paragraph 5 since the psychological aspect (if any) can be taken care of by marking the scale in r. per minute. I must also make it quite clear that at no time have I asked for any such elaborate equipment as mentioned in this paragraph.

The simple battery operated D. R. Ms. reading to 100 r. per minute would be all that are required. These need only be carried on that particular Mosaic project in which neither yield nor cloud height can be definitely forecast, but in which it is essential to get samples. These instruments would enable the observers in the sampling aircraft to proceed with the sampling programme even in the event of a failure of V. H. F. communication with the ground (this has happened before at a Totem rehearsal) and also in the event of any of the other imponderables mentioned in paragraph 7 of S.R.C.R.'s letter.

I have discussed these problems with [Redacted] who has accepted my offer to act as observer in the sampling aircraft for this particular Trial, and very much hope that these instruments can therefore be made available.

[Redacted]
[Redacted] A.F.C., F.F.R., Q.H.S.,
Air Commodore,
Consultant in Radiology

Copies to:-

1. [Redacted] S.S.T.D.,
Building [Redacted]
A.W.R.E.
2. R.M., A.W.R.E.
3. [Redacted] S.E.P.R.,
A.W.R.E.

← We spoke in the last para.

28.11.55

28/11/55

[Redacted]

for infn.

28
11

L

Seismological observations
Buffalo 0446

[Redacted]

1/2/55

14-2 85

[Redacted]

Downgraded to 25th November, 1955.

UNCLASSIFIED

Dear [Redacted]

Have you thought about seismic observations in connection with British atom bomb tests? The Americans have done a good deal in the past, but have not published the results in detail, though summaries of the conclusions have been given by [Redacted]. In the next series of tests the Americans are going to do some unclassified seismic work. Wouldn't it be possible for us to do the same? I can imagine that it might be necessary to classify the amplitudes, but don't see that the times need be restricted in any way. If you think that anything could be done, perhaps the Royal Society's Defence Services Research Facilities Committee could be consulted.

I am sending a copy of this to [Redacted]

Yours sincerely,
[Redacted]

[Redacted]

C.B.E., F.R.S.,

A.E.R.E.,
Harwell,
near Didcot,
Berks.

[Redacted]

59/11/55

From:- Central Medical Establishment,
Royal Air Force,
Kelvin House,
Cleveland Street, London, W.1

To:- [Redacted] S.R.C.R.,
Building [Redacted]
A. W. R. E.,
Aldermaston, Berks.

[Redacted]

Downgraded to

Date:- 25th November, 1955

Ref:- GAE/137/42

[Redacted]

AIRCRAFT SAMPLING ON "MOASIC"

E 79 A1

With reference to SRCV/144 14/11/55, I am in fair agreement with paragraphs 1-4 and with the general recommendations stated in paragraph 6. I do not agree however with paragraph 5 since the psychological aspect (if any) can be taken care of by marking the scale in R. per minute. I must also make it quite clear that at no time have I asked for any such elaborate equipment as mentioned in this paragraph.

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I have discussed these problems with [Redacted] who has accepted my offer to act as observer in the sampling aircraft for this particular trial, and very much hope that these instruments can therefore be made available.

[Redacted]

[Redacted], A.P.C., F.F.R., Q.H.S.,
AIF Commodore,
Consultant in Radiology

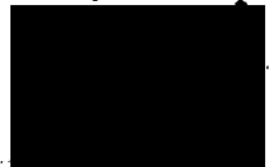
Copies to:-

1. [Redacted] S.S.T.D.,
Building [Redacted]
A.W.R.E.
2. RAF, A.W.R.E. ← [Redacted]
3. [Redacted] S.H.P.R.,
A.W.R.E.

011

AF/K175-558/64

6766



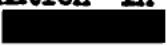
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SECRETED

CMS. 2680/55/D.D.Ops.(AWT)
974

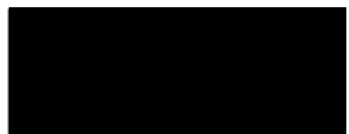
A.C.A.S.(Ops.) (through D. of Ops.(B. & R.))

Atomic Weapons Trials and Training - Joint Organisation

57A

1. Your minute Ops.2210 dated 25th November and D. of Plans loose minute reference Plans/1102 dated 24th November, 1955.
2. The War Office minute suggesting that the planning organisation should be responsible for examining the problem of 'personnel indoctrination' in atomic weapons, is based on the American set-up in Nevada which  saw during the last atomic series at the Nevada proving grounds. I personally believe that after the forthcoming trials at Maralinga, we will have to undertake some nuclear weapon trials as a purely Service venture for the purposes of proving Service weapons and techniques and for indoctrinating Regular Service personnel in the uses of atomic weapons. During the 1957 trials the R.A.F. will gain invaluable experience in handling the weapons and demonstrating at first hand the effects of nuclear explosions on personnel and equipment. The Army have suggested that they be allowed to send 250 selected soldiers to the 'BUFFALO' trials at Maralinga. There has not been wholehearted support for this venture either by the scientists or by members of the other Services who are taking an active part in the trials. The two main reasons for this I think are firstly, unlike the Americans we have to do these trials on the end of a 12,000 mile line of communication and secondly the trials are primarily scientific and all other considerations must be subordinated to the main task of meeting the Aldermaston scientific requirements.
3. I cannot think of any other joint-Service organisation that could undertake future planning for such joint-Service missions but I do think that from 1958 onwards serious consideration should be given to purely Service nuclear trials at which all three Services could be properly represented. I do not consider however that Operation 'BUFFALO' is an appropriate experiment at which Service indoctrination could take place.

29th November 1955



Group Captain
D.D.Ops.(A.W.T.)

5/12/55

Seismological observations
subject 0444.

f L
[redacted] 12/55

Ref: 917/12/55

5th December, 1955.
14-2-55

Dear [redacted]

Downgraded to
CONFIDENTIAL

I have had a copy of a letter which [redacted] wrote to you about seismic observations at U. K. tests of atomic weapons. For a variety of reasons I am not enthusiastic about this suggestion. Most of these reasons will be known to you also. What I do not know is the value in science of any such measurements. Do you know anything about this?

I do not propose to write to [redacted] myself, but I suppose that you will have to make some form of reply.

Yours sincerely,

[redacted] C. B. E., F. R. S.,
A. E. R. E.,
Harwell,
Didcot, Berks.

P

25/2/55

[REDACTED]

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Downgraded to
UNCLASSIFIED

Mosex(55)/M.5

ATOMIC WEAPONS TRIALS EXECUTIVE.

OPERATION MOSAIC.

Minutes of a meeting held in Room 243, St. Giles Court,
on Wednesday, 7th December, 1955.

PRESENT:-

[REDACTED]
Ministry of Supply (Chairman).

Admiralty.

[REDACTED]

Ministry of Defense.

[REDACTED]

War Office

[REDACTED]

Commonwealth Relations
Office.

[REDACTED]

Lord President's Office.

[REDACTED]

Ministry of Supply

[REDACTED]

A.W.R.E.

[REDACTED]

IN ATTENDANCE WERE:-

H.M. Treasury.

[REDACTED]

War Office.

[REDACTED]

Air Ministry.

[REDACTED]

Ministry of Supply.

[REDACTED]

A.W.R.E.

[REDACTED]

[REDACTED]

[REDACTED]

Item 1. MINUTES OF PREVIOUS MEETING

1. The minutes of the previous meeting were confirmed.

Item 2. PUBLICITY ARRANGEMENTS (Mosex(55)/P.11)

2. At this point [REDACTED] joined the meeting.
3. The Executive considered Mosex(55)/P.11. The following drafting points were made:-

(i) Para.4

The final sentence to be re-drafted to read: "The Executive are asked to agree that, if in these circumstances the Australians wish to allot some of the limited accommodation to the press, we should like to discuss the allocation with them:"

- (ii) A new paragraph to be inserted indicating that the Operational Commander will in due course issue instructions on security to all those concerned in the operation who are liable to come into direct contact with the press. [REDACTED] agreed to provide the new paragraph with the co-operation of the Air Ministry and [REDACTED]
- (iii) Para.8(a). The words "by the Admiralty" to be added after "to be issued" in the first sentence:
- (iv) Para.8(a). The Admiralty would forward to Ministry of Supply the text of the announcement which they would propose to make on the departure of H.M.S.Narvik; This should be forwarded in good time for it to be cleared as necessary with Australia:
- (v) Para.8(b). The Executive was informed that a draft announcement to replace this paragraph was being prepared in Air Ministry:
- (vi) Para.8(c). [REDACTED] to be amended to read

The second paragraph of the statement to be amended to read "Preparations are being made for tower detonation at the Northern end of the Islands, the same area as used in 1952". The final sentence of the fourth paragraph to be deleted. The fifth paragraph to read: "As previously stated, the fall-out will be less than that caused by the explosion of 1952. There will be no danger to people or stock on the mainland." The words "next month" in the sixth paragraph to read "later":

- (vii) Para.10. "should" in the first sentence to be amended to read "may":
4. Other points raised during the discussion on the paper were as follows:-
- (i) Para.3. [REDACTED] stressed the importance of Departments' informing the Ministry of Supply of all intended announcements in order that Australia might be kept informed;

- (ii) Para.9. [REDACTED] undertook to draft a signal on the lines

[REDACTED] /of

[REDACTED]

of previous "flash" signals, and to agree it with Commodore Martell.

- (iii) The Executive agreed that photographs of H.M.S. Narvik and her crew on the way to Australia may be taken for release to the press. Material released to the U.K. press in this way would be released also to the Australian press.
- (iv) [REDACTED] stressed the importance of the Prime Minister's being kept in touch with intended announcements forwarded for clearance with the Australians. It was accepted that this was a responsibility of the Ministry of Supply, who would also keep the Ministry of Defence informed.
- (v) The Executive agreed that it was the responsibility of individual members to keep their Ministers informed of what was going on.
- (vi) The possibility of an unsuccessful detonation was discussed with reference to the question of publicity in the event of the press being present in the ships. It was agreed that an unsuccessful detonation would fall into one of three categories:-
- (a) a nuclear explosion of reduced yield:
- The flash signal provided for would be sent as if the explosion was fully successful:
- (b) Failure to detonate:
- The flash message would not be sent:
If the press were present it could be explained locally that a last minute decision to delay the firing had been taken. The Operational Commander should inform Ministry of Supply and A.W.R.E. by immediate operational message:
- (c) An explosion of the H.E. components only:
- In this event any press present would know there had been a failure. To prevent exaggerated stories being circulated the Operational Commander should report the facts to the Ministry of Supply and A.W.R.E. by flash message:
- (vii) The Executive agreed that there was no objection to the publishing, by the Admiralty, of the programme of H.M.S. Narvik:

Item 3. REVISED PROGRAMME (Mosex(55)/P.10:)

5. The Executive noted the revised programme as given in Mosex(55)/P.10 subject to the following amendments:- line 8 of para.2: "January 23rd" should read "January 25th". Line 11 of para.2: "Freemantle" to read "Fremantle":

Item 4. PROGRESS REPORT

[REDACTED]
[REDACTED] reported that:-

- (i) All heavy stores had been loaded on to H.M.S. Narvik; she would sail for Portsmouth on 8th December.
 - (ii) The meteorological officer for Christmas Island was now en route; all the necessary stores had been obtained.
 - (iii) All our requirements in Australia will be met.
 - (iv) The programme for the daily weather flights has been delayed for a week due to the overall delay in the operation.
7. [REDACTED] reported that he had not yet received any indication from the Australians whether the safety criteria he sent them will be accepted or not. Apart from this everything was going satisfactorily.

Item 5. ANY OTHER BUSINESS

8. [REDACTED] said that the Admiralty was considering sending a "Daring" class destroyer to Australia to take part in the measurement of fall-out; no decision had, however, yet been reached. |→ J.

9. The Chairman on behalf of the Executive expressed appreciation to [REDACTED] for the services he had given, which had contributed so largely to the smooth and successful planning of the operation, and wished him well on the operation. [REDACTED] said that all in A.W.R.E. would wish to be associated with these remarks.

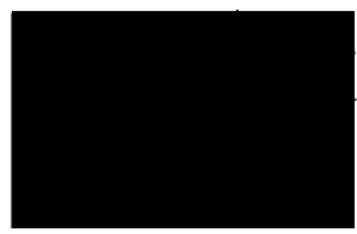
Summary of Action

[REDACTED] - Para.3(ii)

[REDACTED] - Para.4(ii)

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25/2/85
[Redacted]



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Buffalo(55)116

ATOMIC WEAPONS TRIALS EXECUTIVE

OPERATION BUFFALO

Minutes of a meeting held in Room 243, St. Giles Court,
on Wednesday, 7th December, 1955

PRESENT:-

[Redacted]
Ministry of Supply (Chairman)

Admiralty



War Office



Lord President's Office



A.W.R.E.



Ministry of Defence



Commonwealth Relations Office



Ministry of Supply



IN ATTENDANCE WERE:

H.M. Treasury



Air Ministry



A.W.R.E.



War Office



Ministry of Supply



[REDACTED]

Item 1 MINUTES OF PREVIOUS MEETING (Buffalex(55)/M.5)

1. The minutes of the previous meeting were confirmed. Matters arising were as follows:-

(i) Ops in target response programmes (Para.1(ii))

[REDACTED] reported that certain cuts in the target response programmes had been decided on in accordance with the D.R.F.C. discussions. These were being reported to the D.R.F.C. and the Range Commandant.

Item 2. ANY OTHER BUSINESS

2. [REDACTED] reported that the Royal Canadian Air Force would be unable to assist with some of the flying duties, as had been expected. The Royal Air Force will, therefore, undertake the duties which would have been allocated to the R.C.A.F.

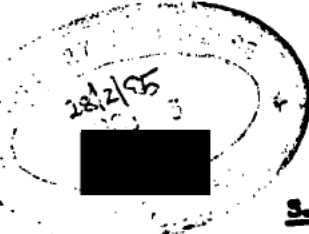
SPT.51.

434 IIa
Maralinga Committee
Minutes of Meetings



20/12/55

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UNCLASSIFIED

S.P.T.

I refer to the Minutes of the 8th Meeting of the Maralinga Committee, Page 7, Item 58 Decision 2 and attachment B.8, page 3, para.2.

The Operational Plan for marking out the medium distance sampling does not require the actual marking, as a physical system on the ground of a grid 10 miles square. Our proposal is to use the existing tracks i.e. the roads Maralinga - Emu, Emu - 600 mile Met. post, Emu - Maple Creek, Woomera - Alice Springs and the road to Ayr's Rock and beyond.

It is proposed in our plan that marker posts should be placed on these roads at convenient intervals, say between one and five miles. Any grid system used would be a "hypothetical" grid used for conveying positions in code, akin to the National Grid system in the U.K. or any military map reference grid.

The suggestion of a "physical grid" on the ground was raised according to [redacted] by the Australian authorities presumably for their own purposes and as we have no functional requirement for that "physical" grid we ought not be asked to pay for the work.



Room 122,
Building [redacted]
AFRE Aldermaston.

Ext. 6796.

8th December, 1955.

Copy to: S.S.T.D.

Downgrades to

R.E/22

UNCLASSIFIED

UK u/c
281.185

Q.P. No. _____ Ref to _____

Subject: Moscow 'Giraffe' Arrangements
Papers etc O182 ID

D.D. saw [redacted] on 9.12.55.
The Admiralty has agreed that one
Daring Class destroyer will be made
available at Monte Bello for this purpose
from approximately May 1st

27.3.56. ARL Report
ARL/R.1/C.791 - 'Fall Out'
Predictions for Operation 'Moscow' refers.

Telegrams Out -
Buffalo Trials

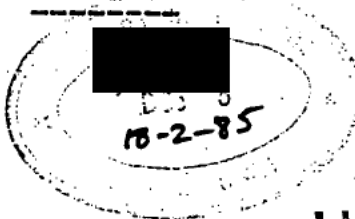
UK U/C w.r.f Def. Nuc. Tech. info
DB 22/1/55

0232 VI
Outward Telegram from Commonwealth Relations Office

TO: U.K. HIGH COMMISSIONER IN AUSTRALIA
(Sent 17.00 hours 9th December 1955)

CYPHER
PRIORITY

No. 1501



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CR

DOWNGRADED TO SSTD

UNCLASSIFIED

MOD 2/4

Your telegram of 1st July No. 647.

M A R A L I N G A

You will be aware, through [redacted] that there is disagreement between [redacted] of Department of Supply, on one hand, and [redacted] (D.C.G.S.) and [redacted] on other, over responsibility for work which will be carried out by [redacted] the Range Commandant and Australian Services force to meet our requirements at Maralinga. [redacted] Department of Supply representative in London, acting on instructions from [redacted] visited [redacted] the Controller of Atomic Weapons in Ministry of Supply, last week. He informed [redacted] that [redacted] wishes Service component of Australian Task Force to be responsible to the Maralinga Committee, and proposes that all requirements from United Kingdom should be sent to the Chief Executive of that Committee. [redacted] appeared to think that [redacted] had been acting without instructions from London. [redacted] also expressed fears that, when our work at Maralinga requires help from Australian Government Departments other than Supply, it will put sand in works if such requests for help come from Range Commandant or U.K.M.O.S.S. [redacted] informed [redacted] of our views which [redacted] has reported back.

2. In our view United Kingdom (Ministry of Supply and A.W.R.E.), U.K.M.O.S.S. and Range Commandant are one organisation with a task to be done. We consider that [redacted] must receive instructions direct from United Kingdom and be responsible directly to United Kingdom for all operational requirements, such as technical work at Maralinga and running range to meet United Kingdom requirements, while Australians, through any channels they may arrange, would be responsible for general administration of force in matters of discipline, postings, welfare, leave etc. We can give complete assurance that, whenever a task requires assistance from Australian Departments, requests for such assistance will be made to Maralinga Committee and not direct to Departments. Further, as we have agreed, we shall do our best to keep Maralinga Committee fully in picture on what we are doing.

3. [redacted] quotes Clause 17 of draft Memorandum of Arrangements in support of his views on direction of effort at Maralinga. You will remember that we expressed many doubts on wording of this Clause 17, and that it was only after receipt of your telegram, No. 647, that, in accordance with your recommendation, we accepted Australian version in substitution for our own. We look on [redacted] proposals as implying Australian interference in day-to-day work and an attempt on part of the Maralinga Committee (in fact, of Department of Supply) to run whole show.

4. Although we consider that Maralinga is not a joint project in sense that Woomera is but British project carried out on Australian soil with help from Australia in those matters in which Australia is best equipped to help, we must emphasise that we are not relying on this argument. We are making our stand solely because we believe that arrangements proposed by Department of Supply will cause unnecessary delays to work. Indeed, [redacted] appears to recognise that they would not stand the test of practicality when things really get busy, as we understand from [redacted] and from [redacted] that, in [redacted] view, instructions to Range Commandant would be given direct by Scientific Superintendent when he is in Australia.

5. We suggest that you should discuss matter fully with [redacted] and then, subject to your views, take it up with Australian authorities. We leave timing of approach to you in view of forthcoming General Election.

Copy to:-

D.I.

BUFFALO DISTRIBUTION

DEFENCE DEPT.
DEF. 55/56/15

11/85

[REDACTED]

Outward Telegram from Commonwealth Relations Office

Telegrams to U.K. High Commissioner
in Australia C182
XVa

TO: U.K. HIGH COMMISSIONER IN AUSTRALIA (ACTING)

(Sent 17.35 hours 16th December, 1955)

CYPHER

No. 1531

DOWNGRADED TO
UNCLASSIFIED

MOD 6/13

My immediately preceding telegram.

Following is text of draft announcement. Begins.

"R.A.F. TASK FORCE FOR ATOMIC
WEAPONS TEST

Air Task Force in support of third series of British atomic weapon tests which, as has been announced, will take place in the Monte Bello Islands, is being formed under command of Group

[REDACTED] More than twenty aircraft of Royal Air Force and several from Royal Australian Air Force will operate from Pearce Field, Western Australia and Onslow, North-Western Australia. First shipment of crated helicopter aircraft and heavy stores is being made this month but main body of aircraft and personnel will not leave United Kingdom until February and March.

2. Seven Canberra B.6 bomber aircraft from Pearce Field will be employed, some in collecting and delivering cloud samples after detonation and others in variety of photographic tasks.
3. Force will also be called upon to track radioactive cloud until it is well clear of Australian Continent. Varsity T.1 aircraft as well as Canberra will be used for this tracking. Varsities will also be used for low level radiological survey for vertical photography over crater area. Whirlwind helicopters, operating from Onslow, will assist the Varsities in this task and will provide air communication between mainland and Monte Bello Islands. In addition these will be available as a local air sea rescue service.
4. Neptune aircraft of Royal Australian Air Force will carry out area safety patrols, watching for surface shipping around islands. They will ensure that shipping is not in vicinity at time.
5. From middle of February four Shackleton aircraft of Coastal Command will operate from Darwin under Air Task Force commander, making daily weather observation flights over Timor Sea. Crews of Shackleton will be watching particularly for tropical storms, known locally as "willy willies" which are sometimes prominent meteorological feature in that part of world.
6. Four Hastings aircraft of Transport Command will be allocated to Air Task Force to carry out special air support required between United Kingdom and Australia and to maintain internal transport service between bases in Australia.
7. While R.A.F. element of Air Task Force will be mainly self-supporting, fullest facilities have been generously offered by Royal Australian Air Force at its bases in Australia and officers of the R.A.A.F. will serve on [REDACTED] staff." Ends.

/Copy to:-

1814

Copy to:-

D.I

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M/Supply



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DEFENCE DEPARTMENT
DEF. 55/56/29

1815

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DOWNGRADED TO
MOD 2/42

Inward Telegram to Commonwealth Relations Office

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

D: Canberra 19.30 hours 19th December 1955
R: 13.10 hours 19th December 1955

CYPHER

No. 1289

Your telegram No. 971.

M A R A L I N G A

Following is substance of letter received today from Prime Minister's Department about financial arrangements. Begin.

2. Australians agree to further amendment of your paragraph 1.
3. They agree not to include in formal memorandum details of numbers of service personnel.
4. As financial memorandum must be read in conjunction with memorandum (? of) arrangements which provides for 10 year tenancy subject to extension, paragraph 4(C) might be redrafted to enable it to cover any contribution of service personnel which Australia might make after 1956 series of tests has been completed. It could be phrased in a general way leaving precise details to be settled by exchange of letter. This would dispense with need for annex previously proposed by Australians and would keep basic principles separate from working details. Australians accordingly suggest 4(C) might read as follows: "the costs of providing such Australian service personnel as are agreed upon by the Australian Government from time to time for specific tests at the Maralinga proving ground".
5. If we agree this redraft of paragraph 4(C) Australians will write us a letter indicating their agreement to provide at their cost certain service personnel as requested earlier by us. This letter of which draft is submitted would quote categories and numbers as in your paragraph 2.
6. As regards your paragraph 4 Australians consider no real purpose would be served by inserting "significant" which is in their view too indefinite and likely to raise questions of interpretation. With reference to your telegram No. 1435 Australians say they think we would agree that in light of past experience there would be no question of "meticulous accounting". They would therefore prefer us not to press this amendment and they feel that in practice no problems should develop as a result of present draft clause. Ends.
7. Copies of letter from Prime Minister's Department enclosing draft letter mentioned in paragraph 5 above together with fair copy of memorandum incorporating all amendments including those now proposed follow by mail.
8. Please let me know what reply should be returned.

Copy to:- D. I
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ALLOTTED TO DEFENCE DEPT.

1818

18-2-85

R

AF/ems 39/62 p2

LOOSE MINUTE

CMS. 2464/54

V3R

A.S.A.(O.)

Safety of Nuclear Weapons

Attached is a copy of an extract from Atomic Energy Newsletter, Volume 14, No. 5, dated 18th October, 1955.

2. Since we badly need information on the vulnerability of atomic weapons, is there any chance of you getting this information from the U.S.A.?

O.R.19
22nd December, 1955.
JCC

Wing Commander

1817

per 39 A

Copy 1 of 4 copies

LC7/057/56 PE 3
24/2

~~24~~ OK

[REDACTED]

64



UNITED KINGDOM ATOMIC ENERGY AUTHORITY

ATOMIC WEAPONS RESEARCH ESTABLISHMENT
ALDERMASTON,
BERKSHIRE.

DOWNGRADED TO

Ref: 953/12/55

22nd December, 1955.

Dear [REDACTED]

We think that it is likely that the Australians will ask us for filters which have been flown at Mosaic and Buffalo. No doubt they will offer very close security treatment in their Atomic Energy Commission. While I am not very keen on the idea of giving them samples, I do not see how we can refuse. They could, of course, fly 'planes of their own or they could most easily take contaminated soil particles from the close-in area.

They would not know that fall-out contamination from close-in areas is very different from samples obtained from the cloud, and that only the latter is sufficiently representative to enable quantitative estimates to be made. On the other hand, they are probably very puzzled to know why we fly 'planes to get samples when it would be very much easier to take a few shovelfuls of dirt from the crater.

On balance I am recommending that if they ask us we give them a little piece of the filters, but that we wait a few days so that some of the short-lived key isotopes have decayed a good deal.

Do you wish to consult other people on this question before you give me your considered view?

Yours sincerely,

[REDACTED]

[REDACTED]
Ministry of Defence,
Storey's Gate,
LONDON, S. W. 1.

K. B. E., C. B.,

Ref: 961/12/55

14-265

Seismological Observations
Buffalo 0444

23rd December, 1955.

1/2/81

L

Downgraded to

I have had copies of your letters suggesting seismic measurements at weapons tests, at distances 700-2,000 miles. You say that perhaps 10 stations would give valuable information. There are two or three good stations in Australia, and perhaps one in New Zealand, but you would know the numbers and qualities of these, whereas I do not. However, I read your letter to mean that there are not enough stations or apparatus already in being to do the job you are interested in, and that more would be required.

At our previous tests in the Australian desert, the Australian Mining Department did set up one station 50 miles from the burst point. They are considering whether to do more extensive measurements next time, and I have asked for details but have not yet received them.

It is, I am afraid, not possible for me to do much to help, but before saying so definitely I should like more information on the size and cost of the job.

Our test site is roughly 600 miles north west of Adelaide. Would you please do the following for me:

- (1) Make a rough sketch of Australia showing existing manned stations that could take measurements.
- (2) Add places where temporary stations could be put. (These had better be in or near towns - anything in the bush costs so much money.)
- (3) Estimate roughly how much new equipment would be required or suggest where existing equipment could be borrowed.
- (4) Estimate how many people would be required per station, and if you can, indicate where we could borrow them for the job.
- (5) Any estimate of costs you can make. [To send people from England for this sort of work comes out at £2,000 per man. This covers travel, shipping equipment both ways and subsistence.]

Yours sincerely,

[redacted] Kt., F. R. S.,
National Physical Laboratory,
Teddington, Middlesex.

c. c. [redacted]

1819

28/12/55

39/12 L



Seismological observations
Buffalo 0444

NATIONAL PHYSICAL LABORATORY,
TEDDINGTON,
MIDDLESEX.

[Redacted] 1/2/55

Your Ref: 961/12/55

28th December, 1955.

14-2-85

Downgraded to
UNCLASSIFIED

Dear [Redacted]

Thank you for your letter of December 23rd. I think the best and cheapest way of organising seismological observations of your bang would be to get [Redacted] to make the arrangements. I am pretty sure that we could put the instruments in places where someone local could operate them and that all that would be necessary would be to send an Australian round to give instructions on setting up and operating. Only one person would be required per station. The main difficulty is instruments. I think it is quite likely that we could borrow the ones the Americans are using for their next series of tests, provided there is a reasonable interval between the end of their tests and the start of yours. I don't know of any spare instruments in this country, but will make enquiries. I will write to you in a day or two giving a list of existing stations and proposed places for new ones; most of my papers have been moved to Cambridge and are not easily accessible at the moment. Have you any objection to my writing to [Redacted] and suggesting that he organise some measurements of this kind in Australia? Would you like me to try and borrow the American instruments, or would it be better to do it officially? It would, of course be a great convenience to know when your bang is supposed to take place. Is this still classified? I know roughly when the American one is.

Yours sincerely [Redacted]

[Redacted] F.R.S.,
A.W.R.E.,
Aldermaston,
Berks.

Copy to [Redacted] A.E.R.E.

UK UK

6/2/55

192 XVIIa
Mosaic Result

DPR/EWS/78/56

OPERATION MOSAIC - FALL-OUT OBSERVATIONS

Recommendations Concerning the Stationing of
H.M.S. DIANA and the Scientific Whaler

Downgraded to
UNCLASSIFIED

1. Introduction

1.1 The original suggestion (meeting at A.W.R.E. 28th July, 1955) was that two observation ships might be used at distances of 200 miles and 400 miles respectively. The radiological hazard for G1 was estimated by A.W.R.E. to be:-

<u>Distance</u> (Miles)	<u>Fall-Out</u> <u>Intensity</u> (mc/m ²)	<u>'Dose-Rate'</u> <u>at 1 hr.</u> (r/hr)	<u>Time of</u> <u>Arrival</u> (hrs.)	<u>Max. Integrated</u> <u>Dose (to infinity)</u> (r)
200	8	1.0	H + 10	3.3
400	1.3	0.3	H + 20	0.9

1.2 When it became apparent that only one ship would be available it was decided that observations should be made at the shorter of the two distances, namely, at 200 miles. However, the provision of an unmanned whaler would enable additional measurements to be made much closer in. It was clearly desirable to obtain as much information as possible concerning the properties of fall-out at a shorter distance where it was capable of producing casualties. The closeness of the whaler was limited by the need for DIANA to steam from the whaler station to her own station in time to receive fall-out herself, and a position at 50 miles for the whaler was tentatively agreed.

2. Reasons for Choosing a Station as Close as Possible Consistent with Safety

2.1 The estimated progress of the radioactive cloud will be based largely upon meteorological data obtained immediately before firing in the region of the burst. Non-local winds may be expected to carry the contamination away from the predicted direction by a distance proportional to the square of the distance from ground zero. The angular error due to this will therefore increase linearly with distance.

2.2 The higher activity of fall-out at shorter distances means that if the ship is off the central path of the fall-out the marginal activity is more likely to have a useful level of radiation.

2.3 The time of passage of the fall-out is roughly proportional to the distance of the point of observation. Since it is hoped to close-down one engine-room during the passage of fall-out, any reduction of this time will considerably ease the problem of endurance of engine-room personnel.

2.4 The characteristics of the fall-out are likely to vary with distance. By fitting an unmanned whaler with a duplicate set of instruments and stationing her close-in where there is likely to be a casualty-producing level of radiation, valuable information will be obtained. It has not been found possible, however, to fit the whaler with automatic water sampling equipment. It is therefore desirable that DIANA, who will be so fitted, shall be stationed close in to obtain radio-active sea-water samples which will be as representative as possible of those in an area of hazardous operational fall-out.

3. Safety Considerations

3.1 The other effects of the explosions (blast, heat, gamma and neutron radiations) will all be negligible hazards at distances down wind compared with the danger from fall-out.

3.2 The maximum permissible levels of external radiation for Operation MOSAIC have been laid down as follows (Joint Operational Plan Section E p. 6, para. 2.2):-

	<u>r</u>	<u>When Allowed</u>	<u>Remarks</u>
Normal Working Rate	0.3	Once a week indefinitely	-
Lower Integrated Dose	3	Where necessary for the smooth running of the Operation.	No further exposure until average from beginning of Operation is down to N.W.R.
Higher Integrated Dose	10	Where necessary to recover vital records or information which might otherwise be lost.	As above.
Special Higher Integrated Dose	25	Applicable only in cases of extreme necessity and only to personnel who are not normally exposed to radiation.	No further exposure to radiation for three years.

3.3 The following table lists the probable early injurious effects on human beings (apart from genetic effects) to be expected from acute external doses of X or gamma rays over the whole body when received over a short period of time of the order of a day or less (U.S. Atomic Energy Commission quoted in "The Protection of Workers Against Ionizing Radiations", International Labour Office, August, 1955):-

<u>Acute Dose</u> (r)	<u>Probable Effect</u>
0-25	No significant effect.
25-50	Possible blood changes but no serious injury.
50-100	Blood cell changes; some injury; no disability.
100-200	Injury; possible disability.
200-400	Injury and disability certain; death possible.
400	Fatal to 50 per cent
600 or more	Fatal, probably to 100 per cent.

It will be seen from above that there appears to be no possibility of injury or even of blood changes after receipt of the Special Higher Integrated Dose.

4. Most Probable Dose-Distance Relationship

4.1 A careful study spread over several months by [redacted] (A.R.L.)

[REDACTED]

of all the data available to the Atomic Weapon Research Establishment including the results of both British and American tests has resulted in a graph showing the most probable distribution of activity with distance from MOSAIC explosions G1 and G2 (see [REDACTED] MOSAIC report Ref. No. ARL/R1/C791). The latest information concerning the characteristics of the weapons likely to affect this distribution has been made available by A.W.R.E. for this purpose.

4.2 Representative figures taken from the graphs are:-

<u>Total Dose to Infinite Time</u> (roentgens)		
<u>Distance</u> (Miles)	<u>G1</u>	<u>G2</u>
10	200	760
15	90	350
20	50	200
30	23.5	90
50	8.5	33
100	2.25	8.5
150	1.0	3.8

These figures have been derived assuming certain meteorological conditions, namely a mean wind speed of 20 knots and an angular standard deviation for the distribution of the activity of 3 degrees. Furthermore, it has been assumed that the cloud rises to 30,000 ft. for G1 and 40,000 for G2.

4.3 Some uncertainty is attached to these figures because of the large numbers of variables and the lack of sufficient experimental data, but [REDACTED] considers that if the best estimates available at the time, of the height to which the cloud will rise, the mean wind speed and the angular standard deviation are put into his basic formulae the results are unlikely to be out by a factor of more than 10, and that an error of a factor of more than 100 can be considered virtually impossible unless the bomb fails to explode.

5. Protection Afforded by the Ship

5.1 The dose figures quoted above (para. 4.2) assume that the dose is received from an infinite plane source of contamination. In practice the largest area from which radiation could possibly be received is the horizontal weather deck of the ship, since material falling on the surface of the sea will sink sufficiently for its radiation to be completely cut off. Experiments by A.R.L. [REDACTED] have shown that whereas an infinite area uniformly contaminated with cobalt 60 (1 curie/sq. ft.) will produce a dose-rate of 368 r/hr at a position 3 ft. 6 ins. above the deck, the same density of activity on the deck of the frigate RAPID will produce a dose-rate of only 190 r/hr. i.e., a reduction of 52%.

5.2 The A.R.L. experiments also showed that at the least protected of the covered positions for which measurements were made in RAPID, namely, the Captain's Position on the enclosed Bridge, the dose-rate was reduced to 40% of what it was on the weather deck. Thus the combined effect of a limited surface contaminated by fall-out and the physical shielding of the ship will produce a protection factor of approximately $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. A similar figure of $\frac{1}{4}$ will apply to the slightly less penetrating radiation received from the fall-out deposited on the weather deck of DIANA (which is comparable in area to that of RAPID).



5.3 By adequate pre-wetting of the ship's exposed surface, followed by effective washdown, indications are that approximately 75% of the fall-out can be washed away, i.e., a further protection factor of $\frac{1}{4}$ is effective.

5.4 Thus, for personnel under cover, at sea, in a ship which is being adequately pre-wetted and washed down, protection factors of approximately $\frac{1}{4} \times \frac{1}{4} = 1/16$ are applicable.

6. Stationing of H.M.S. DIANA

6.1 From a consideration of the above protection factors and the radiation tolerance doses discussed above, it has been decided that DIANA shall be at that distance from ground zero at which the hypothetical peak total dose in an infinite field would be 5 roentgens. The following will then apply:-

Dose from an infinite field	5 r
Dose on deck	2.5 r
Dose below deck (no washdown)	≤ 1.25 r
Dose below deck (pre-wetting and washdown)	≤ 0.3 r

6.2 It should be noted that the dose to personnel below deck in an adequately pre-wetted and washed down ship is equal to the weekly dose at the Normal Working Rate.

6.3 It should also be noted that should, by an unfortunate mischance, curves be as much as 20 times too low, AND the pre-wetting and washdown procedures be inoperative, then the dose received by personnel just below the weather deck will be 20×1.25 r = 25 r which is no more than the Special Higher Integrated Dose.

6.5 The formula given by Beale relating

x the distance in nautical miles from ground zero

H the maximum height of the centre of the cloud above sea level in thousands of feet

\bar{u} the speed of the mean wind to the centre of the cloud measured in knots

and σ_θ the angular standard deviation (in degrees) of the distribution of activity on the ground (or sea)

for the hypothetical peak total dose of 5 roentgens in an infinite field is

$$x^{1.95} = 29015 H^{-0.25} \bar{u}^{-0.05} \sigma_\theta^{-1}$$

6.6 It is seen that the dependence of x upon the mean wind \bar{u} is very slight. Consultation with Mathewman suggests that a mean wind speed of 30 knots is most likely to be typical of conditions at the time of firing and this value for the mean wind has been adopted for the subsequent calculations.

6.7 Dependence of the distance x upon the height of the cloud H is rather more than the dependence of the distance upon the mean wind discussed above. The height of the cloud, however, is likely to tend to one of two values, depending on whether or not meteorological conditions favour water condensation in the cloud as it rises. If condensation occurs, then the latent heat given up will make the cloud more buoyant and it is likely to rise to the tropopause. If not, the cloud may remain many thousands of feet lower. For this reason two heights of cloud, with and without

/condensation

1824

condensation, are considered for both G1 and G2.

- 6.8 The distance x at which a dose of 5 roentgens will be received is most sensitive to variations of σ_{θ} , the angular standard deviation. It is understood that this will be evaluated for the prevailing conditions before firing. The distance at which it is recommended DIANA be stationed can be found from the following table for both G1 and G2 according to the appropriate value of σ_{θ} and whether or not it is considered that the cloud will condense. (The heights of the cloud for G1 are taken to be 16,000 ft. (uncondensed) and 30,000 ft. (condensed) and for G2, 20,000 ft. (uncondensed) and 40,000 ft. (condensed)).

TABLE OF RECOMMENDED DISTANCES FROM GROUND ZERO
FOR H.M.S. DIANA IN NAUTICAL MILES

σ_{θ}	G.1		G.2	
	<u>Dry Cloud</u>	<u>Condensed Cloud</u>	<u>Dry Cloud</u>	<u>Condensed Cloud</u>
$\frac{1}{2}$	178	164	357	326
1	125	115	250	229
$1\frac{1}{2}$	101	94	203	186
2	88	81	175	160
$2\frac{1}{2}$	78	72	156	143
3	71	65	142	130
$3\frac{1}{2}$	66	61	131	120
4	61	57	123	112
$4\frac{1}{2}$	58	53	116	106
5	55	50	109	100
$5\frac{1}{2}$	52	48	104	95
6	50	46	100	91
$6\frac{1}{2}$	48	44	96	88
7	46	43	92	84
$7\frac{1}{2}$	44	41	89	81
8	43	40	86	79
$8\frac{1}{2}$	42	38	83	76
9	41	37	81	74
$9\frac{1}{2}$	39	36	79	72
10	38	35	77	70

Note: The figures given in the above table are, of necessity, based upon the best estimates of yield available at the time this paper was written (March, 1956). It is probable that these estimates are not final and that, before firing day, A.W.R.E. representatives on the operation will be able to provide improved estimates of yield, which may require modifications to be made to the distances given above.

7. The Expected Duration of Fall-Out

7.1 This is difficult to estimate accurately but it is more sensitive to variations in the mean wind speed than is the estimated distance for observation previously discussed.

7.2 However, the following figures for three values (two extreme and one mean) of σ_{θ} have been evaluated for G1 and G2 and refer to the time required for 95% of the fall-out to arrive.

[REDACTED]

- 6 -

Estimated Duration of Fall-Out

G.1

σ_{θ} \ \bar{u}	10	20	30	40	50
$\frac{1}{2}$	1 hr. 10 min.	30 min.	20 min.	17 min.	14 min.
3	2 hr. 40 min.	1 hr. 20 min.	50 min.	40 min.	30 min.
10	5 hr.	2 hr. 30 min.	1 hr. 40 min.	1 hr. 10 min.	1 hr.

G.2

σ_{θ} \ \bar{u}	10	20	30	40	50
$\frac{1}{2}$	2 hr. 20 min.	1 hr. 10 min.	50 min.	30 min.	30 min.
3	5 hr. 30 min.	2 hr. 40 min.	1 hr. 50 min.	1 hr. 20 min.	1 hr. 10 min.
10	9 hr. 50 min.	4 hr. 50 min.	3 hr. 20 min.	2 hr. 30 min.	2 hr.

7.3 . Until the correct values of σ_{θ} and \bar{u} are available for conditions at the time of firing, for preliminary planning, values of 3 degrees for σ_{θ} and 30 knots for \bar{u} may be taken as the most probable. In these cases we have:

Most Probable Duration of Fall-out (95%) for G1 = 50 min.
Most Probable Duration of Fall-out (95%) for G2 = 1 hr. 50 min.

7.4 These times are intended as a rough guide only. They may be in error by a factor of two.

8. Recommended Procedure to Avoid Exceptionally Heavy Fall-Out

8.1 Should, in spite of all precautions, DIANA find herself in an unacceptably high radiation field it is recommended that she steam at full speed in that direction at 45° to the bearing of ground zero which is most nearly opposed to the surface wind.

9. Stationing of the Unmanned Scientific Whaler

9.1 The object of using the whaler is to obtain data as representative as possible of fall-out which would be capable of producing casualties aboard an unprepared ship caught in it under operational conditions.

9.2 The chief limitation on the closeness with which the whaler can be stationed appears to be an operational one, since it is essential that DIANA be on her own station in time to make all necessary preparations after having dropped the whaler. The exact location of the whaler should therefore be left to the discretion of the Commanding Officer, H.M.S. DIANA, in consultation with [REDACTED] and other appropriate authorities at the time of the operation. 1826



10. Conclusions and Recommendations

- 10.1 For accurate prediction of the best position at which to station DIANA it is essential to have last minute evaluation of σ_θ , the angular standard deviation in degrees of the expected distribution of the fall-out at sea level, of \bar{u} the speed and direction of the mean wind to the centre of the cloud and of whether or not condensation is likely to occur in the cloud. From this data the recommended distance for the stationing of DIANA can be determined from the Table in paragraph 6.8. Distances are likely to be of the order of 65 miles for G1 and 130 miles for G2.
- 10.2 The bearing from ground zero will be determined by the direction of the mean wind.
- 10.3 The expected duration of fall-out can be determined from the Table in paragraph 7.2. Durations are likely to be of the order of 50 minutes for G1 and 1 hr. 50 mins. for G2.
- 10.4 The position of the dropping of the unmanned whaler is likely to be governed by the need for DIANA subsequently to reach her own station in time and is left for on-the-spot decision.
- 10.5 Subsequent to detonation it is desirable that the position of the radio-active fall-out at or near sea-level be tracked by survey aircraft in order to keep DIANA informed so that she may be able if necessary to steam along an arc to the best position.
-



OK

MINUTE SHEET

407/057/54 PC3
E4 OK

B4

I think that if the Australians
ask us ~~not~~ give them
filters. They should be changed.

I don't see why you should
consult anyone else but it
would be appropriate to tell

[Redacted]

[Redacted]

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29 Dec 55

Buffalo General
Arrangement Papers
0228 IP

CMS. 2840/56/D.D. Ops. (A.W.T.)

AIR PLAN

OPERATION "BUFFALO"

29/1/55

Reference to other Papers:-

Appendices: "A" Engineer Plan
"B" Equipment Plan
"C" Time Table
"D" Movement Instructions
"E" General Flying Plan
"F" General Signals Arrangements
"G" Establishment of R.A.F. Detachment

1955

INFORMATION

1. The second of the 1956/57 series of atomic weapons trials will take place at MARALINGA, SOUTH AUSTRALIA, in September, 1956. The code word Operation "BUFFALO" has been allotted to this series of trials.
2. A permanent atomic weapons proving ground is being created at MARALINGA under the auspices of the Ministry of Supply and the Department of Supply, AUSTRALIA. This will consist of a village similar to WOOMERA, an airfield capable of handling medium bombers and an atomic proving range equipped with suitable instrumentation. It is intended that construction should be sufficiently advanced by July, 1956, to permit partial use of the facilities for Operation "BUFFALO".
3. The scientific effort will be housed at MARALINGA including weapons storage and assembly. The effort will require air support and a Royal Air Force Task Group is being formed for this purpose. This, in the main, will be based at EDINBURGH, near ADELAIDE, with only an advanced element forward at MARALINGA. EDINBURGH is also the rear base for WOOMERA and a building programme to expand the facilities in order to house the "BUFFALO" Air Task Group is being undertaken to R.A.F. specification by the Ministry of Supply.
4. This series of trials will probably include, four rounds, one of which will be an air drop of a modified version of the weapon now in service. The R.A.F. Task Group will be responsible for most of the aspects of the air drop, and for all the air aspects of cloud sampling, cloud tracking, radiological survey and photography of all weapon firings. In addition the Royal Air Force will be responsible for air transport between the UNITED KINGDOM and AUSTRALIA and such internal services between the Task Force bases in AUSTRALIA as are required to support the operation.
5. The R.A.F. on behalf of the Ministry of Supply will be responsible for installing, operating and maintaining ground radio and radar facilities at MARALINGA and for supplementing those at EDINBURGH. Provision of all line telecommunications and telephone requirements will be the responsibility of M.O.S./A.W.R.E.
6. In addition to the main scientific tasks already outlined two subsidiary trials will take place providing they do not in any way interfere with the main purpose. The more important of the two is a "Target Response" trial. In this, various items (objects, structures, etc.) chosen on an interdepartmental basis are being subjected to the effects of an atomic explosion by positioning them near one or more of the firing points. The other, is an Indoctrination Trial sponsored by the War Office in which about 250 military personnel will be exposed to the psychological effects of an atomic explosion.

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1829

INTENTION

INTENTION:

7. To outline the air support tasks for Operation "BUFFALO".

EXECUTION

Executive Responsibility

8. (a) The Royal Air Force will assume overall executive and administrative responsibility for the Combined Task Force. A Senior R.A.F. Officer has been nominated as the Task Force Commander. The Air Task Group which forms part of the Task Force will also be Commanded by a Senior R.A.F. Officer.
- (b) The scientific aspects of the trials, including Target Response, will be controlled by the Director of Atomic Weapons Research Establishment or his nominee.
- (c) The indoctrination Trials will be controlled by a Senior Army Officer responsible to the Task Force Commander.

Aircraft

9. The aircraft forming the Air Task Group will include 2 Valiants, 10 Canberras, 8 Varsitys, 4 Hastings and 2 helicopters. In addition the Royal Air Force, in co-operation with the Royal Australian Air Force will provide the search and rescue organisation necessary for the operation details of aircraft required (if any) will be specified later. The R.A.F. will also undertake the air photographic aspects of the bombing range survey. and Varsitys will be used for this task.

R.A.F. Tasks

10. The R.A.F. Air Task Group is:-
- (a) To help assemble the atomic weapons in accordance with instructions issued by A.W.R.E., load the Valiant aircraft and carry out a live drop at MARALINGA range.
- (b) To collect and deliver cloud samples to the laboratories at MARALINGA after each explosion.
- (c) To track the radio-active clouds until they are well clear of the Australian Continent.
- (d) To carry out low level radiological survey of the crater area with helicopters and of the fall-out area with Varsity aircraft.
- (e) To carry out development flights with "Cold Finger" equipment fitted in Varsity aircraft.
- (f) To photograph the whole of the test area, the Target Response Site, the crater areas and the entry of aircraft into the radio-active clouds.
- (g) To test-fly radar fuses required for the air drop weapons over the terrain at MARALINGA.
- (h) To carry out thermal flux measurements using equipment fitted in the Valiant.

/(j)

(j) To test-fly the bhangmeter at each explosion.

(k) To provide transport support between the U.K. and AUSTRALIA, EDINBURGH and MARALINGA and other bases in AUSTRALIA as required.

11. The general flying plan to cover the tasks listed at para. 10 above is detailed at Appendix "E".

Special Fittings

12. The aircraft are to be fitted with special equipment for the operation. Details of the aircraft installations are included in the Engineering Plan at Appendix "A".

Aircraft Bases

13. UNITED KINGDOM. The Valiant element of the Task Force is to assemble at R.A.F. WITTERING under the control of H.Q. Bomber Command. The remainder of the Canberra and Varsity element is to assemble at R.A.F. WESTON ZOYLAND. The Hastings element is to remain at its parent station until required to proceed overseas.

14. Overseas. The Canberra, Varsity and Hastings elements of Operation "MOSAIC" are to move from PEARCE to EDINBURGH on completion of that operation. Here, they will be joined by the Valiants, Canberras, Varsities and Hastings from the U.K. Parts of this force are to be advanced to MARALINGA as required. Whirlwind helicopters at ONSLOW for Operation "MOSAIC" are to move to MARALINGA on completion of their task.

Base Facilities

15. MARALINGA. Weapon assembly/loading and aircraft decontamination facilities are being provided and are to be fully manned at MARALINGA. Limited M.T., Air Traffic Control and P. & F. facilities will also be available but aircraft servicing is to be limited to that which can be provided on a duty crew basis. Incidents requiring servicing of a more complicated nature are to be dealt with by a mobile party flown in from EDINBURGH. Furthermore, accommodation for R.A.F. personnel in the village is limited to about 65. Requirements in excess of this will be housed in tents on the airfield. Thus the numbers forward are to be kept to a minimum.

16. EDINBURGH. The Task Force will be required to be mainly self-supporting and a large building programme is in hand to provide the facilities needed in EDINBURGH. These include a hangar capable of taking the Valiant, extension of aircraft parking areas, erection of radio servicing and equipment buildings and a Task Force Headquarters building complete with Ops. Room, Briefing Room and a crew locker rooms. Considerable difficulty is being met in trying to provide temporary accommodation, other than tents, for Task Force personnel. It must be remembered that both living accommodation and building labour are much more difficult to obtain in AUSTRALIA than in the UNITED KINGDOM. Thus, the size of the Task Force must be kept as low as possible and accommodation may have to be on a wartime scale.

ADMINISTRATION

General. As for Operation Mosaic, Operational and Administrative Control of force whilst in U.K. will be exercised by H.Q. Bomber Command except for Hastings element. In AUSTRALIA admin. Control will be retained by H.Q. Bomber Command (except for Hastings) but Op. Control will be exercised by A.M. (A.C.A.S. Ops.)

Personnel

17. With a few minor exceptions the personnel established for Operation "MOSAIC" are to remain in AUSTRALIA on completion of that operation and take part in Operation "BUFFALO". The "BUFFALO" establishment is to be made final as soon as possible and activated in the following order:-

- (a) Valiant aircraft element.
- (b) Extra Canberra element.
- (c) Supplementation of the "MOSAIC" establishment to bring it up to the prescribed standard.

18. The establishment is to be given priority manning to 100% and personnel concerned are to be posted by A.O.C. i/c Records and D.G.P.II, as appropriate, to the following units:-

- (a) The Valiant element to R.A.F. WITTERING.
- (b) Canberra element to R.A.F. WESTON ZOYLAND.

19. The tour of duty is to be classed as overseas and personnel posted to the establishment are to retain possession of the married quarter they occupy if they so desire. Administrative Instructions and a nominal roll are at Appendix "H".

Equipment

20. Details of equipment required for the operation are listed in the Equipment Plan at Appendix "B".

Movements

21. In general, movements are to take place to the time table shown at Appendix "C". More detailed movement instructions are to be prepared by the Directorate of Movements and will be issued as Appendix "D" to this document.

SIGNALS

22. The general signals arrangements have already been issued in a separate document which should now be labelled as Appendix "F" to this document and its Appendices relabelled as Annexures.

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UK UK

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DRAFT PAPER FOR SUBMISSION TO THE CHIEFS OF STAFF
BUFFALO TRIALS - INDOCTRINATION OF SERVICE PERSONNEL
IN ATOMIC WEAPON EFFECTS

INTRODUCTION

1. The Chief of Staff Committee at their meeting on the 14th April 1955 agreed in principle, subject to Australian approval, that it was desirable to take the fullest possible advantage of the 1956 atomic weapons trials to indoctrinate Service personnel and that Service Ministries should examine the proposal in detail.
2. The agreement in principle of the Australian Government was communicated in a telegram from the UK High Commissioner in Australia on 8th June 1955.
3. The War Office in consultation with the Australian Army Staff, the Air Ministry and the Atomic Weapons Research Establishment have examined the proposal and submit the following recommendations for the approval of the Chiefs of Staff Committee.

FACTORS

4. It is proposed to send Service personnel to witness an Atomic explosion and examine the effects on the ground and on equipment.
5. The 1956 series of trials at MARALINGA are planned primarily for scientific purposes and in examining the proposals weight has been given to ensuring that the main object of the trial should not be in any way prejudiced. This necessitates the party being completely self-contained as regards transport and accommodation, particularly in the trials area.
6. The trials as at present planned will start with a shot at which military equipment and structures will be exposed and where ~~the interference with the Scientific Staff will be kept~~ and therefore this shot would be eminently suitable for the indoctrinees to witness.
7. An examination of the problems of transport, accommodation and radiological health control in the forward area has shown the latter to be the limiting factor as regards numbers which can be accepted. The maximum number which can ~~conveniently~~ be handled by radiological health control is 250 indoctrinees.
8. The following requests for vacancies for indoctrinees have been received:-

Admiralty	-	3 Officers
War Office	-	As many as possible, both from the UK and overseas commands.
Australia	-	62 Officers.

The Air Ministry who are already heavily committed in this trial do not wish to send any indoctrinees.

9. An examination of the total cost, including accommodation and transport, has been made. Transport would be by the most convenient route which for those going from the UK would be by air via

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UK 4c

SINGAPORE. Details of the costs of accommodation and transport in Australia have not yet been received, but the total cost per head of the party from the UK is estimated at £450 and assuming there will not be any unduly long postponement of the event due to adverse weather conditions after the arrival of the party, they would be away from normal duty for about one month.

- 10. Personnel from Commands throughout the world would concentrate at various collecting centres whence they would be sent to ADELAIDE via SINGAPORE by the most convenient means. At ADELAIDE they would be accommodated with the Australian increment in an Australian Citizen Military Forces Camp. Two or three days before the trial was due to take place they would be flown from ADELAIDE to MARALINGA where they would be accommodated in a bivouac camp. During the two days before the trial they would be conducted round the trials area and be shown the items that were being exposed on behalf of the War Office and other Departments. They would also see the radiological health control through which they would have to pass before entry into the contaminated area. The event would be seen from a suitable stand where they would experience some of the effects of the explosion. Then on the two following days they would proceed in suitable parties through radiological health control and view the effects of the explosion on the ground and on equipment. As soon as they have done this they would return to their bivouac camp through radiological health control and be evacuated via ADELAIDE back to their units.

CONCLUSIONS

11. A summary of the conclusions which have been reached are:-

- (a) that it is possible to handle 250 military indoctrinees in the forward area;
- (b) that there are no insurmountable problems in transporting and accommodating this size of party;
- (c) that assuming average meteorological conditions it is anticipated the indoctrinee party would be away from duty for about 4 weeks, of which time they may spend up to 10 days in the trials area.
- (d) The total cost is estimated to be about £450 per head from the UK and less for those travelling from other commands overseas. Therefore the total cost for the War Office contingent is estimated to be approximately £83,250.
- (e) Planning would have to start immediately in order to secure the necessary transport and make the necessary accommodation arrangements in Australia.

RECOMMENDATIONS

12. The Chiefs of Staff are invited to agree to the following proposals:-

- (a) that 250 indoctrinees should attend this 1956 trial at Maralinga;
- (b) that the number be divided as follows:-

Admiralty	-	3
War Office	-	185
Australia	-	62

- (c) that planning should proceed forthwith.

0231/c w.r.f. Def. Nuc. Tech. info.

23/1/85

Review of Present Situation

Telegrams have been exchanged between the Commonwealth Relations Office and the United Kingdom High Commissioner in Australia as follows:-

A. C.R.O. Telegram No. 633 dated 29.7.1954.

Proving Ground

We should be glad if you would now approach Australian Prime Minister on lines set out in my immediately following telegram. In making your communication you should explain that we are looking forward to increasing co-operation with Australia over the field of atomic energy in pursuance of discussions held last year. We are keeping [redacted] fully informed.

2. For your confidential information

- (a) We should hope that Australian Government would be prepared to make some contribution to cost of the project, since a joint undertaking would avoid difficulties and embarrassments almost certain to arise from a purely United Kingdom establishment in Australian territory.
- (b) Australians are unlikely to be content indefinitely with limited information given to them in the past and may insist on being given fuller information e.g. on the form and manufacture of weapons. As things stand today, this would certainly create difficulties with United States but American attitude towards exchange of atomic weapon information with Allies is beginning to change and it is reasonable to hope that a satisfactory arrangement might be reached with Americans in the long run. In the meantime you should be cautious about any approach from the Australians on this question since we do not wish to prejudice closer collaboration with Americans in this field.

3. At same time as approach is made to [redacted] points of detail set out in enclosure to [redacted] letter of 7th July to [redacted] (DEF.55/56/15) should be passed to Prime Minister's Department.

B. C.R.O. Telegram No. 634 dated 29.7.54

My immediately preceding telegram.

Following is basis of approach:-

- (a) United Kingdom will need to carry out a number of atomic weapon trials over the next decade and the next series should, if possible, be held in Spring of 1956.

/(b)

1835

C. Canberra Telegram No. 563 dated 4.8.1954.

Your telegram No. 633.

PROVING GROUND

When I saw [redacted] yesterday he referred to my letter to him on the basis of your telegram. I think that he is personally favourably disposed to the idea and would welcome the prospect of continued collaboration between the United Kingdom and Australia. I felt it best to use discretion given in subparagraph (k) of your telegram No. 634 and scotch any suggestion that we had been thinking of Canada as an alternative.

2. [redacted] however alluded to the newspaper story mentioned in my telegram No. 556. I told him that I had no knowledge of any suggestion that the range at Woomera should be shared with the United States and had no reason at all to think that there was anything in it.

D. Canberra Telegram No. 658 dated 2.9.1954.

My No. 563 and your No. 729

ATOMIC TESTS

Prime Minister's Department have given us interim oral answer to effect that Cabinet have agreed in principle to establishment of permanent proving ground in Australia and to co-operation in proposed new series of tests. Detailed questions of costs nature and extent of Australian participation etc. have been referred to officials and definitive reply will not be sent to our approach until Cabinet have considered official report. Official Committee concerned will meet on this early next week and we do not think there will be undue delay.

2. We understand that despite arguments provided in 1(c) of enclosure to [redacted] letter of 7th July to [redacted] Cabinet decided against sending planning team to United Kingdom and that we are likely to receive invitation to send United Kingdom team to Australia instead.

3. We have been told on same interim basis that Government have also agreed in principle to co-operate in initiator tests on understanding already stated that United Kingdom Department of Atomic Energy would accept full liability for expenses involved. Here also full reply will be deferred until details have been considered and reported on by officials.

E. C.R.O. Telegram No. 880 dated 30.9.1954.

Your No. 658, paragraph 2.

ATOMIC TESTS

In view of passage of time and need to make best of that remaining, we now think advantage would lie in United Kingdom team visiting Australia. We are making preparations to this end. Paragraph 1(c) of enclosure to [redacted] letter of 7th July to [redacted] can therefore be treated as cancelled.