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Document UIN

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PM

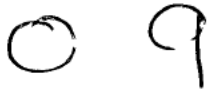
Caveat



NOTE: 
and other Caveats are
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Give document special handling.

Prepared By

Number of Sheets



Note: See coding sheet for Protective Marking (PM), Caveat and Prepared By codes.

For use with Documents with Protective Markings up to and including



RC 558

11-22-1964

TS 3306 2c

INCREASED TO
UNCLASSIFIED

02 MAR 1955

P

JL

From:

[Redacted]

Ops 383

(S.O.A.C.A.S. Ops)

[Redacted]

Copy to ops (S) 3

1413

105

18th January 1954

I have had a word with the staff about your letter ZTAF/3.506/5/WFS/PSO dated 28th December 1953 and I hope this reply will clear the point, although I am not going to give a direct answer to your question.

You will remember I said that the Mustangs were exposed to an average force of 3 P.S.I. As you will appreciate, the range at which aircraft receive this pressure will depend upon the power of the bomb. For example, a 20 kiloton bomb would be expected to exert a pressure of 3 P.S.I. at 7,000 ft. from the burst, depending, to some extent, on the height of the explosion. I understand that reference books give the pressure ranges for bombs of any given power; providing, therefore, you have the necessary atomic publications - if you have not I will try to get them for you - you should be able to relate the results of the last test to your present problem.

Let me just add that the difficult problems of airfield defence against a Bomb attack are at present being studied here and the staff suggest that an official approach from you for guidance on the subject might help to speed-up deliberations.

[Redacted]

[Redacted] D.F.C., A.F.C.,
P.S.O. to the Commander-in-Chief,
Second Tactical Air Force,
Royal Air Force,
B.A.O.R. 38. [Redacted]

Downloaded to

OK. 25/1/85

254 pads T&Co. G834. (S8)

Both sides to be used

R.O.F. Form 2a.

Minutes to be numbered consecutively

Q.P. No.

Ref. to

Alan V...

Subject {

Long Range Tracking of Constant Height Balloons

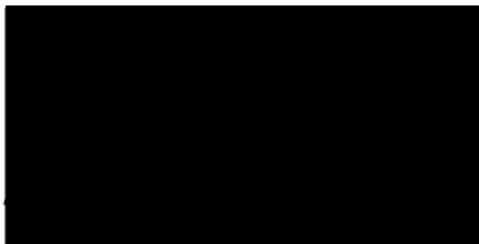
Reck: for the... COBS T6

VD/AE,
Building

1. The use of Aircraft for tracking the radioactive cloud from weapon tests in Australia has proved unsatisfactory. The aircraft become contaminated in the cloud and the engines require a complete strip down in order to remove the contaminants. As a result aircraft which took part in previous events were grounded for several weeks.

2. [redacted] has suggested that constant height balloons with a radio transmitter whose position can be found by D.F. should be used to follow the cloud. [redacted] has carried out a preliminary enquiry into the use of balloons and the method appears possible. However, the problem is primarily meteorological and would normally be undertaken by a meteorological branch if one existed inside A.W.R.E. It is now suggested that a fuller investigation should be undertaken by the Meteorological Office, possibly by [redacted] who was on Totem, or by some other meteorological officer who is likely to attend future trials.

3. If you agree this suggestion will you please arrange with the Director, Meteorological Office. A proposed draft letter is attached.



Building [redacted]
A.W.R.E. Aldermaston [redacted]
11th March, 1954.
HGG/1823.

Do you agree with draft letter or should we wait for [redacted] news was to join us in JUNE. (His name is Markham)



12/3

ER [redacted] 25/1/51

DRAFT

Rockets & their use for Air Sampling

CCSS JL

FRG/1323

WHP

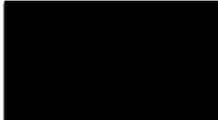
Subject : Long Range Tracking of Constant Height Balloons

[redacted] C.B., F.R.S.,
Director Meteorological Office,
Victory House,
Kingsway W.C.2.

1. After a weapon test in Australia we need to track the radioactive cloud from the explosion until it is so diluted that it is no longer a hazard. This may be until it is clear of the continent and some thirteen hundred miles from its start point. For previous events we have used a system of aircraft which can measure the presence of the cloud and can log its position. We are then able to allow the civil airways to operate in areas reasonably remote from the cloud which are safe. Unfortunately, the aircraft which follow it become contaminated in the process and have subsequently to be grounded, often for a long period, before they can be suitably cleaned. This method is therefore both expensive and unsatisfactory from the Australian side who have supplied the sampling aircraft.
2. [redacted] who was in charge of the meteorological measurements seen on previous trials has suggested that we should follow the cloud by means of constant height balloons whose position can be found by radio. [redacted] is no longer available to us, but Mr. E. Freeman of the Meteorological Office kindly made some enquiries on our behalf. We have also approached Messrs. Mullards Research Laboratory who can provide a suitable transmitter with a maximum range for D.F. purposes of about one thousand miles. From these preliminary enquiries it appears that the method shows promise and that it would be more suitable than using aircraft.
3. However, the problem is primarily meteorological and further information will be required under the following headings:
 - (a) The solution of several meteorological problems which also involve the Australian meteorological service.
 - (b) The performance and availability of constant height balloons
 - (c) The distribution and communication network for radio D.F. station on the Australian continent in order to obtain a more precise upper limit for the transmitter range.

We understand that [redacted] at Bristol has experience in the use of this type of balloon, but there may be some security difficulties in this

Establishment seeking information from him, though your office would presumably have no such difficulty. As we possess no Meteorological section we should be ^{grateful} ~~grateful~~ if the Meteorological Office were able to accept a fuller investigation of the costs and practicability of using this method for cloud tracking. Possibly [REDACTED] could undertake the work when he returns from overseas.



24/1/85



UK U/C



24/1/85

T57518

E24

DOWNGRADED TO

Ref: 200/5/54/V



11th May, 1954

Dear

E21A

In reply to your letter of the 2nd March, 1954, reference
DNB/1/1/54-... of ... and ...
1. Following the recent survey of the White Hall Islands,
my staff have now made a further appreciation of the contamina-
tion hazards. They find that despite the heavy rainfall
and severe gales which have occurred during the winter, the
overall effect of weathering has been negligible and conditions
are very close to those which would have been predicted on
known decay laws, and the level of contamination is still



2. The Islands are still very contaminated and because of
further decay is at a very slow rate, the pollution is not
likely to change significantly over the next ten years.

3. In considering the hazard presented by this contamination
it has been assumed that a landing party might spend 7 days
in the Islands, during which period they might be in a small
contaminated area for 200 hours. The hazard is of external
 β and γ radiation, both from food and from deposition on
the skin, and of inhalation, ingestion, and contamination of
wounds by fission products and unrefined fissile material
have been considered. It has been assumed that the principal
it is found that the external whole body radiation is the over-
riding factor. Two cases of this have been considered, one
in which a total dose equivalent to 25 rads of external
radiation is received....



Royal Naval Scientific Service
Dept. of Physical Research,
Queen Anne's Messons,
St. James' Park,
London, S.W.1.

received and from which the risk of any damage or undesirable symptoms arising is slight, the second in which the total dose received is equivalent to 5 röntgen which involves no risk. The attached map shows by a Red line and a Green line the boundaries corresponding to Slight Risk and Zero Risk respectively, the coloured areas in each case being areas in which these values are exceeded.

4. Beyond these regions there is a considerable area where there is contamination from fall out and contaminated equipment. It would be dangerous to remove any material or equipment from these areas without special precautions in handling and decontamination. These areas are coloured Yellow on the map.

5. Apart from the question of hazards, the survey has shown that conditions are such that it is still possible to make a very accurate picture of the activity contours at Eilat and to measure the size and shape of the crater. Air samples which could be collected are sufficiently active to allow for radio chemical analysis. Security aspects have, therefore, to be considered as well as hazards.

6. It is considered that the Kabinia must remain a Prohibited Area and that access to the coloured regions on the map, even by authorised persons, must be carefully controlled. The situation will be reconsidered from time to time but is unlikely to change significantly for many years.

Yours sincerely,
[Redacted Signature]
[Redacted Name] Admiral (Retd.)

TS 3306

RC

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110

A.C.A.S. (Ops)

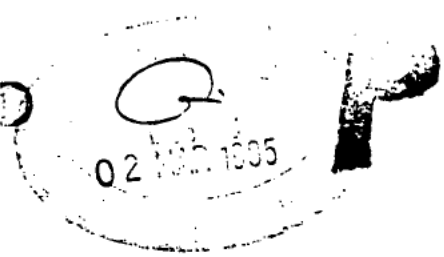
A.W.R.E. Report No. T. 3/54

I attach for retention copy
No. 17 of [redacted] Report on the
Canberra flight at Totem. I have passed
a copy also to A.C.A.S. (OR) and C.E.E.

A.S.A. (O)

13/4/54

DECLASSIFIED TO
UNCLASSIFIED



B ops 41195

Reference: A.S.A.(O)/227/1

D.D.Ops.(B)

Ops 35 III

Dissemination of Information on the
Effects of Atomic Weapons.

You will be interested in the reports enumerated below,
which are attached for your retention.

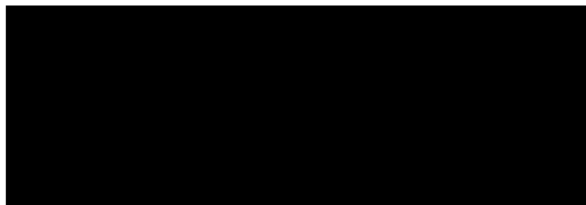
- (a) A.W.R.E. Report T8/54 - "Operation Totem -
Operational Report"
- (b) A.W.R.E. Report T2/54 - "Operation Totem - Report on
Observations of the Effects of the Totem One Explosion
on a Half-Scale Cylindrical Funnel"

2. We hold one copy of A.W.R.E. Report T6/54 "Radioactive
Sampling and Analysis Report - Operation Totem" which you may
wish to see on loan.



for S.A.A.M.

13/5/54



E3C

E3C

T

ADMIRALTY, S.W.1.

Further communication
should be addressed to:-

Secretary of the Admiralty,
Whitehall, S.W.1.

11th June, 1954

Ref No. N.152/4/54

Signal 9000
Message 902

Chief Naval Liaison Officer,
Washington.

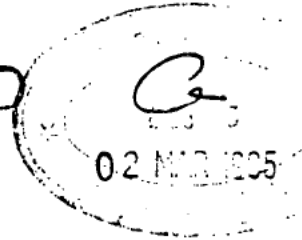
With reference to your letters of 9th February, and
10th April, 1954, (GNSM/1954/HRV), I am so forward as Annex
a copy of a report received from the Vice Director, Atomic
Weapons Research Establishment, and a map illustrating this
report.

2. It will be observed from paragraph 3 of this report
that although all types of hazards that might arise have been
considered the ever-riding factor is the external gamma radiation
to which a man would be subjected. This radiation is measurable
with the dosimeters and survey dose-rate meters passed over to the
Australian party at the completion of the Monte Belle operation.
The report makes clear that, on the assumption that a landing
party might be in the contaminated area for a total of 100 hours,
the whole body gamma dose received would reach 25 roentgen of
radiation anywhere along the boundary of the red area, and would
exceed that figure inside the red area. Similarly the total dose
in 100 hours would reach 3 roentgen along the boundary of the
green area, and would exceed that figure inside the green area.

3. With these doses the risk of damage or of undesirable
symptoms is slight, but it will be observed from paragraphs 3 and
4 of the report that considerable security risks are still
involved, and that the only way of avoiding these risks is to
ensure that the landing party is kept away from the red area,
and that the green area is kept clear of personnel, even by
means of a perimeter fence.

DOWNGRADED TO
UNCLASSIFIED

DECLASSIFIED TO
UNCLASSIFIED



ps 5170A
~~ps 3952.~~
Bops 6731.

ASA(0)/227/8.



29/4.



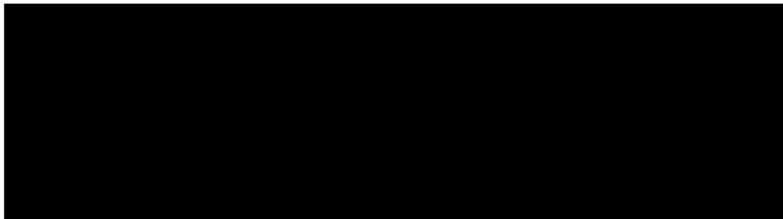
A.C.A.S. (Ops)
A.C.A.S. (O.R.)

112

OPERATION TOTEM

You may be interested to see
the attached Report No. T.12/54,
which we have received from the
Atomic Weapons Research Establishment.

26.7.54.



RC.

X4/4/01

P

COM/DC

Downgraded to

CONFIDENTIAL - EXCLUDED FROM GENERAL DISSEMINATION

TO: C.R. FROM: [REDACTED] L. [REDACTED]

(Sent 17.30 hours 5th August 1954)

CYPER

NO: 222 TAP [REDACTED]

By No. 261

ATOMIC TESTS

Proposed initiator tests have been discussed by [REDACTED] with Martin, who is satisfied that they will present no difficulties from safety and contamination aspects.

2. As to choice of site it is not clear whether our recent proposals for Maralinga site will alter Australian preference for Esau. We can do trials at either site provided logistic and civil engineering support is available. For this reason we prefer whichever site is already in occupation and thus has these facilities. If neither site is so occupied our preference would be for Maralinga area so that more use could be made of wheel transport (e.g. caravans for instrumentation).

3. Decision whether these tests will be required cannot be given for a week or so.

Copy to:-

C.R.C.
Atomic Energy Authority
(St. Giles Court)



2. 1954
25/8/54

X7/4/01

Downgraded to

P

5/3/55

[Redacted]

[Redacted]

65/6



Tel. READING 0060

Telegrams:

ATEN, ALDERMASTON, READING

DOM ATOMIC ENERGY AUTHORITY,
DEPARTMENT OF ATOMIC ENERGY

ATOMIC WEAPONS

RESEARCH EST.,

ALDERMASTON,

BERKS. [Redacted]

13th August, 1954

Ref: 20/8/54 [Redacted]

C.A.W.

(1) We have found it necessary to request "Kittens" trials in Australia early in 1955. A copy of a signal which I have asked to be sent to U.K. High Commissioner for onward transmission to the Australian Authorities is attached.

(2) Although this is an occasion when we propose the use of the site for small scale trials of our own it can probably be very useful in rehearsing the arrangements now under consideration for major trials. We should be very glad to have your co-operation with our Trials Division in the relevant administrative aspects arising in the mounting and execution of the trial.

[Redacted]

Director/A.W.R.E.

[Redacted]

[Redacted]

65/6

[REDACTED]

DRAFT SIGNAL

- (1) REFERENCE PARA. 3 OF MY NO. 668 THE DECISION IS THAT INITIATOR TESTS WILL BE REQUIRED IN AUSTRALIA.
- (2) ASSUMING AUSTRALIAN AGREEMENT WE NEED TO KNOW THEIR CHOICE BETWEEN MARALINGA AND EMU.
- (3) PROPOSED DATE IS MARCH OR APRIL 1955 AND NUMBER OF TECHNICAL STAFF ABOUT 12.
- (4) IF MARALINGA IS CHOSEN AUSTRALIAN SUPPORT IS REQUIRED ONLY ON LOGISTIC ASPECT AND COMMON USE CIVIL ENGINEERING FACILITIES NOT CONFLICTING WITH REQUIREMENTS FOR PERMANENT RANGE WHICH INCLUDES KITTENS SITE. IF EMU IS CHOSEN SOME CONSTRUCTION WOULD IN ADDITION BE REQUESTED FROM AUSTRALIA.
- (5) DETAILED REQUIREMENTS COULD BE DISCUSSED WITH AUSTRALIAN MISSION WHICH WE HOPE WILL VISIT U.K. SHORTLY TO DISCUSS WHOLE REQUIREMENTS FOR PROVING GROUND.

DRD/HV/2
COPY PH1



Extract from
11/14/14

Downgraded to
Unclassified

15/13/8

Director
4.285

Initiator Trials September 1954 - Wick or Australia

I have the following comments on [redacted] document.

Calculations of Hazard. Hazards from breathing the cloud appear to be over-estimated according to our ideas by a considerable factor. Deposition of activity from the cloud also appears to be somewhat over-estimated and we would probably get a figure of perhaps 12-15 miles instead of Penney's 20. We have not made rigorous calculations, neither has he, apparently. It is to be noted that his breathing hazard limit in calculating distance is taken as .1 microcurie whereas in Section 5 he takes the maximum emergency dose 1-2 microcuries, with which I agree.

Single Particle Hazard. The argument is very weak, if one assumes that firing takes place with an off-shore wind.

Contaminated Debris. I think the risk of highly contaminated pieces of metal and equipment distributed round the firing site present a serious hazard and virtually necessitate an enclosed site to guard against souvenir hunters subsequently picking up the bits of material.

Electronic Equipment Difficulties. In my view one of the most powerful arguments against the Wick site is the question of wetness. I know from experience that it is extraordinarily difficult to maintain electronic equipment in efficient working order in such conditions and the interference with the work would probably make the tests very protracted. It would undoubtedly be a great advantage from this point of view to do the tests at Woomera or, at least, in a dryer place than the North of Scotland.

General Comment. I think it is quite clear that Penney has already made up his mind and the difficulties of the weather, and of proving that hazard would not be incurred even if the site is not fenced, are so great that it would be desirable to agree to the Australian site for the 1954 trials, even if we propose to have a domestic site available later. My own opinion is that such trials could be done in the U.K. but may necessitate special provision, which would be difficult for the 1954 trials. For instance, these shots could be fired some distance above the ground so that intense contamination in a crater is avoided; this would necessitate having the electronic equipment raised up also. Another provision which might be adopted is to use a gamma active marker for the active material so that any large individual sources remaining in the vicinity of the site afterwards could be detected by gamma monitoring. On balance, I think the weather argument is more powerful than the radio-active hazard argument against the Wick site.

There has not been time, since I received this document to-day, to do any firm calculations. I doubt whether these are necessary as the decision is essentially a matter of judgement.

DOWNWARD TO

Copy 3 of

CONFIDENTIAL

0242 14

[REDACTED] [REDACTED] [REDACTED] 29/1/66 OK [REDACTED] 31/1/66 [REDACTED]

INITIATOR TRIALS SEPTEMBER 1954 - WICK OR AUSTRALIA

1. The results obtained in the Kitten trials at Totem were extremely satisfactory - so much so that we are re-designing the initiator to make it considerably smaller and less elaborate. We therefore wish to have further trials in September of this year.

Ten shots have been planned, each with 100 curies of polonium.

2. The possibility of holding the trials in the United Kingdom has been considered. Quite the best site found was north of Wick, on the coast, where there is a desolate area of several square miles, bounded on the east by the sea. There is no foreshore, and cliffs drop straight into the water. We should have to buy out one crofter and his stock.

If this site were selected, the ground would have to be purchased, some accommodation built, probably hutting, and fences erected. All of this could probably be achieved quickly, in time for work in September, 1954. However, the site is poor for the purpose. Throughout the year, month by month, rain falls every other day. The relative humidity in the early morning is never less than 90, and at mid-day anything less than 80, even in the summer, is exceptional. Electronic equipment would therefore be troublesome to operate.

Wind conditions are reasonably satisfactory, one day out of three being suitable.

We estimate that a series of trials which could be done in a month in Australia would take at least six weeks, and might take eight weeks at Wick.

EXPERIENCE AT TOTEM

3. The main object of the Kitten trials at Totem was to prove the functioning of the initiator. Measurements of contamination had to be done perfunctorily, since most of the health survey team were measuring contamination from the main explosions.

Ground contamination was extremely light except within 40 ft. radius of the Kitten burst. However, a lot of debris, which was part of the measuring equipment, was flying around up to 400 yards. This debris was highly active and individual samples carried as much as 1 millicurie.

The total activity left on the ground in the 40 ft. crater area was of the order half a curie.

A brief survey of the fall-out area down-wind was made by collecting ground samples and returning them to Aldermaston for measurement. The results show that the contamination was between one tenth to one quarter of the theoretical estimates given later. It is possible that the samples did not come from the down-wind centre line of the contamination, and to this extent we think that the theoretical estimates are about right.

THEORETICAL ESTIMATES OF DANGER ZONE

4. Calculations have been made to find the distance down-wind beyond which there would be no danger from deposited or airborne polonium. For this purpose it was assumed that the maximum allowable breathing dose is 0.1μ curie, and the maximum amount that may be deposited without danger is 0.5μ curie/sq. metre. [REDACTED] methods of calculation of the diffusion of airborne particles were used with the appropriate constants for conditions of average atmospheric turbulence. It was assumed that initially a cloud was formed containing 100 curies of polonium deposited on solid particles, (none of which carries more than 0.1μ curie), the cloud being of diameter 100 feet and at a height of 200 feet.

The results show that the maximum allowable breathing dose was not exceeded beyond a distance of 6 miles if all the cloud particles were of diameter less than 10μ or 12 miles if they were of diameter about 30μ . The distance beyond which less than the maximum allowable



amount is deposited reaches a maximum of about 20 miles for particles about 30μ in diameter, being less than this both for larger and smaller particles.

These distances would be greater in conditions of low turbulence, or if it should rain through the cloud, but such conditions could be foreseen in time to postpone firing.

These calculations indicate, therefore, that the danger area can extend to about 20 miles down-wind. Even if the initial cloud is not precisely as assumed the distance of 20 miles is not likely to be exceeded.

DANGER FROM A SINGLE PARTICLE

3. The maximum "emergency" dose of polonium to be taken in a single dose we consider to be between one and two microcuries. This is about equivalent to 25 R of whole body gamma.

A single particle of density 3 containing 1% by weight of polonium, of diameter 12 microns just contains the maximum emergency dose. Such a particle could easily remain airborne for 12 hours.

One can argue almost indefinitely that it is either safe or unsafe to release particles, containing the emergency dose or more, at the proposed site near Wick. Some such particle might travel fifty miles to sea, and fall on a ship; others might adhere to debris or vegetation near the crater, and subsequently blow off into the air. The odds against a man getting sick or dying from polonium inhalation or injection are admittedly small and are perhaps infinitesimal. Even if a man did die, the cause would probably never be correctly diagnosed. However, why should we subject anybody to these risks when at moderate cost in money and no cost in working time we can go to a much safer place, where working conditions are far superior.

16

6.

The following arguments count against the Wick sites:-

- (a) Difficult to get the site ready in time. First the agreement of the local authorities must be obtained. This will be no easy job. Then the land must be bought and the site has to be prepared.
- (b) The weather conditions are such that delays for each shot are inevitable. Rain and humidity make the electronics more costly and even then failures may be expected.
- (c) We cannot guarantee that there is no health hazard. Collection of contaminated debris is a big job and every crater must be very effectively fenced in.

Arguments favouring the Wick site are:-

- (a) No large travel costs for staff and equipment.
- (b) No waste of time travelling (but considerable delays waiting for the right winds and no rain).

Arguments against the Australian site are:-

- (a) Cost of getting staff and equipment to the range.
- (b) Time lost travelling.

Arguments favouring the Australian site are:-

- (a) No contamination hazards (nearest people or stock 250 miles away).
- (b) Guaranteed perfect weather and very dry air, implying that once the series is ready to go, everything can be got through without weather troubles and minimum electronic snags.
- (c) The range is intended for Atomic trials, and in due course, camp, sites etc. will all be there.

While these may not be ready this year, any follow-up trials should fit into the Atomic range programs, and fill in gaps which will inevitably occur between large scale trials, thus keeping the Range staff on their toes.

RECOMMENDATION

7. That we go to Australia.

9th January, 1954

E9

29/1/85
31/1/85

0.42 14

WEATHER CONDITIONS AT WICK

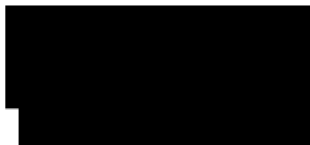
Month	Air Temp.			Rain			Snow		Wind									Poor visibility No. of days < 2 miles	Relative humidity %	Cloud amount in tenths
	Mean of			mm. Av. Fall	No. of days Max. fall in 24 hrs. mm.	No. of days	Sales	Percentage of observations, from												
	° Average	° Daily Max.	° Daily Min.					N	NE	E	SE	S	SW	W	NW	Calm				
Observations at 0700 G.M.T.																				
January	40	43	37	62	16	38	6	5	4	0.6	2	3	21	36	19	15	0	0.1	91	7.1
February	40	43	36	58	12	33	7	3	5	2	3	10	19	24	21	16	0.4	0.2	93	7.8
March	41	45	36	58	12	29	6	2	3	4	5	13	20	21	20	15	0	1	91	7.9
April	42	47	38	51	13	58	5	1	12	9	5	8	14	16	15	21	0.3	0.8	91	7.6
May	46	51	42	53	12	41	0.9	0.7	13	11	4	10	18	12	10	21	0.3	2	91	7.8
June	50	55	46	46	12	47	0	0.3	8	9	6	12	17	13	12	22	0.7	2	89	7.9
July	54	59	50	67	11	64	0	0.1	6	6	5	10	16	19	15	22	2	3	92	8.4
August	54	58	50	70	18	48	0	0.3	5	5	5	10	19	23	17	14	2	2	93	8.1
September	51	56	47	64	14	48	0	0.8	6	4	2	5	18	26	17	20	1	3	93	7.7
October	47	51	43	75	18	51	1	2	6	6	2	4	17	25	23	18	0	0.1	91	8.0
November	43	46	39	80	15	53	3	3	6	3	2	10	20	28	16	14	0	0.1	89	7.4
December	41	44	38	78	16	33	5	5	5	2	2	11	21	25	18	14	0.3	0	90	7.2
Year	46	50	42	762	164	64	34	23	7	5	4	9	18	22	17	18	0.6	14	91	7.7
Observations at 1300 G.M.T.																				
January									4	2	1	3	23	36	20	10	0	0	89	7.6
February									6	3	3	7	21	26	18	15	0	0.2	90	7.8
March									5	8	5	13	25	16	15	12	0	1	85	7.7
April									12	13	7	13	16	13	9	17	0	0.6	84	7.9
May									13	21	8	14	20	8	5	13	0	2	85	7.9
June									8	15	9	16	19	10	7	16	0	1	83	7.7
July									6	10	6	16	22	13	10	18	0	0.5	85	8.1
August									5	8	7	13	25	13	12	15	1	2	87	8.1
September									8	9	3	9	20	17	14	20	0.7	0.9	85	7.8
October									7	8	3	6	18	18	23	17	0.3	0	83	8.0
November									7	3	3	13	23	23	16	13	0	0	85	7.9
December									4	3	3	12	23	26	18	11	0	0.1	89	7.8
Year									7	9	5	11	21	18	14	15	0.2	8	86	7.9

1008

DOWNGRADED TO

(10/1/85)

0242 1a



Def. Nuc. Tech. info.

Ref: 11/1/54

29/1/85

5th January, 1954

Dear [redacted]

Here is a note written very hastily on Wick and Australia.

The weather at Wick is not reliable - in fact poor. Contaminated debris is a problem - it is quite impossible to find it all, so that there will be at least 100 millieuries left in a quarter mile circle around each shot. The hazards of down-wind contamination are probably acceptable but it will be difficult to give the local authorities an honest assurance that they are zero. We can do nothing about shipping outside the 3 mile limit.

Australian weather is ideal and there will be no delays for Kitten shots. Electronics work perfectly. The Atomic Range staff will need work and an occasional Kitten trial will help to fill in long gaps which would otherwise be awkward.

I prefer Australia. I do not think there will be much difference in cost or any loss of time. And it is safe for certain!

Yours sincerely,



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

DECLASSIFIED TO

UNCLASSIFIED

19/1/71
#6
[Redacted]

0242 14

31/1/85

29/1/86

19/1/54



TEL: ABINGDON 620

11/1/1/71A

[Redacted]

ATOMIC ENERGY RESEARCH
ESTABLISHMENT

MARWELL,
OXFORD,
BERKS.

SEEN BY D.A.W.

11th January, 1954

Dear [Redacted]

Initiator Trials

Please see the attached copy of a note from [Redacted] on your document. You will see that although we feel that you have somewhat over-estimated the hazard, we think that, in the circumstances, you are right to carry out the 1954 trials in Australia.

Yours sincerely,

[Redacted]

[Redacted]

[Redacted]

K.B.E., F.R.S.,

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

[Redacted]

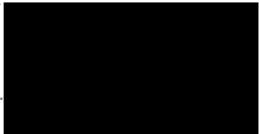
operation with

Australia - General
Correspondence 5263

Downgraded to

GENERAL

UNCLASSIFIED



D.T.F. Def. Sec.
Tech. info.

22/1/65

24/1/61

1. At their meeting on the 27th November the Chiefs of Staff considered a paper by [redacted] raising the question whether the Chiefs of Staff were willing to acquiesce in a variation of policy which might result in a limitation of the United States stockpile of atomic weapons in the interest of the development of atomic energy for industrial use, and suggesting that, as a preliminary step, an attempt should be made to assess the size and adequacy of the American stockpile of atomic weapons.

2. [redacted] who was present at the meeting, expressed the opinion that the problem should be tackled in a different way and that there were prospects of guaranteed supplies of uranium from Australia if we were prepared to offer them greater co-operation in the atomic field. The Chiefs of Staff Committee decided that it was desirable that [redacted] should discuss his proposals with the Official Committee on Atomic Energy.

3. The matter was fully discussed at the Committee's meeting on the 22nd December and a record of the discussion is appended. Briefly the general conclusion was that, while we should invite certain selected Australian scientists to visit England to be initiated into our weapon project in connection with the establishment of a permanent atomic testing range in Australia, we should [redacted] for the moment take the

NOT ATTACHED I

[REDACTED]

initiative in suggesting any further co-operation on atomic weapons. It might well be that ultimately some such co-operation would be desirable but it would only obscure the position if any such approach were attempted before we knew the outcome of the general approach which was now contemplated in connection with the development of Australian uranium resources for industrial purposes.

4. In this connection the Cabinet considered and approved yesterday afternoon the lines of a communication to be addressed to the Australian Government. In the circumstances the Chiefs of Staff will no doubt wish to defer further consideration of the subject until the Australian reaction to this latest approach is known.

5. I am sending copies of this note to [REDACTED]

[REDACTED] and [REDACTED]

13th January, 1954

DOWNGRADES TO

712

UNCLASSIFIED

E12

3/1/85

35/1/54

14th January, 1954

[Redacted]
Director,
A. E. E. S. Harwell,
Didcot,
Berks.

024210

Dear [Redacted]

[Redacted] has suggested to [Redacted] that a suitable site for initiator trials would be Suffield in Alberta. We are looking at this now and will make up our minds within a week or so. By this time I ought to have a letter back from Australia giving us their views on the technical feasibility of doing the job this year north of Ooldea.

In the meantime I am glad to know that you agree that it would be wiser for us to go to some remote place for these experiments rather than complicate the negotiations on the reactor site by trying to get in at Wick.

Yours sincerely,

[Redacted Signature]

Copy to:

[Redacted Copy To]

23/1/54 DOWNGRADDED TO

UNCLASSIFIED



T. 11013

21/1/55 613
11a Broomley

LM5818
TO
FROM



29/1/55

FOR [REDACTED] FROM [REDACTED] HAS OFFERED FACILITIES AT SUFFIELD FOR KITTS TRIALS THIS YEAR. FOR TECHNICAL REASONS AND FUTURE COLLABORATION WE PREFER AUSTRALIA BUT IF THIS IS EMBARRASSING TO YOU WE WOULD ACCEPT SOLANUT'S OFFER FOR THIS YEAR.

BEFORE MAKING OFFICIAL APPROACH MAY I HAVE YOUR VIEWS PLEASESXXX PLEASE, IF POSSIBLE BY FEBRUARY SIXTH

1211Z
25.1.54
REPTN 251211Z ++ TP ++ VA ++

XZT

10
No. Add air strip of £10,000 for extra 30 miles of road to Dickens Well. Subtract £40,000 if associated with construction of permanent site.

£19,900	£19,900	1. Transport: (on Site near to Oolde or Watson) Transport of men (14) from England to Site
£1,500	£1,500	2. Site preparation: (a) Roads 15 miles track @ £30 per mile (b) Camp construction for 56 men 12,600 (c) Tech. facilities incl. signals 4,600
£16,800	£16,800	3. Site Maintenance: (a) Hire of 13 vehicles on site for 60 days. £1,600 (b) Fuel for vehicles & generator @ 40-gallons/day. 1,500 (c) Men and food (Men @ £5. per day for 60 days) £16,800
£13,500	£13,500	4. Water if transported: 1000 gallons/day, 1/- per ton mile, 500 miles
£9,000	£9,000	5. Irrecoverable test equipment
£75,300	£75,300	Cost of Kittens 1954



1/55

29/1/55

UNCLASSIFIED

Downgraded to

UNCLASSIFIED

3/1/85

042

LA5817 . . . CONFIDENTIAL
TO
FROM

22/4/85

REFERENCE ML 6062 THE HEIGHT OF THE TOWERS IS CLASSIFIED SECRET
GUARD AND THIS CANNOT BE DOWNGRADED.

2. OTHER STRUCTURAL DETAILS OF TOWERS COULD BE RELEASED UNDER
CONFIDENTIAL CLASSIFICATION ++

251210Z

25.1.54 +

REPTN ML 6062 2 ++ TP ++ AND 261210 Z ++ BB ++

Downgraded to
UNCLASSIFIED

SECRET ML 6130 28
SECRET
S4 1321
TO
FROM

ATOMIC WEAPONS RESEARCH ESTABLISHMENT.

YOUR LM. 5818 RECEIVED.
EXAMINATION OF PROPOSITION REGARDING "KITTEN" TRIALS
ALMOST COMPLETE. REPORT SHOULD BE WITH YOU BY TELEPRINTER
BEFORE END OF JANUARY. PRELIMINARY INFORMATION SUGGESTS
THAT PROPOSITION IS TECHNICALLY FEASIBLE ++

26.1.54 GA
REPT 5818 ++

4/1/54

DANGER TO
UNITED KINGDOM
from [redacted]

0242 1a

-6 FEB 1954

L 11

TELEGRAMS: SPLYMIN.
MELBOURNE.

UNITED KINGDOM MINISTRY OF SUPPLY STAFF

TELEPHONE: FO211

339 SWANSTON STREET.

MELBOURNE, C.1

Our Ref. SM.1321

Your Ref.

[redacted]

25/1/54

27th January, 1954

2/1/54

Dear [redacted]

I have been talking over with [redacted] the question of an Atomic Test Site in Australia, and your latest signal asking whether they could provide facilities for some "kitten" experiments later this year.

I feel quite confident that they could cope with the "kitten" experiments fairly easily at a spot not too far from the main Transcontinental Railway. The proposal at present is not to work from Ooldea but from a place called Watson, from which access to a spot suitable for the "kitten" tests would be fairly good.

I think Australia could adequately carry out the tests even though it may be decided not to carry on with the proposal for a full scale test site out here. On the other hand, the cost of carrying out specific tests would be relatively higher if they were carried out in isolation than if they were grafted on to the preparations for a final site.

[redacted] people have been working hard preparing a report on the proposal for a future Atomic Test Site, and he has every hope that this report will be available by mid-February. Indications at present are that the Site will cost in the order of £1.5M. I will try to get you a copy of the report for advance information as soon as possible.

Yours *sincerely,*

[redacted signature]

P.S. 26' hot and sticky here at present -- two days over 100° F. Not as hot as Cune perhaps but much more humid. Had impairment.

[redacted] K.B.E., F.R.S.
Director,
Atomic Weapons Research Establishment,
ALDERMASTON. BERKS.

0-42 14
Downgraded to
UNCLASSIFIED

SECRET

31/1/85

22/1/85

ML 6151
SM 1321
IMMEDIATE
~~SECRET~~

Atomic
59-8

WEAPONS RESEARCH ESTABLISHMENT

FOR [REDACTED]
FROM [REDACTED]

FURTHER TO MY ML 6130.

THIS IS TO CONFIRM NO TECHNICAL DIFFICULTY IS SEEN IN CONDUCTING THE KITTEN EXPERIMENTS AS PROPOSED DURING THE LATTER PART OF THIS YEAR. IF THE MAIN MARALINGA PLAN GOES AHEAD THE TRIAL CAN BE DEAL WITH AS A COMPARATIVELY MINOR ADDITION TO THE REQUIREMENTS FOR THE MAIN BOMB TRIALS AREA. IF HOWEVER MARALINGA SCHEME IS NOT PROCEEDED WITH THEN IT WOULD PROBABLY STILL BE PREFERRED TO USE A SITE NEAR MARALINGA RATHER THAN EMU.

IN ANY CASE WE ARE CONSIDERING A ROUTE TO TIETKINS WELL COMMENCING AT WATSON 20 MILES WEST OF OOLDEA. THIS ROUTE WILL INVOLVE LESS ROAD CONSTRUCTION AND FACILITATE PROVISION OF AN AIRFIELD.

WE WOULD BE INCLINED TO FAVOUR THE PROVISION OF A KITTEN TEST SITE A LITTLE TO THE EAST OF THE WATSON- TIETKINS WELL TRACK WHICH IS AT PRESENT BEING EXPLORED.

SUGGEST THAT YOU APPROACH COMMONWEALTH RELATIONS OFFICE FORTHWITH SO THAT A MAXIMUM TIME FOR PREPARATION WILL BE AVAILABLE ++

27.1.54 GA
REPTN 6130 20+++

Downgraded to
Totem planning
0261 XII c

Ref. CE/AA

[REDACTED] H.P.B. G.L./R.H. [REDACTED]

Ref. TOTEM.

I have received a copy, via [REDACTED] of [REDACTED] reports to H.O.C.S.A, and to the Director General of C.D. Training.

[REDACTED] has not discussed the contents of these reports with me, so I am forwarding my comments to you. In doing this, I shall mention only those aspects which concern R.H.5, but I must admit to considerable surprise and alarm when reading the second report in particular. Under current A.W.R.E. instructions, observations made, though only qualitative, should be "Top Secret" not "Restricted".

[REDACTED] also refers to his period of technical training at Aldermaston, "during which I saw the two major atomic weapons being manufactured". Neither [REDACTED] or myself showed [REDACTED] any aspect of weapon manufacture, and we had no knowledge that he saw anything of this sort.

Comments:- P.1.

- (1) Siebe-Gorman dust masks and surgeons masks were not approved items for this operation, and were not issued to sorties except in a few experimental cases when authorised by the Health Controller.
- (2) The β -electroscope was not carried in the pocket but hung downwards.
- (3) (1) at bottom of page) Notebooks are not necessary.

Pockets are not desirable owing to a tendency to accumulate dust.

The question of carrying anti-dim is referred to R.H.1.

P.2.

(a) I do not agree that a belt is required but hooks sewn to the suit might be very useful.

(b) Para.5. The need to wear respirators is not for R.H.5. to decide.

The loss of elastic fasteners is a good point, but could not these be fixed to the hood?

Para.7. Again while a valuable comment on relative popularities the question of respirators is not for R.H.5 to decide.

Para.8. I do not know for what purpose [REDACTED] used the surgeons mask, but as far as I know he did not carry out any penetration tests. They were not issued to sorties.

Para.9. I do not know of such experiments but the conclusions are obviously sound.

[REDACTED]

Page 3.

"Hoovering" personnel. Preparations were made to do this, but it never proved necessary as far as I know.

For information:-

I mis-led [REDACTED] slightly over the exact composition of S.D.Paste, which we now know did not contain Cellofas jelly.

It was actually

Geigy decontamination cream	2 Kgs.
Teepol (dried)	100 mls.
Ammonium citrate	100 gms.
Citric acid	75 gms.

The Geigy cream probably contains Tragacanth jelly and sequestrol

NA.3.

Page 4. (last para.) Contamination of vehicle tyres was low. It was greatest on oily parts of the engine and chassis.

Page 5. (top). (a) Aircraft decontamination.

The remarks here are quite unmerited.

(b) Mention of 200 ft. towers is not only unnecessary but rather misleading.

Second Report.

P.2. (a) No use was actually made of barrier creams, strippable lacquers or ~~special packaging~~, and experiments using these gave no results.

In matters relating strictly to R.H.5, apart from those criticised above, [REDACTED] and I agree that the report is a reasonable, though incomplete, record and support the recommendations it contains.

[REDACTED]

R.H.5.

A.W.R.E.

29/1/54.

1019

s/478

DOWNGRADED TO

DCAS/478

DGMS/7786

D.C.A.S.

ATOMIC TRIAL : WOOMERA

The attached papers are the narratives of [redacted] and [redacted] on their experience at Woomera. You will remember that they flew a Canberra through the cloud following the atom bomb explosion.

[redacted]

2nd February 1954

- ① Thank DGMS
- ② Send to HQ H's (OR)

[redacted]

A.C.A.S.(O.R.)

1020

The attached papers are the narratives of [redacted] and [redacted] on their experiences at Woomera, when they flew a Canberra through the atomic cloud following an explosion of the atomic weapon.

2. D.C.A.S. has asked me to send you these reports, which contain much useful information. I also attach a copy of D.C.A.S.'s reply to D.G.M.S.

[redacted]

[redacted]

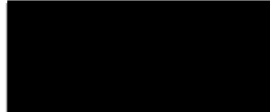
8th February, 1954.

P.S. to D.C.A.S.

6493 1985

DOWNGRADED TO

UNCLASSIFIED



0242 100

E18

~~SECRET~~

U.S. Def. Use. Tech. Info.

28/1/85

9th February, 1954

13/2/54



3/1/85

[Redacted] K.C.B., K.B.E.,
Department of Atomic Energy,
Rm. 832, St. Giles Court,
1/13, St. Giles High Street,
London, W.C.2.

Dear [Redacted]

You will recall our discussions at A.E.X. about Initiator trials this year. The necessity for these trials is clear and urgent. Three sites have been considered

- (a) The U.K., particularly a site near Wick
- (b) Australia, at or near the new proposed main atomic weapons trial ground
- (c) Suffield, Alberta, suggested by Dr. Solandt, Chairman Defence Research Board, Canada.

Discussion at A.E.X. went against (a), and A.W.R.E. and A.R.E.E. on further study, have confirmed this view.

A.W.R.E. has also made a careful study of (c). While Suffield is suitable for the trials, there are several advantages for (b) over (c).

A.W.F. asked me to explore with [Redacted] Chief Scientist Supply Department, the technical feasibility of (b) in Sept. - Oct. of this year. His reply is favourable and urges us that if we wish to proceed, no time must be lost in making the official approach.

A copy of my letter to [Redacted] defining our requests and technical requirements was sent to [Redacted] just before Christmas.

P. L. C.

Will you therefore request C.F.C. "to ask permission from the Australian authorities for a team of about a dozen scientists from A.W.R.E. to explode in Australia, small explosive charges containing radioactivity in Sept. - October this year, at a site to be chosen by the Australians. These trials are similar to those held at Eds Field concurrently with the main atomic trials in 1953. Technical discussions have already taken place between [redacted] Chief Scientist Department Supply, and [redacted]

[redacted] reports that the trials are technically feasible, and recommends working from the main transcontinental railway, either from Coldra or Watson. The Department of Supply would provide the necessary support.

If the Australian authorities will grant us these facilities, A.W.R.E. would like to send out a scientist in the near future to arrange details."

I suppose that the Dept. of Atomic Energy should offer to pay the whole of the expenses.

Yours sincerely,

P.S.

[redacted] is well briefed on this subject and if you need any further information during my absence perhaps you would be good enough to refer to him.

[redacted]

DOWNGRADED TO
UNCLASSIFIED

27/4/54
- 5770 205
104211

Copy to [redacted] Aldermaston

23 FEB 1955 MAC/COPY

I understand that you have
yourself advised M.O.S.? See 7

DEPARTMENT OF ATOMIC ENERGY (SECRETARIAT),
Room 57A, Ground Floor, [redacted]

COPY to SEM/lt/SSMD

sent 23254

20/2/54

17th February, 1954.

D O/R

~~SECRET~~

[redacted]

28/1/86

3/1/85

Dear [redacted]

It has been decided that further trials of initiators should take place this year. These are not atomic bomb trials, but they involve the detonation of small charges of ordinary high explosive containing some radioactive material, so that contamination of the ground may follow. They are similar to the six 'kittens' which were let off at Emu Field at the time of the Totem tests.

Consideration has been given to the holding of trials in this country, but it has been decided that the weather is too unreliable and the risks to life and health too great.

It has therefore been concluded that they should take place in Australia.

Will you therefore seek the permission of the Australian Government to the holding of these trials in September-October of this year at a site to be chosen by them. It would be necessary for about a dozen people from Aldermaston to go out. Technical discussions have already taken place between [redacted] Chief Scientist, Department of Supply, and [redacted] reports that the trials are technically feasible, and recommends working from the main transcontinental railway, either from [redacted] or [redacted]. The Department of Supply would provide the necessary support.

[redacted] C.M.G.,
Commonwealth Relations Office,
Downing Street, S.W.1.

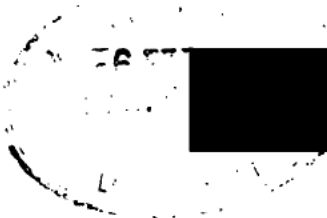
If the Australian authorities will grant us these facilities, we should like to send out a scientist in the near future to arrange details.

We are prepared to accept liability for the whole of the expenses involved.

X These tests form part of the experimental work which will be conducted at the discretion of the new Authority, and are not required to be the subject of contractual arrangements with the Ministry of Supply, but we are informing the Ministry of our intentions since they are engaged in negotiations about a permanent proving ground for atomic weapons, and we do not want to cross the wires.

Yours sincerely,





[Redacted]

DOWNGRADED TO

UNCLASSIFIED

0242 1a

27/1/54

[Redacted]

TS 110/3



St. Giles Court.

1/13, St. Giles High Street.

London, W.C.2

[Redacted]

28/1/54

[Redacted]

31/1/54

19th February, 1954.

[Redacted]

✓ Thank you for your letter of 9th February about initiator trials.

I have arranged for the C.R.O. to be approached on the lines you suggest, and I gather that a copy of [Redacted] letter to [Redacted] is being sent to [Redacted].

I will see that you are kept in touch with developments.

Yours sincerely

[Redacted signature block]

[Redacted] KBE., FRS.,
A.S.R.L.,
Aldermaston, Berks.

✓

DOWNGRADES TO

2/2/85

K uk

[Redacted]

28/1/85

0144

[Redacted]

Radiological Health Hazards at AURE V 33M
0144 III.

23rd February, 1984.

Dear [Redacted]

This is to confirm my telephone conversation with you this afternoon that no member of the A.E.R.S. staff, man or woman, has suffered from radiation sickness, either as the result of work at Aldermaston, or at the trials in Australia.

The standards of protection imposed have been and will continue to be, very high, and extremely safe.

Yours sincerely,

[Redacted]

S.S.U.D.

r. [Redacted]
Department of Atomic Energy,
Treasury Chambers,
Great George Street,
London, S.W.1.

cc. Admiral [Redacted]

1026

CAA/JG.

DEPARTMENT OF ATOMIC ENERGY
XXXXXXXXXXXXXXXXXXXXXX

684

Token planning
0261 XII c

No. 5/1.

DOWNGRADED TO



24th February, 1954.



c/o
Aldermaston,
Berks.

UK y/c
24/1/54

Dear

I have received a letter from [redacted] in which he requests information on several heads. The relevant part concerning the gamma measurements is as follows:-

"With reference to the information from [redacted] on Gamma measurements I take it that owing to the scatter in the Gamma measurements the smooth curve will depart considerably from the averaged values at any given distance. Can [redacted] give us some idea of the standard deviation of his measurements? Several film badges were put inside the Centurion. Can he give us any results from these?

Can you supply the information he asks for?

Yours

CAA/JG.

Totem planning
0261 XII C

UK v/c

24/1/86

22 2 4

S.S.T.D.,

6.7., Fort
Halstead.

684

S.S. 5/1.

S.H.P.,
Building A.W.R.E.,
Aldermaston, Berks.

DOWNRAGE 70

Many thanks for sending me a copy of your memo to S.S.M.D., on the subject of [redacted] report. The particular sin that you pick out is not the only one of his commission. I have already written to [redacted] giving some objections to the form and substance of [redacted] report and I sent a copy to [redacted] in his capacity of Group Leader over the team in which [redacted] served. I think it probable that [redacted] would have access to this letter and if S.S.M.D. is taking any action over the point you have raised, he may like to see the comments I made and hence ask [redacted] for his copy.

From [redacted] reply to me, I gather that no circulation of [redacted] report is to be sponsored by the Home Office but it is difficult to be certain that [redacted] has not disseminated his views in any other way. I am sure that [redacted] would have made it his business to impress on [redacted] that reporting ought to occur through the normal channels, but in his absence it is impossible to be certain that the proper discretion is being observed. In these circumstances it may be necessary to get in touch with [redacted] in order to find out just what he has done, but I will await further information from you or S.S.M.D. before taking this line.

S.S. 5/1.

RECORDED TO

[Redacted]

[Redacted]

Totem planning
0261 XU d.

UK V/C..

[Redacted] 24/1/55

TOTEM RESULTS

MULTI-DIRECTIONAL GAMMA RADIATION COLLIMATORS

TEN
~~Eight~~ graphs are attached.

These show the results from the collimators plotted as a function of direction, in two ways:-

- (i) Actual radiation received through the channels per unit solid angle.
- (ii) The fraction of the total dose received through the channels per unit solid angle.

The latter depends on the value taken for the total dose at the collimator sites.

Results for the two fore-and-aft collimators at different distances are shown on the same graphs. Results for the transverse collimator are shown separately.

Results from T.1 and T.2 are shown separately.

The following facts emerge:-

1. In all cases the graphs of fraction of total dose per square degree lie slightly above the value of 4.85×10^{-5} which is the ratio of the solid angle subtended by one square degree to a solid angle of 2π .

This could be explained if the total dose measured by film at the collimator sites was too small by a factor of about 2.

2. In all cases the dose increases suddenly as the angle of the channels of observation approaches the horizontal, both for the fore-and-aft collimator in a direction away from the source and for the transverse collimator, in directions at right angles to the line to the source.

3. The curves of dose with angle are steeper for the greater distances. If it is assumed that T.1 is equivalent to T.2 then the slope of the curves increases progressively in the same order as the distances 1,400 yards, 1,500 yards, 1,900 yards and 2,000 yards. This is contrary to expectation and to the results obtained with 500 curies of Co60 up to 400 yards at Shoeburyness.

Results of gamma radiation energy deduced from the photographic quality badges are not yet available.

[Redacted] S.S.O.
Admiralty Research Laboratory,
TEDDINGTON,
March 2nd, 1954.

1029

~~TOTEM RESULTS~~

STEEL BOX

3

The box consisted of $\frac{1}{2}$ inch thick steel, had dimensions of 8 ft. x 8 ft. x 8 ft., was totally enclosed (except for the base which was of sand), and was sited at a range of 1,100 yards from T.1.

Films were suspended facing the front face of the box (nearest the source) on a light string and wire framework.

The films formed a cubical lattice of 18 in. side with the planes nearest the sides, top and bottom of the box 3 in. from them.

Results are shown ^(3 sheets) for the six vertical planes perpendicular to the line of sight, the first vertical plane being nearest the source. The results are shown as seen by an observer standing behind the box and looking towards the source.

Unbracketed figures are roentgens as deduced from the films according to certain assumptions (which may need to be qualified).

The bracketed figures are the effective transmission factors expressed as a percentage of a total unshielded dose of 295r.

The latter dose is that obtained at 1,100 yards from the final smoothed curve of dose-distance from T.1. The value of 323r which has been given to A.R.L. as the external dose at the box was measured at sites about 5 yards in front of the box where the dose from the smoothed curve is estimated to be about 308r.

The higher figure of 323r may be due to radiation back-scattered from the box.

The figure of 295r is considered to be the more reliable reference figure.

Contour diagrams based on the figures given are in process of being drawn for the six parallel planes in each of the three dimensions (18 figures).

From the results it may be seen that:-

1. The highest dose is close to the front face of the box towards the centre of the upper half of the face.
2. The lowest dose is also close to the front face of the box, close to the floor of the box.
3. The dose falls gradually by about 25% of its higher value from the front to the back face.
4. In any vertical plane perpendicular to the line of sight the dose falls by about 15% of the value at the centre towards the sides and top of the box but less towards the bottom, with the important exception of the plane nearest the front face. This fall is greater (20% or more) for the planes nearer the rear of the box.
5. The dose increases slightly close to the rear face.

1030

TOTEM RESULTS

3 POSITION REGARDING A.R.L. PHOSPHATE GLASS DOSIMETERS 26/2/54

Six graphs are attached showing the variation of gamma dose with distance for both T1 and T2 the dose being measured by filtered and unfiltered phosphate glass cubes and by film badges placed adjacent to the cubes.

The recorded values have been corrected for the background readings of the glass cubes and in the case of doses greater than 1000 r for saturation effects in the reader.

The ratio of the dose, as measured by the phosphate glass dosimeter to that indicated by the film badge has been tabulated and tables are appended.

In the case of dosimeters receiving effectively 'all round' radiation comparison of the dose received is made with the initial gamma dose with distance curves for a 5 and 10 KT weapon scaled from E.A.W. page 235.

Comparison between the film and glass doses show that in all cases the phosphate glass gives a higher value for the dose, the ratio of glass/film dose increasing with distance from the source. Even in the case of the filtered glass the ratio, for dosimeters receiving 'all round indication' increases from 1.1 to 3.25 over the range covered.

The ratio for dosimeters on the back of the lead block, receiving scattered radiation only, is much greater. Here however the response of the film, especially the angular response to soft radiation may account for this large ratio.

Experiments are being carried out to ascertain the response of the filtered phosphate glass cubes over a range 25 Kev - 1 Mev and work is also being done to determine the angular response of the films to soft radiation.

S.O.

Admiralty Research Laboratory,
TEDDINGTON.
March 2nd, 1954.

1031

~~TOTEM RESULTS~~

~~SHELLS ABSORBERS~~

4
Graphs are attached showing the percentage transmission of lead and steel shells at 3,000 yards and 3,300 yards for T.1 and T.2.

On one (T.1, steel, 3,000 yards) is shown for comparison the experimental results obtained in the laboratory with 1.25 Mev radiation.

There is seen to be no significant difference between the results for the two distances.

The results are consistent with the presence of radiation considerably more energetic than 1.25 Mev. There is a suggestion that the radiation for T.1 is slightly more energetic than for T.2.

~~██████████ S.S.O.
Naval Research Laboratory,
TEDDINGTON.
March 8nd, 1954~~

1032

0242 10

THIS IS COPY No. 50050000000000000000

[Redacted] OK O/C. 28/1/88 [Redacted] 22 3/1/85

[Redacted]

UNCLASSIFIED

5th March, 1954

14/5/54

Mr. [Redacted]
Department of Supply,
300, Swanston Street,
Melbourne.

My dear [Redacted]

We have made an astonishing discovery which will probably make the Kitten trials this year unnecessary. We are putting great pressure on finding whether our new ideas are absolutely sound but we think that they are.

Recently I set the machine rolling at this end requesting the approach, through C.R.C., to the Australian Government for permission to use a site chosen by you for the Kitten trials this year and this request had hardly gone off when we got our new ideas. So we sent an immediate cable telling the High Commissioner to hold his hand for a few days. I have promised to give a decision by the end of next week whether we do or do not do the Kitten trials this year. I think the answer will be that we will not do them.

This note is just to let you know roughly what is happening so that if apparently inexplicable changes of policy occur at your end you will know that the reason is because we have made a sudden and unexpected discovery which greatly simplifies part of our work.

Your letter saying that the report was on its way was safely received but so far the report has not arrived. I am looking forward to reading it with great interest.

[Redacted]

p. t. o.



Thank you also for enclosing a copy of
[redacted] letter - I do not believe that
it changes in any way what I said to you or what
you said to me.

Yours sincerely,



NONI:
H. 11957.

Telegrams:
"SERATEN, ABINGDON"
Teleph. : ABINGDON 620
2079



HEALTH PHYSICS DIVISION
MINISTRY OF SUPPLY
Building 364
Atomic Energy Research
Establishment

HARWELL, DIDCOT
BERKS

Our Ref. *NR/16 34...*
Your Ref.

8th March 1954.

OK Y/C. 24/1/54

*Totem planning
0261 X11d.*

A. W. R. E.,
Fort Halstead,
Sevenoaks,
Kent.

Dear [redacted]

The neutron data of [redacted] is now available, I believe. Could we be provided with a copy of this, please? The reason is that we consider part of the 'flash' gamma radiation arises from a neutron reaction with nitrogen - a (n,γ) reaction. From assumptions about the original pulse, the cross-sections of the various reactions and the residual pulse when it reached the detectors, we may be able to estimate the amount of this contribution.

Yours sincerely,

[redacted signature]

Downgraded to

[redacted]

From: [REDACTED]
H. 118 S.P.

R. E.

HEALTH PHYSICS DIVISION
MINISTRY OF SUPPLY
Building 364
Atomic Energy Research
Establishment

HARWELL, DIDCOT

BERKS.

Telegcode Address:
" [REDACTED] ABINGDON "

Telephone:
ABINGDON 620, Ext. 2079.



ur Ref: BR/91/33

ur Ref: [REDACTED]

*Totem planning . 8th March, 1954.
0261 XII d.*

[REDACTED]
S.S.T.D.,
A.W.R.E.,
Fort Halstead,
Sevenoaks,
Kent.

*UK L/C.
[REDACTED] 20/1/55*

Dear

Reference your S.S.5/1 of 24th February, 1954.

At this stage I am loathe to provide the A.E. group with any more data piecemeal fashion. He asked for the gamma dose at specified distance, and this was provided. It now seems he wishes to construct the air-dose distances curve and is interested in the standard deviation. This is not his concern and it is most undesirable that several versions of the gamma dose distance curve should appear. For his purposes, as I understand them, the best measured value at any position is the appropriate one to use. The final curve must take some account of the geometry of the instrument lane. The root mean square deviation was not constant but had a maximum value of 13%.

The doses measured at the several positions in the tank were:

Driver	6,000 r
Gunner	6,400 r
Loader	4,130 r
Behind glacis plate (3" thick)	7,400 r.

/The

CONVERGED TO

The way in which the dose inside a shielded volume will vary with position is under consideration. Owing to the unsymmetrical nature of the shielding provided by a tank, the dose will depend on orientation with respect to burst. My advice to [REDACTED] is that he employ an average reduction factor of about 20. At greater distances the factor will probably be smaller.

Yours *Sincerely*

[REDACTED]



684

Totem planning
0261 RTI d.

Downs RAO 70

S. S. 5/1.

10th March, 1954.



A. E. R. E.,
Building 364,
Health Physics Division,
Harwell,
Didcot, Berks.



Dear

Thank you for your two letters of the 8th March, 1954. As regards the neutron data from [redacted] report, can you please say which extracts you would like to be sent to you. As I explained yesterday, there is no spare copy which could conveniently be loaned to you.

Your second letter deals with the provision of information to the A. E. Group. I agree in general with the substance of your observations on the circumstances in which information should be passed on. I will transmit to [redacted] the specific values for doses as given in your letter and will examine any further request he may make with your observations in mind.

Yours



22/1/54

624

████████████████████
████████████████████

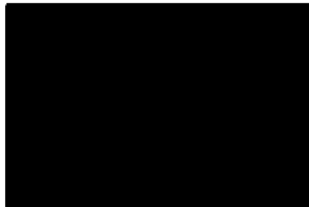
Totem planning
0261 XII d.

DEMOGRAPHICS 20

S. S. 5/1.

12th March, 1954.

Mr.
(S.A./A.C.),
The War Office,
London, S.W.1.



Dear

In reply to your 16/Research/875 of 23rd February, 1954,
the doses measured at the several positions in the 'Tank' were:-

Driver	6,000 r
Gunner	6,400 r
Loader	4,130 r
Behind	7,400 r
glass plate (3" thick)	

2. With regard to your question of the standard deviation of the gamma measurements previously sent to you, I would prefer you to await publication of the gamma dose distance curve derived from R.H. Group measurements. For your practical purposes I suggest the best measured value at any position is the appropriate one to use.

Yours

Copy to



24/1/55

0261 XII d. [redacted] [redacted] *connected to*
[redacted] 22/1/85
Chem Planning

Interim Report of Team RC3:- Operation Totem

The object of Team RC3 was the study of the composition of long distance airborne fission products. The team consisted of 4 chemists with one Laboratory Assistant and was housed in a laboratory separate from RC2, so that problems of cross-contamination did not arise. Electronics servicing was supplied by members of RC2.

The original plan of study for RC3 called for active filters from Totem 1 at distances of 500, 1000 and ~ 2000 miles and at 500 miles from Totem 2. Unfortunately, no active material was detected from Totem 1 at ~ 2000 miles (flights between New Zealand and Fiji) and although similar flights were then arranged at our request for Totem 2, collection was again unsuccessful. Active filters were collected however at 400, 800, 1000 miles from Totem 1 and at 400 miles from Totem 2, and analysed.

The scheme of analysis allowed for the separation and purification of 16 elements (Ba, Sr, Zr, Cd, Ag, Ru, Mo, Y, Sm, Eu, Pm, Nd, Pr, Ce, Pu and Np) from the same sample. The individual variation in analysis ^{between} members of the team was also checked by making a common solution from a very active piece of filter. Aliquots were then taken by each worker and four elements, (Ba, Sr, Ag and Mo) were determined. This procedure was followed on filters of three different origins, and the results indicate a variation of about ^{about the mean} $\pm 5\%$. This is the order of reproducibility usually quoted for such analyses but is a little disappointing as it was hoped that the techniques employed, particularly that of source mounting, would improve the agreement.

Results

The results quoted below are preliminary and have not been corrected for window absorption or sample scattering of the β particles. In some cases (Ce^{141} and Ce^{144} , Ru^{103} and Ru^{106}) isotopic resolution has not yet been attempted. The ratio of fission product yields from Totem 1, 400 miles are very similar to those of slow neutron fission of Pu239, one filter being used for all analyses. At 600 miles, (one filter), there was an increase in the ratios of Sr, Ag, Y, Nd, Pr with Ba as compared with the 400 miles

sample. At 1000 miles, however, the results are particularly interesting as, due to the lower activities of the filters, two were used. For the first, the ratios Sr, Ag, Cd¹³⁷ Ba were higher than at 600 miles, but on the second, the Sr/Ba ratio was $\sim 1/5$ of the 1st 1000 miles^{sample} and ~~was~~ about $1/2$ of that at 400 miles. The praseodymium to barium ratio was also very high, approximately twice that at 400 miles.

For Totem 2, (400 miles), the analyses were appreciably different from Totem 1 at the same distance. Expressing the results as ratios to Molybdenum, barium was higher by about 15% but ^{Sr/Mo} Sr was nearly twice totem 1. Other results on totem 2 were also higher than for totem 1. The analyses from Totem 2 showed a much greater enrichment of those fission products with gaseous ancestors, (and corresponding to a greater fall out) than Totem 1.

Considerable success in the correlation of both Hurricane and Totem results with quite a simple theory has been achieved. Work on this is still going on but a report will be issued shortly.


March 23rd 1954.

file Downgraded TO

11/85
Totem planning
0261 III d

XXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXX

XXXXXX A.W.R.E.,

XXXXXXXXXXXXXXXXXXXX

SS 5/1

24th March, 1954.

Home Office,
Whitehall, S.W.1.

Dear

Many thanks for your letter of the 22nd March, and congratulations on assuming your new role.

2. As regards the production of Totem reports, I am pressing on as fast as possible with their production and, in general, I am against the policy of supplying advance copies or extracts as such procedure usually delays the issue of the report itself. However, in some cases, where the need is proved or obvious, the policy can be altered. You may like to know what reports we have at the moment, considered would be of Home Office interest, and I enclose a list accordingly.

3. Taking your specific requirements in detail, I would comment as follows:-

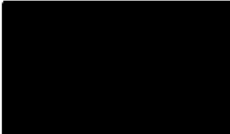
(1), (2), (3), (5) and (6) will all be covered to a considerable extent by the issue of a report "Radiation Hazard - Measurements" and I am seeking approval for you to receive three copies of this. It should be issued in about six to eight weeks.

For some more specific details you may find it necessary to ask for certain 'team reports'.

(4) will be covered by Radiation Hazard Group - Health Control.

(7) is probably well covered by a note D.D/214 dated 22nd March, 1954, sent by [redacted] of this Establishment to Stanbury.

/(8)



(8) is covered by the issue of the report on Ground Zero Indicators which may be expected within about six weeks.

With further reference to (1), the report by [redacted] and [redacted] (A.R.L./R.1/R.864) will probably be known to you and you could doubtless obtain a copy from the A.R.L. The subject is well covered in the R.H. - Measurements report and probably a report from the teams of which [redacted] and [redacted] were members will be available later.

4. I hope this information will be of use to you and if there is any more you want you must let me know.

5. It is true that we have made a film of 'Operation Totem' but it contains fairly highly classified material. Although it was completed some weeks ago, it has not yet received circulation except to a few very privileged audiences. The Director has not seen it in its final form and his views on classification would be required before commenting on your request. Arrangements have been made for him to see it on Thursday, 25th March, so it should be possible to let you know in the fairly near future whether he would agree to its exhibition at your Conference.

All best wishes.

Yours,



██████████
██████████
Totem Planning
0261 XIV d.

24/1/54
DOWNGRADED TO S.8.5/1.

MUSTANG AIRCRAFT - FILM BADGE RESULTS

S.H.P.

In connection with the work of the Aircraft Structures Group in Operation Totem the film badges as given below were mounted in the six Mustang aircraft deployed in the T1-R lane.

2. In order that a full assessment of results can be made will you please send to ██████████ who acted as Group Leader A.S., the results from the exposure of these badges with a copy to me. ██████████ address is given below.

██████████
Senior Superintendent,
Trials Division.
31st March, 1954.

<u>Aircraft Site</u>	<u>Badge No.</u>
A.S.1	2736
A.S.2	2737
A.S.3	2738
A.S.4	2739
A.S.5	2740
A.S.6	2741

Copy to ██████████
Admiralty Signal and Radar Establishment,
Portsmouth,
Cosham,
Portsmouth,
Hants.

Totem planning
0261 XII d.

Home Office,
Whitehall,
S.W.1.

P.A.A.

Downgraded to
UNCLASSIFIED

22nd March, 1954.

24/1/56

Dear [REDACTED]

I imagine that some of the Totem reports will soon be nearing completion, and if there is to be any circulation on a "Need to Know" basis of individual reports in advance of the issue of a comprehensive report I should be very much obliged if you would put me on the list for the following items which are of particular interest to us in Civil Defence at the present time.

- (1) The energy of the gamma flash - [REDACTED] own report and [REDACTED] report on his collimator results and any other relevant data.
AR 27/2/54
- (2) The behaviour of flash dosimeters of various kinds - high range quantity fibre instruments, ~~exposed~~, film badges etc.
- (3) The nature and extent of fission product deposition; beta/gamma ratios, and the gross decay law; protection afforded by clothing against betas.
- (4) Decontamination of people and equipment.
- (5) The protection afforded by vehicles and slit trenches against the gamma flash.
- (6) Air sampling experiments and general comparison of internal as against external risk.
- (7) The heat flash time intensity curve (intensity in any nominal units) and the behaviour of fabrics exposed to the flash.
- (8) [REDACTED] shadowgraph report.

/We

[REDACTED] E.Sc., F.Inst.P.,
Atomic Weapons Research Establishment,
Ministry of Supply,
Fort Halstead,
Sevenoaks, Kent.

We should be obliged particularly if No. 8 could be released fairly quickly for general use, as we are being worried by A.E.N.E. who placed a development contract with General Radiological Ltd. for the production of these instruments. They are naturally anxious to agree on the next step, which cannot be done until the report is made available to them.

I understand that a fairly complete film of the Woomera test was made and we should be very glad if this could be shown to our Conference of General Scientific Advisers from June 1st - 3rd. At a similar conference last year Sir William Penney came himself and the Hurricane film was shown. This action was much appreciated and helped a great deal to make the conference a success. I trust that A.W.R.E. will be able to help us again this year.

Yours sincerely,

p.s. I have also written a note to [redacted] + hope that he will find time to receive me in A.W.R.E. so that current problems can be discussed.

raft

Totem planning
0261 XII e

UK u/c

22/1/50

24/1/50

DOWNGRADED TO

Report on Medical Equipment Exposed
during Atomic tests in Australia 1953

Note by SA/AC
(To be read in conjunction with MABCW(54)3)

1. Siting of the equipment

The layout of the equipment for the first test was planned to cover the range from "no damage" to "severe damage", and ~~the siting~~ was based on what information could be culled from American data, on observed and predicted effects on equipment similar in nature. * When the results of the first test showed that little damage was done it was decided to re-expose undamaged items at closer ranges. The basic data recorded at ranges E to H were approximately three times the value of those recorded at ranges A to D.

2. Relation to a nominal weapon

Both explosions were near-ground bursts and neither produced a yield comparable with a nominal bomb. From the basic data measured by A.W.R.E. it is possible to give estimates of the range from weapons of other yields at which comparable effects would be observed. The results have been given in terms of ranges from ground zero of a nominal 20 kiloton weapon air burst at 2,000 ft. as it is considered that members will be more familiar with a weapon of this yield than any other.

omit
[]

3. The following table gives predictions of the likely effects on medical equipment stacked or laid out entirely in the open. They are based on the results obtained from the exposure of the medical equipment together with the results from the exposure of other types of equipment by the Army Equipment Group. Some ranges for injury to men exposed in the open are given for comparison.

* See pages 75-79 of "Capabilities of Atomic Weapons" by Armed Forces Special Weapons Project, SECRET, DISCREET, dated July, 1951.

Table I

Table I

Damage Ranges for Medical Equipment
Exposed to a 20 kiloton Weapon exploded
at 2,000 ft. (Visibility 25 miles).

<u>Range from ground</u> <u>zero in yards</u>	<u>Effect</u>
0	Ground zero.
500	Likely limit of neutron induced activity in medical supplies.
800	Likely limit of damage to contents of RMO's pannier. The pannier itself may be blown about and the canvas and leather scorched but it will be otherwise undamaged.
1200	Likely limit of destruction of the less resistant packed containers in the open. (Boxes, haversacks) Contents will be undamaged.
1400	(LD ₅₀ for gamma radiation - also approximate limit of burns under normal clothing).
1700	(Approximate limit of gamma radiation casualties)
2200	Likely limit of severe damage to cellophane and polythene coverings.
2700	Likely limit of severe damage to rubber viscaps.
2800	Likely limit of any damage to medical equipment exposed in the open. (Also approximate range for third degree burns on exposed skin)
4250	(Limit of first degree burns on exposed skin)

Note:- It should be emphasized that these results are based entirely on the observed effects to equipment exposed on these trials. Ranges may be subjected to some revision as and when later data become available.

4. Notes on the effects of blast and heat

The main point which emerges from these trials is the extreme robustness of medical equipment. No heat or blast damage would be expected beyond 2800 yds. to medical stores unpacked and laid in the open, and packed stores in normal containers (boxes and haversacks) are unlikely to be damaged beyond 1200 yds. Inside this range it may be

expected that bottles etc. will be broken but between these ranges the main damage is scattering of equipment from partially unpacked boxes and scorching and burning of protective covers, e.g. viscaps. It will be noted that the equipment inside the RMO's pannier is undamaged even at a range corresponding to 800 yds.

5. Notes on the effect of neutrons

It will be seen that neutron doses likely to induce activity in medical equipment are not achieved much beyond 500 yds., which is in the zone of heavy damage and loss of life. Unless the weapon is burst substantially lower than 2,000 ft. activities of the order experienced at range E on the Australian trials are unlikely to be induced except close to ground zero. It is considered that the likelihood of stores in this zone being used is very low.

6. Effect of an explosion on the treatment of casualties in the field.

The effects of an atomic bomb on medical equipment stacked or otherwise exposed in the open are less than on men exposed in the open, indeed it will be seen that the maximum range for bad damage to equipment is less than the range at which men experience third degree burns on exposed skin. Inside this zone equipment can be considerably protected by packing it inside containers which are proof against the effects of heat flash (wooden boxes or heavy canvas haversacks) and these do not break up outside a range at which exposed men die from the effects of gamma radiation or severe burns under normal clothing. Indeed a resilient container like the RMO's pannier protects its contents at closer ranges still. It should perhaps be noted however that this equipment was exposed completely in the open and that ^{usually} there might be some secondary blast damage to equipment from the flying debris of trees, etc. From effects noted in wooded areas exposed to these test explosions it is estimated that the range inside which flying debris from trees etc. is found is about 2,000 yds. Experience on these tests has shown that shielding from the effects of blast and heat can be given by sinking items of equipment in fairly shallow pits. It seems likely by this means that a high degree of safety can be attained.

[REDACTED]

7. If equipment containing items likely to be critically affected by the effects of the heat flash is to be exposed in the open it is suggested that some extra protection is given in the form e.g. of aluminium foil covers for viscaps and tubes and aluminium paint on polythene covers. Cotton covers, especially for e.g. shell dressings, should be avoided wherever possible. The effect of painting polythene covers with aluminium paint is likely to reduce the range at which they are affected to 1700 yds. or so.

8. The fact that medical equipment is more ~~resistant~~ ^{resistant} than the men it is needed to treat, coupled with the need for the dispersal of medical stocks in atomic warfare suggests that equipment be carried on as low a unit level as possible so that after an incident units can treat themselves ~~and limit~~ ^{and limit} ~~the need for special deliveries of~~ ^{from higher central stock} ~~stock~~. This would be an advantage if more than one atomic bomb is dropped at one time, as seems quite likely.

Science 1
Room 437.
1 April, 1954.

Log 4/1



Totem
Planning
0261

SA/186

XTC

From: Mr. [REDACTED]

THE WAR OFFICE,
LONDON, S.W.1.

2 April, 1954.

24/1/54

Dear Mr [REDACTED]

21/1/54

DOWNGRADED TO

Report by [REDACTED]

We spoke 30th March. [REDACTED] report on the medical equipment exposed at Totem having been cleared by A.W.R.E. at the SECRET and GUARD level is being presented to the Committee on the Medical Aspects of Atomic, Biological and Chemical Warfare on Wednesday, 7th April. The Chairman of this Committee is the Director General of Army Medical Services.

As the Committee have no need to know the original ranges at which the equipment was exposed these have been deleted from the paper being presented to them and I have written a note to be read in conjunction with this paper at which ranges are given in terms of a nominal 20 kiloton bomb exploded at 2,000 ft. Bearing in mind the fact that it is undesirable to quote more than two phenomenological parameters in one report I have smoothed the original data and arranged the presentation so that I consider it will be difficult from the figures which I have given to estimate the yield of the Totem explosions.

/Before

[REDACTED]
Senior Superintendent,
Trials Division,
Building Q.7, A.W.R.E.,
Ministry of Supply,
Fort Halstead,
Seven Oaks,
Kent. [REDACTED]

[REDACTED]

Before my note is circulated, however, I should like your approval of its contents, ~~while~~ bearing in mind the fact that all members of this Committee are entitled to access to SECRET information.

A copy of [REDACTED] report now issued as MABCW(54)3 is attached together with a copy of my note.

Yours sincerely

[REDACTED]

Copy to:- [REDACTED] Lundie,
A.M.D.8, Room 215,
The War Office,
Lansdowne House,
Berkeley Square,
London, W.1.

DOWNGRADED TO

Reference.....H.F.S./3024.....

Totem planning
0261 XII e

22/1/65

S.S.T.D.

SUBJECT TOTEM-CENTURION TANK. DOSAGE.

In reply to your inquiry about the film badges exposed in the Tank.

These results are:-

		Dose (r)
A	2080) L. Breast.	>1000
) Driver	
	2081) R. Thigh.	6000
	2082)	Film not
) Commander	returned
	2083)	to R.H.3.
	2084) R. Thigh	>1000
) Gunner	
	2085) L. Breast	6400
	2086) L. Breast	>1000
) Loader	
	2087) R. Thigh	4130
	2088)	>1000
) Against underside	
A	2089) of Glacis plate of hull.	7400

Health Physics Branch,
Building [redacted]
A.W.R.E. Aldermaston.
Berks.
D. H. 54

143) A.O.St.
REGIMITE
Code S-35-0

SS 5/1
Seq 4/15

RECEIVED
- 8 FEB 1954
LONDON

DOWNGRADED TO
UNCLASSIFIED



Test here 2 weeks before within 1000
Marsfield discussion IV. difficulties near COLICA -

Spring 55

11 MAY 1954

ST. GILES COURT,

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

copy

6th May, 1954.

Fin/63/1

Dear [redacted]

28/1/85

31/1/85

Commonwealth Relations Office have received a telegram from our High Commissioner in Canberra in which he says that the request for initiator tests in Australia in 1955 is unlikely to cause any difficulty for the Australian Authorities. They wish to know, however, whether the permanent proving ground is likely to be required for these tests, in which case their ability to stage the tests would depend on progress with the proving ground.

As I understand the position the proposed initiator trials are quite distinct from the arrangements for the permanent proving ground and this was in fact specifically stated in paragraph 4 of C.R.O. telegram No.34 of 20th February. I assume, therefore, that the proposed initiator trials can be dealt with quite separately from the question of the permanent ground, but I should be grateful for confirmation before sending a reply since the Commonwealth Relations Office refer to "certain exchanges with [redacted] on the subject of a proving ground."

I suggest, subject to your agreement and that of Lloyd, to whom I am sending a copy of this letter, that the reply should be that the trials proposed for 1955 are quite separate from the proposals for the permanent proving ground, and that these trials could be held, in accordance with the provisional /arrangements

[redacted] C.B., D.S.O.

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

[redacted]

arrangements discussed between [redacted] and [redacted] or [redacted]

Yours sincerely,
[redacted]
[redacted]

DOWNGRADED TO UNCLASSIFIED

[REDACTED]

28/1/85

Miss R

Put in Final file plan

[REDACTED] 31/1/85

0042 14

927

DAW(Trials), 621

13 MAY 1954

11th May, 1954

Dear [REDACTED]

I agree with the proposal in your Pin/63/1 of 6th May that your reply should state that the initiation trials proposed for 1955 are quite separate from any proposals for a permanent proving ground. I think you should add that, if they are to be held in the area [REDACTED] as provisionally discussed by [REDACTED] they should be arranged so as not to contaminate any ground which might be required for the permanent proving ground if and when agreement is reached to establish it.

I am sending a copy of this letter to [REDACTED]

Yours sincerely,

[REDACTED]

[REDACTED]
AS/At. In. (S)1,
Room 826,
St. Giles Court,
London, W.C. 2.

G. B. E.,

[REDACTED]

SECRET

DOWNGRADED TO
UNCLASSIFIED

CR42 1a

[REDACTED]

SECRET

rat

LM

[REDACTED]

U.S. GOVERNMENT TELETYPE SERVICE

12 MAY 1954

FROM

LM6677 ~~SECRET~~

[REDACTED]

TO

URGENT
FROM AWRE

[REDACTED]

2/1/88

ENCLOSURE

TEL. MESSAGE 3000 EXT.

[REDACTED]

3/1/85

AWRE

TO [REDACTED]
FROM [REDACTED]

YOUR ML6950.

MATTER HERE IS NOW UP FOR DECISION BY
MINISTERS AND ACTION IS EXPECTED SHORTLY. PROPOSAL HAS
CERTAINLY NOT BEEN SHELVED ALTHOUGH DATE OF EVENT
PREVIOUSLY ENVISAGED HAS BEEN POSTPONED BY A FEW MONTHS.

FOR INFORMATION OF [REDACTED] ONLY MATTER IS REFERRED TO IN
C R O TELEGRAM NO.266 TO HIGH COMMISSIONER ++

DISTRIBUTION

ORIGINATOR [REDACTED]

7.5.54++

REPTN ML6950 NO266 ++DC++

DANGEROUS TO

UNCLASSIFIED

[Redacted]

VIA DIRECTOR'S OFFICE,

0142 1a



[Redacted]

28/1/85

11th May, 1954

3/1/85

Ref: 192/5/5/A
Your Ref: 217/6/1

[Redacted]

Dear [Redacted]

In reply to yours of 6th May I agree that your reply should be that the initiator tests proposed for 1955 are quite separate from the proposals for the permanent proving ground although for technical reasons they could best be carried out in the Oalden-Nansen area.

In this connection we agree with the point [Redacted] is suggesting about selecting a site for the tests which will not "prejudice" either the permanent site or its approaches.

We should also like you to make the point that certain research is being undertaken here for the next few months, and until this work is completed we shall not be in a position to say whether or not the initiator tests will be necessary.

I am sending a copy of this reply to [Redacted]

Yours sincerely,

[Redacted Signature]

Admiral (Retd.)

[Redacted]

St. Giles Court,
1/13, St. Giles High St.,
London, W.C.2.

Copy to: - S.S.M.D. [Redacted]

14/5/54 Co-operation with Australia
General - Correspondence
0263

DOWNGRADG TO
UNCLASSIFIED
S1



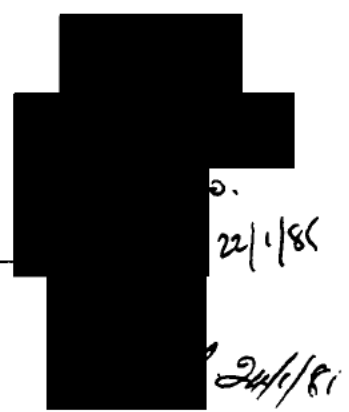
DEEN... D. AWKE
12th May, 1954.

We were asked by the Official Committee yesterday to get [redacted] views on how much the Australians were likely to ask us for in the way of technical collaboration with us in the negotiations for a permanent proving ground for atomic weapons in Australia.

Plewsden has spoken to [redacted] and his views are as follows :-

1. They will presumably ask for at least as much as we gave them for Totem: This included full information on weapons effects, Service officers being allowed to inspect the effects on tanks, etc., although no papers were given to them.
2. They are likely to ask to send four or five scientists to Aldermaston to learn about the design and manufacture of atomic weapons. [redacted] personal view is that we should at least give access of this sort to Stevens and to one scientist.

[redacted] Esq.
Foreign Office,
Downing Street, S.W.1.



MEMO FOR PROJECT HEALTH DISCUSSION GROUP

Extract from
AB6/1527
15/1/3/247

Downgraded to
Unclassified 4/1/85

4/2/85

Chronic Intake of Plutonium and its Detection in Radiation Workers

1. In general it can be said that adequate control can be exercised over a worker who is accidentally exposed to concentration of plutonium which are well above M.P.L. Isolated episodes can occur when a worker inhales or swallows plutonium, and by subsequent biological monitoring we can determine the resulting body burden with sufficient accuracy for medical purposes.

2. In a working plant, however, we have not yet reached a stage when we can exactly know, at all times, the plutonium content of the air an individual breathes.

It is possible for a worker to inhale small amounts of plutonium dust unwittingly because of practical difficulties connected with air sampling.

Similarly small ingestions can take place which would not be detected by routine methods.

3. In either case mentioned in (2) some unsuspected accumulation could occur over a long period of time, either locally in lung or generally in skeleton.

The M.P.B.B. is very small and might easily be reached or exceeded by this means.

4. Urinalysis, either routine or special, would not demonstrate this unless carried out at frequent intervals. To be significant a urine content of Pu has to be 20 μg or more. One to three months after intake at 0.01% excretion, 20 μg would indicate a body burden of 0.2 μg i.e. $\frac{1}{5}$ the M.P.B.B.

X Furthermore, there seems no reassurance that body burden considerably greater than maximum permissible would be detectable by urinalysis if they were acquired slowly in fractionated doses. The skeleton can obviously retain far more than 0.6 μg Pu without measurable excretion taking place. Already results of 20 μg are sometimes reported in two of the Windscale cases whose urine levels were high a year ago. In the absence of past records it would be impossible to distinguish between these men and one with no burden of Plutonium.

Other method of detection save urinalysis exists at present.

6. The foregoing is important in the case of soluble Pu dusts but is more so if the dust is insoluble. Any urine level which is measurable can only indicate what was absorbed into the blood stream from the small proportion of contaminant brought up, by coughing or otherwise, and swallowed. The proportion of dust remaining in the lungs cannot be estimated directly and can only be guessed at.
7. Some long-term implications are mentioned below:
- (i) A single negative sample of urine, in a plutonium worker of some years' standing, has no value except in special circumstances.
 - (ii) It is possible to permit a man with a M.P.B. of plutonium to continue his work, perhaps risking additional dosage from external radiation, in the belief that he is fit to do so. If it were known that he carried M.P.B. he would be barred from all radiation work.
 - (iii) A radiation worker is to be defined as a worker who is regularly exposed to 1/10 M.P.L. or more. As far as the plutonium hazard is concerned there is no way of discriminating to such a low level. It will be "all or nothing" for plutonium workers.
 - (iv) If a plutonium worker succumbs to malignant disease, particularly of bone, in later life, a series of negative urine analysis figures might not have the great value one tends to ascribe to them.
 - (v) Direct evidence by analysis of bone from plutonium workers who eventually reach the post-mortem table, from natural causes or otherwise, would be very valuable.
 - (vi) A method for rapid and accurate measurement of plutonium in the air breathed remains a pressing need.


Senior Medical Officer.

S.P.T.,
Building [redacted]
A.R.R. Aldermaston.

Radio-Active Sampling
CS12 I

[redacted]

W
Gale
Yes
L

Subject : Measurements requiring use of Aircraft at Trials

1. Among the RH Division's proposed tasks at future trials are some requiring the use of aircraft. The measurements are shown in the following paragraphs. When the future RH organization was evolved in February, these measurements were considered and no staff increase will be necessary.

2. Determination of particle sizes in the "cloud"

(i) The Measurements are for two purposes:-

(a) For S.C.M. [redacted] for determination of the ratio of activity to size, as a check on the mixing in the cloud.

(b) For S.H.F. in connection with forecasts of the fall-out to be expected from various weapons.

(ii) Flights would be required at two times after the explosion.

(a) As soon as possible after the cloud has reached its maximum altitude.

(b) Between about 30 mins and 1 hour after the explosion

(c) The vehicle for the measurements should be either an aircraft or a drone. Because the measurements cannot, at the moment, be made with high air speeds the early measurement will almost certainly require to be made from a drone. The later measurements would require a relatively slow (200 kt or less) aircraft. The aircraft may have to fly at altitudes of 30,000 ft or more.

3. Measurement of Dose rates in the clouds

(i) These measurements are required for safety calculations in connection with civil airliners and military aircraft flying through "clouds" either deliberately or accidentally.

(ii) The measurements can be made at any convenient time after the explosion, preferable times are at very early times and at times about 3-5 hours after the explosion. The measurements can and should be made in any aircraft or drone flying through the cloud.

(iii) Either drones with recording gear or manned aircraft, travelling at any convenient speed, can be used for these measurements. At very early times drones would be most suitable. Any aircraft having to traverse the cloud at any time could carry out these measurements after suitable briefing. The aircraft may have to fly at altitudes of 30,000 ft or more.

4. Aerial Survey of Ground Contamination

(i) These measurements are required for the assessment for safety purposes of the activity deposited on areas down wind of the firing sites and for a rapid preliminary survey of the deposited activity.

(ii) In the first instance it is proposed that the measurement should be made in two parts.

(a) Survey of the area up to about 10 miles down wind of the target on D day and again on D + 1 day.

Q T 88

- (b) Survey of the areas from 5 miles down wind to 300-400 miles downwind on days D = 1 and possibly D + 2.

Associated with these measurements will be a number of flights at various altitudes over areas of good ground survey at various times (in days) after the explosions.

- (iii) Prior to the flights, a number of flights will be required to establish background conditions.
- (iv) Because of serviceability effects it will be necessary to have two aircraft available for each of these tasks.
 - (a) Helicopters, or slow light aircraft, are suited for the target area survey, preferably helicopters.
 - (b) Medium transport aircraft or light bombers are suited for the long range tasks and speeds up to 300 m.p.h. (M.P.H.), with low stalling speeds.
- (v) Because of the lack of navigational facilities in the test area, it is recommended that the RAF should supply aircraft for this task with experienced RAF pilots and Navigators.
- (vi) These aircraft will carry out their surveys at altitudes of approx. 500-ft above ground level.

Cloud Tracking and Cloud activity sampling

If aircraft are used for either of these tasks or any other task including passage in or near the cloud all the aircraft and aircrews must carry suitable instruments and equipment, supplied by C.I.I. and A.I., for checking the dose received by the crews.

[Redacted]
C. I. I.

[Redacted]
Aldermaston
9th June, 1954.

[Redacted]
[Redacted]
[Redacted]
[Redacted]
[Redacted]
File

RAF/...

XXXXXXXXXXXXXXXXXXXX

684

Totem planning.
0261 XII e.

S... 5/1.

22/1/55

9th June, 1954.

24/1/55

DOWNGRADED TO

Dear

I have now had an opportunity to study your report in detail and I have found it of the greatest interest. As regards the bulk of the material I have no alterations to recommend but there is one subject on which I must comment critically, particularly since it involves material obtained from another Group. In the section on "Interpretation and Discussion" you make the following observation "..... it is found that D1 intensity was greater than D2 by about 13%. Assuming a two fifths root scaling law this suggests a 35% higher yield for D1". As far as I can see, these statements depend on two assumptions:-

- (1) The received radiation intensity is proportional to $R^2 \theta$ where R is the radius and θ the temperature.
- (2) The relation between E, the total energy, t, the time and R is of the form $R = kE^{1/5} t^{2/5}$

If then θ is assumed to be the same for Totem 1 and Totem 2, the comparison of the powers reduces to the comparison of the radii with the appropriate index in just the same way as would be used in assessing the photographic results.

I am a little doubtful about the assumption that the temperatures can be regarded as the same. In your graph they

/arc

e plotted as the same over the range concerned, but the tables show differences. The argument may be that the differences are not significant in view of the magnitude of error in the observations but if this is the case, I think the graph should give some indication that this is so. In addition to this point, however, there is the more serious one that even if it were well substantiated that any difference in temperature would not affect the estimates of power, there should be agreement between the estimate from thermal effects and the estimate from photographic observations since they depend on the same basic data. I have looked into [redacted] most recent analysis of the results and I find that the difference between Totem 1 and Totem 2 is less than one half of the percentage difference which you quote. This may in part be due to the fact that [redacted] has had the opportunity to add a few more observations in making his most recent analysis, however, I doubt if this can be the whole story because [redacted] in working from the same data as I believe you used gets a result not very different from [redacted] present results.

It would obviously be very undesirable to have different estimates given in different reports even if the reason were that the results obtained from different types of observations were contradictory. Apparent contradictions could, of course, occur and if they do, then some attempt should be made to define the differences and to explain the reasons for them. In this particular case I suspect that there is no fundamental contradiction but that different estimates from the same original observations have led to different results, partly because an incomplete set of observations are used in the early stages and partly because errors of observation led to a fairly large standard error in the final conclusions.

Since you are not here it is rather difficult to suggest an entirely satisfactory method of clearing up these discrepancies, I should propose to discuss them with [redacted] I have already

/discussed

[REDACTED] dated 9th June, 1954

discussed them with (Walker) and to ask him to undertake another analysis of the observations on which the estimates of temperature and power are based. This would lead to an insertion to be substituted in your report, with a few deletions to your original draft as I assume the estimates which you have give a need modification. It appears to me that it is not only the conclusion about relative powers which will require alteration but that there is an implication that any figures depending on the effective radius of the fire ball in the early stages will also need to be altered.

I am sorry to have to bother you with these matters now when I have no doubt you have plenty of other things to think about both officially and privately. I hope all goes well in both spheres.

All best wishes.

Yours
[REDACTED]

CIA/JG.

DEPARTMENT OF ATOMIC ENERGY,

~~XXXXXXXXXXXXXXXXXXXX~~

684

Totem planning

0261 XIIe

JK U/C [redacted] 22/1/54

[redacted] 24/1/54

B. S. 5/1.

9th June, 1954.

[redacted]
Defence Research Board,
(Canadian Joint Staff),
66 Bunsford Gardens,
London, S.W.7.

Dear

I should be grateful if you would be good enough to forward the accompanying "Secret" correspondence to [redacted]

[redacted] He submitted his report on his work at Totem a day or two before he left this Establishment and there was no time to have a detailed discussion with him on its contents. After studying the report, I have concluded that there are a few points on which I should like further elucidation and the letter is confined to technical matters arising from his scientific investigations.

I should like to take this opportunity of recording my appreciation of the valuable and high quality work which [redacted] performed in this Establishment. In the short period he was with us he gained a very high reputation amongst his colleagues both for his scientific and personal qualities and we were all very sorry that he had to leave us.

Yours

[redacted]

INTERNAL MEMORANDUM

[PW] 9 / 6 / 195 4

From: [REDACTED]	To: [REDACTED]
Branch	S.W.P.,
31dg. Q.7., Fort Halstead	Building [REDACTED] A.W.R.E., Aldermaston.
Ref. S.S 5/1	Ref.

24/1/55
DOWNGRADED TO

Subject

Totem planning 0261 XII e.

... Herewith one copy of [REDACTED] report on the measurement of thermal intensity by photoelectric methods. You will probably be interested in the whole of it but I shall be very glad to have your comments on the particular point we discussed over the 'phone, i.e., the estimate of yield and the scaling law which should be applied in the early stages.

... I think we discussed the difficulties in sufficient detail but to make sure that you have the points on which I am doubtful I am enclosing a draft of the letter which I shall be sending to [REDACTED]

... Encl. [REDACTED]

note to Committee
rel - G. 172
S.S. 5/4

[REDACTED]
[REDACTED] 22/1/55

[REDACTED]

DEPARTMENT OF ATOMIC ENERGY

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

XXXX A.W.R.E.

Totem
Planning
0261
XIIIe

XXXXXXXXXXXXXXXXXXXX

SS 5/1

[Redacted]

22/1/55

10th June, 1954.

[Redacted]

14/1/55

[Redacted]

Esq.,
Senior Meteorological Officer,
No. 1 Group, R.A.F.,
BANTRY, Yorks.

DOWNGRADED TO

SECRET

Dear [Redacted]

We are still in some trouble on meteorological data for Totem 1 and 2.

Various calculations are required for which the density of the air at the towers is vital data.

For Totem 1, vide Appendix B1 of your report, there is sufficient information on surface temperature, pressure and the dewpoint to enable density to be calculated.

Unfortunately, Appendix B2 only gives estimated surface pressure at T2. It seems unsafe just to assume that temperature and dewpoint are the same as at the camp (for which B2 gives figures) because such a straight forward comparison is not applicable to Totem 1.

Can you give us any further information or a clue as to whether any such information is available elsewhere?

Hope you like your new job.

Yours,

[Redacted Signature]

GIE

Both sides to be used

R.O.F. Form 2a.



4/2/85

Minutes to be numbered consecutively

Q.P. No.

Ref. to

~~RESTRICTED~~

Subject { Health Aspects of Trials.

Extract from
IS/1/3/247

AB6/1537

An analysis of the radiation doses received by civilian personnel at the Hurricane and Totem Trials has been made by [redacted] Superintendent Health Physics, A.W.N.S., Aldermaston. It is as follows

Dose	Hurricane		Totem	
	Numbers	of Total	Numbers	of Total
Less than 1r	41	52	76	76
1 to 3r	33	42	20	19
3 to 10r 7r	5	6	5	5

The doses quoted are as recorded on the film badges and are assumed to be whole-body penetrating radiation corresponding to a weekly m.p.l. of 0.5r.

The duration of a trial, including travelling, can be taken as about three months. The highest of the 10 cases of over 3r was only 6.8r, and this officer was away for 17 weeks, the next highest doses were 4.7r and 4.5r. It can be seen therefore that the average dose over the period was in all cases below the value of 0.5r/week.

No person, therefore was exposed to external radiation in excess of the recognised permissible levels and in addition, repeated urinary analyses on the returned personnel showed no evidence of any internal radiation hazard, the figures being, in all cases, well below the

/ permissible

permissible level.

On the purely medical aspect, every person proposed for duty at a Trial is re-assessed medically and this medical assessment is accepted without question in deciding whether a person should or should not take part in a Trial. In making the assessment, such factors as, climate and flying are taken into consideration and in one case, special arrangements were made to meet the medical requirements. All personnel on their return have been re-examined and showed no evidence of any ill effects, the contrary usually being the case.

Medical Division,
Building [REDACTED]
11th June, 1954.

S.S.E.D.

Radio - Active Sampling
0312 I

2931
R18.6

Cloud Sampling

came to see me a few days ago to suggest that if we were likely to place a demand on the R.A.F. for cloud sampling aircraft, we should give more notice than on the last occasion so that the operation can be properly planned.

I therefore had discussions with S.C.M. and S.H.P., and asked them to let me have an indication of what they thought they would need.

Their replies are attached.

To some extent S.H.P. and S.C.M. have air sampling requirements in common, which can be summarised as follows:

Item	Time after the event	S.H.P.	S.C.M.	Vehicle	Operation
1	5 seconds	No*	Yes	Rockets	L.R.W.E.
2	3 minutes	Yes (2 ii (a))*	If available would use	Drones	L.R.W.E.
3	20-30 minutes	Yes (3 ii)	Yes	Canberra	R.A.F.
4	3-5 hours	Yes (3 ii)	If available would use		
5	During D day	Yes (4 ii a)	No	Helicopter or light A/C	R.A.A.F.
6	D + 1 + 2 day	Yes (4 ii b)	No	Medium A/C (Dakota, Bristol)	R.A.A.F.

suggested that for item 3, at least three Canberras should be made available. He pointed out that there is in existence a Canberra Flight specifically formed for air sampling activities. It was possible that this Flight could be used for the operation, in which case the cost of the sampling should be only that incurred over and above the normal running costs of the Flight. It was also possible that even if we had no cloud sampling requirements there might be a request that the Flight be allowed to participate in the Trial as an exercise.

The Committee investigating the extent to which A.W.R.E. shall take measurements of the explosion will presumably decide how much of the above is permissible.

If the Committee agrees to any measurements involving R.A.F. or R.A.A.F. participation, the Trials Division must make organisational arrangements for effective liaison between S.C.M. and S.H.P. on the one side, and R.A.F./R.A.A.F. on the other - an aspect of planning which was not entirely satisfactory on the last occasion. I have discussed this with [REDACTED] who has agreed to provide, through the Trials Division, whatever liaison is required. (Although C.A.W. may have to make the initial arrangements for R.A.F. or R.A.A.F. participation, I think it very important that detailed liaison should be within A.W.R.E.)

I am not clear whether the question of cloud tracking is within the terms of reference of the Committee, but it does link closely with the above in that it could be co-ordinated under the same liaison arrangements. So far the question has been shelved on what seems to me a not very valid premise, that it is up to the Australians to request our assistance if they want to track the cloud.

In fact, the Australians have no reason to suppose that we are not going to arrange to track the cloud as we did on the last occasion, and valuable time may be wasted while they discover that we are waiting for the initiative to come from them.

It is fairly certain that they will need to know the path of the cloud, if only as a matter of safety to civil airlines. It is, therefore, equally certain that we will be involved in predicting the path of the cloud, fitting the aircraft with detecting equipment and so on. I think, therefore, that we should accept this as a commitment now. Since we are not concerned with sampling at great distances, it would appear that, given time for proper planning and arranging, it does not involve any additional U.K. staff.

[REDACTED]
[REDACTED]
S.P.T.

[REDACTED]
[REDACTED],
Barnham, Berks.
30th June, 1954.
[REDACTED]
[REDACTED]

1072

S. P. E.
Building

Radio-Active Sampling

0310

1412 85

3

Downgraded to
UNCLASSIFIEDSampling and Laboratory Requirements in Future Trials

I refer to our discussions on these subjects, which are best considered together.

1. With regard to the provision of site laboratories, the choices are:
 - (a) to conduct all or part of the analyses at Coldea;
 - (b) to use L.R.W.E. Salisbury again;
 - (c) to do all or part at A.W.R.E. Aldermaston.

The governing factor in the radiochemical determination of efficiency - for the present type of weapon - is the necessity of determining neptunium-239 and certain primary fission indicators of half-life 12-67 hours. Reasonably reliable measurements could be made on some of these even if the start of analysis were delayed until, say, D + 7. However, while therefore in theory the determination could be carried out in the second week from burst, there are essential subsidiary and ancillary measurements which are best begun at the earliest time, as well as practical considerations which lead to the same conclusion. The former include:

- (a) investigations of the condensation of fission products and trans-uranics from the cloud, and the variation of this with conditions of burst;
- (b) the allied question of the homogeneity of the sampled cloud with respect to these elements;
- (c) the distribution of certain light elements if these should be used: in other words, to establish the validity of the final result by confirming that a fair sample was taken.

If samples were to be sent to U.K., practical considerations include

- (a) an assessment of their integrity before dispatch; and
- (b) the necessity of doubling their dispatch to ensure safe delivery.

Thus, at Totem II, the first sample delivered was of little or no use for efficiency determination, and, if in a future event a similar sample were sent to U.K. as the only one available, a fortnight and much valuable information would be lost.

Therefore, bearing in mind the likely possibility of entirely unforeseen factors arising in future trials, I am satisfied that the following proposal gives the maximum cover at least cost, viz. That provision would be made for a small number of chemists at Coldea, who would deal with the problems enumerated above, and that other samples, assessed by them, be sent to A.W.R.E. Aldermaston for all other measurements; these would be despatched by some reasonably expeditious method without any exotic special arrangements being made. A "small number", depending on the number of bursts, would be from 4 to 6 chemists, say, plus a similar number of assistants.

The discussions we held with RAF/AWRE indicate that if the air dispatch of samples to U.K. by any other means than commercial lines were considered, the cost of even two such flights would counterbalance the cost of BL4. It would be advisable, however, to get from RAF/AWRE an estimate of the cost (of delivery only) of the recent "Aconite" sample to clarify this point: about 60% of these arrived in very satisfactory condition.

[REDACTED]

2. Similar considerations apply to air sampling. From past trials, I believe the most satisfactory general sample is one taken from the cloud at a time 15-30 minutes which probably involves piloted aircraft with a ceiling of >30,000 feet. This is the method most likely to be adopted for general use. For the next trial, at least, however, we should like to take advantage of any arrangements made for flights by pilotless aircraft at times \approx 3 minutes, without now requesting this as a routine commitment. (In addition, we should sample at times in the region 5-10 seconds, if this can be simply done (e.g. by rockets close in), as well as the previous normal collection of dirt).

3. I suggest that, following our discussions with H.P.B. and RAF/AWRE, close and continuing collaboration be maintained, not only to reduce the number of flights, but also to ensure that full advantage is taken of any ad hoc flights made for other purposes.

[REDACTED]

[REDACTED]
A. W. R. E.
Aldermaston.
30th June 1954.
FM/DH

c. c. [REDACTED] (for S. S. T. D.)
S. S. T. D.
[REDACTED] RAF/AWRE
S. H. P.
File

[Redacted]

28/1/55

28 Jul

Inward Telegram to Commonwealth Relations Office

FROM U.K. HIGH COMMISSIONER IN AUSTRALIA

[Redacted]

21/1/55

D: Canberra 14.18 hours 17th July 1954
R: 08.15 hours 17th July 1954

CYPRER

NO. 511 SECRET

Your telegram No. 77 Saving.

DOWNGRADED TO
UNCLASSIFIED
MOD 6/12

ATOMIC TESTS

If initiator tests prove necessary Australian authorities will be likely to approve holding of them in Australia but they would first like to have data about weapon effects so that they can study safety aspects. Check will be made by [Redacted] Defence Scientific Adviser and Australians suggest that required information should be given to him in London where he will be assisting [Redacted] and [Redacted] between 25th July and 19th August in discussions on nuclear physics research.

2. As regards site Australian authorities are inclined to prefer Emu Field which will be required for "Red Rapier". Camp site, air strip, storage and other facilities reopened for "Red Rapier" could be kept in readiness for initiator tests and site is considered suitable. Grateful for observations on this alternative suggestion.

Copy to:-

C.R.O.
Dept. of Atomic Energy
(Treasury Chambers)

[Redacted]

ALLOTTED TO DEFENCE DEPT.

[Redacted]
18-2-85

Copies sent to [Redacted]

22/7/54

1075

MAC/COPY

Killers
0242 Ua



Inward Telegram to Commonwealth Relations Office

FROM U.K. HIGH COMMISSIONER IN AUSTRALIA

D: Canberra 14.18 hours 17th July 1954
R: 08.15 hours 17th July 1954

DOWNGRADED TO
UNCLASSIFIED
MOD 2/61

CYPHER

No. 511



25/1/85



18-2-85

Your telegram No. 77 Saving.

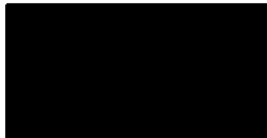
ATOMIC TESTS

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Copy to:-

C.R.O.
Dept. of Atomic Energy
(Treasury Chambers)



ALLOTTED TO DEFENCE DEPT.

DOMINGRADES TO

AF/CMS 39/66/PE 1

NOTES ON THE ORGANISATION OF OPERATION "HURRICANE"
AND "TOTEM"

The following notes describe the events that occurred before the two British atomic bomb experiments were carried out.

2. The first experiment took place in October 1952 at the Montebello Islands; it was known by the codeword "Hurricane".

3. The second experiment took place in October 1953 on the Australian Guided Missile Range near Woomera; it was known by the codeword "Totem".

Operation "Hurricane"

4. In August 1949, the Ministry of Supply submitted a paper to the Chiefs of Staff on the subject of the trials of our first atomic weapon, asking for the Chiefs of Staff to decide the nature of the trials. In September 1949, the Chiefs of Staff referred the paper to the D.R.P. Sub-Committee on Strategic Aspects of Atomic Energy for their views in consultation with the Ministry of Supply. In July 1950, the Sub-Committee under the chairmanship of [REDACTED] (R.A.F. representatives were Air Vice-Marshal [REDACTED] were persuaded that the trials should be framed to indicate the effect of clandestine use of atomic weapons concealed in a merchant ship. A suitable site was found in the Montebello Islands and eventually on this basis the Admiralty were made responsible for the planning and execution of the whole Operation. A planning staff was formed at the Admiralty under Admiral Torlesse in April 1951. The R.A.F. representative on the Executive Committee was [REDACTED] D.D.Ops.(A.T.) whose function appears to have been to organise the air transport side of the operation.

5. It seems that it was not until January 1952 that the Air Ministry considered participating in the operation. D. of Weapons discussed with [REDACTED] and C.A.E. the possibility of testing aircraft at Montebello.

6. After discussions, it was decided that because of the location of the test site the limited size of the expedition and the fact that the facilities were all pretty well saturated by commitments from the other Services and Government Departments the Air Ministry requirements would have to be kept to a minimum. However, after discussion with the R.A.F., M.O.S. and [REDACTED]

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██████████ proposals for the inclusion of tests on aircraft components were formulated and C.A.E. agreed on 12th February 1952 to their inclusion in the Hurricane programme.

7. In the event the following aircraft components were positioned at various distances on the site to discover the effects of an atomic explosion on aircraft on the ground:-

- (a) 6 Spitfire wings
- (b) 6 Spitfire tailplanes
- (c) The rear section of a Lancaster fuselage
- (d) Two Lancaster outer wings.

8. A member of the Structures Department at the R.A.E. went as a member of the expedition and assessed the effects of the explosion on the test ^{Bases} bases. This was the only specific R.A.F. trial that took place, though of course much information of value to the R.A.F. was obtained by other departments taking part in the Operation.

Discussion

9. As "Hurricane" was the first British atomic explosion, it is evident that the emphasis was placed on exploding the bomb successfully and measuring results; any other trials took second place and were only to be done if they did not hinder the main experiment.

10. Montebello was an unsatisfactory site for the R.A.F. as it was not possible to fly Drone aircraft in the vicinity nor was it possible to take large or heavy items of equipment ashore.

11. It is not clear why R.A.F. representation at the experiment was so small; it may have been due to the fact that ██████████ insisted that only a minimum of people should go and the R.A.F. respected this in view of the fact that the R.A.F. experiments were small in comparison with the others. On the other hand, it would have been fitting if a senior R.A.F. officer and a member of S.A.A.M. staff had attended, especially as the R.A.F. are to be the users of the weapon and it was ⁱⁿ the R.A.F. team who actually prepared and assembled the bomb before it was fired.



Operation "Totem"

12. In January 1953, a meeting was held by D.R.P.C. Sub-Committee on the Strategic Aspects of Atomic Energy to consider what tests the Services might wish to have included in future atomic weapon trials.

13. The R.A.F. put forward a very comprehensive list of tests they required doing including the effects of an atomic explosion on an airfield and on an aircraft in flight.

14. At the meeting - [redacted] was in the chair and the Air Ministry was represented by A.C.A.S. (Ops.) and S.A.A.M. - it was doubtful if more comprehensive tests could be done than had already been carried out at Montebello. In any case, his own staff would be fully occupied with their own work and if other tests were to be included in the trial those interested would have to arrange for additional scientists to be present.

15. In the light of [redacted] remarks the Services were invited to reconsider their requirements.

16. In February 1953, an Executive Committee under the chairmanship of [redacted] was set up to coordinate and discuss technical and administrative connected with "Totem". The Air Ministry were represented on the Committee by members of Operations and S.A.A.M. staffs.

16. At a meeting on 16th February 1953 the much reduced R.A.F. requirements which were broadly to test the vulnerability of aircraft on the ground (8 complete aircraft were to be used); tests of simple earth ramparts were agreed in principle; one assessor from the R.A.E. would be required. Later it was agreed that a R.A.F. medical team would sample the atomic cloud from the air.

17. In the event 6 Mustang aircraft were placed in position and the R.A.E. assessor did not go because of the limited accommodation available and Farnborough's reluctance to lose his services for the period of the trial.

/The

The assessor's work was undertaken by other members of the expedition but the reports they brought back were very scanty and of little use to the R.A.F. The cloud sampling tests done by the R.A.F. medical team were satisfactory.

Discussion

18. Operation "Totem" suffered from the same disadvantage as "Hurricane" in that the site was unsuitable as many trials required by the R.A.F. could not be done because of the difficulty of getting equipment to the site and the small numbers allowed on the expedition.

19. The failure to send a competent scientific observer from the R.A.F. resulted in a loss of information on one of the two major R.A.F. trials.

Conclusions

20. (a) The primary purpose of both tests was to collect information for the benefit of A.N.R.E.; trials required by other ^{agencies} agents were only incidental and were not allowed to interfere with the main experiment.

(b) The R.A.F. was unable to get all the information it required from the two tests because of the unsuitability of the trial sites.

(c) The R.A.F. did not get the full benefit from these limited trials because of the failure to insist on a suitable representative being present.

Recommendations

21. The following recommendations are made.

(a) The location of the site for future trials should be so selected that all trials required by the R.A.F. can be carried out.

(b) Future trials should be planned sufficiently far ahead so that if necessary extensive preparatory work can be done on the site.

(c) In future trials, more emphasis should be placed on the requirement of the services; if necessary more than one bomb should be exploded.

(d) The R.A.F. should insist on adequate representation at any future trials.

26th July, 1954

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Table of contents

1. The two previous static bomb tests known as "Air Force" and "Force" were not entirely satisfactory to the Royal Air Force because, firstly, the sites chosen produced certain experiments being done which would have yielded valuable information and, secondly, the Royal Air Force were inadequately represented with the results in information which could have been obtained was not recorded.
2. Primary for the next table is already in hand by and, although our main interest is centered on the test of the 1,000 lb. F.4. bomb, we must take the opportunity of pointing out in addition of general interest to the Air Staff.
3. As far as my own table is concerned, I recommend that a committee be set up within the Air Ministry not to consider what is required by the service, the two fields of interest and the experiments concerned with the results are listed below.

(a) Operations

Operations
Am. Eng.
C.I.F.
C.I.F.

(b) Operations

Operations
Am. Eng.
Operation 1 Requirements -

(c) Effects

Operations
C.I.F.
C.I.F.

(d) Training

Operations
Am. Eng.

(e) Logistics

Operations
Movements

1081

[REDACTED]

Thus, although it is preferable for acquiring and maintaining all kinds of weapons and equipment within the Air Ministry, operations have the greatest interest in the tests and I recommend that a representative at a higher level than that Department be nominated Chairman of the Committee which should include in the first instance representatives from the following departments:-

- (a) (C. S.)
- (b)
- (c)
- (d)

Other members could be accepted as required. The Chairman of the Air Ministry Committee could then represent the Air Force on the C. S. Committee which will be required to seek the Cabinet approval is given to hold the trials.

I should be grateful for your concurrence.

[REDACTED]

21st July 1954

. (C. S.)

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- (b) We should be most appreciative if Australian Government would agree in principle to holding of further series of weapon trials in Australia in April or May 1956 and would again extend their co-operation.
- (c) Since necessity for atomic weapon trials is likely to continue for ten years or so, we should like to consider in consultation with Australian Government whether it is desirable in interests of efficiency and economy to establish a proving ground of more permanent nature than has existed hitherto.
- (d) The choice of site would seem to be between Enu Field and a new site at Maralinga. Our experts consider that under suitable meteorological conditions Maralinga would provide an adequate margin of safety for bursts of atomic weapons of somewhat higher power than those used in previous trials.
- (e) The power of the atomic repeat atomic weapons to be tested and the meteorological conditions suitable for the tests will be subject to prior agreement with the Australian Government. It should be made quite clear that there will be no question of testing hydrogen weapons.
- (f) Over choice of site we would wish to be guided by Australian Government, who are in best position to assess local factors and would, we are sure, seek the most economical solution.
- (g) We shall, of course, be dependent on Australia for much help in provision of works and services. We hope that provision of required facilities can be undertaken as a joint project. We fully appreciate many other calls upon Australian resources and the precise apportionment of costs would be a matter for negotiation taking due account of other commitments.
- (h) We should like to have Australian views on this proposal as soon as possible with view to reaching agreement in principle between the two Governments including apportionment of responsibilities and costs.
- (i) Subject to such agreement, we would hope that detailed planning on the construction of the proving ground and the conduct of the 1956 trials could start without delay.
- (j) So far as United Kingdom is concerned it has been decided that administrative responsibility for the project should rest with the Minister of Supply. The Ministry of Supply will refer technical questions as necessary to the United Kingdom Department of Atomic Energy.
- (k) You may, if necessary, inform the Australians that the rumour in [redacted] letter J.743/2 of 1st March that proving ground might be located in Canada is unfounded. We do not regard Canada as suitable site owing to climatic conditions in uninhabited areas.

89/72/011

[REDACTED]

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Buffalex(54)P.1

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 Tory (DEF.55/56/15) should be passed to Prime Minister's Department.

B. C.R.O. Telegram No. 634 dated 29.7.1954

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)

[REDACTED]

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Buffalo: Biological Measurements
Use of Live Animals

At its third meeting on May 17th, Buffalex discussed a programme of experiments submitted by MRC/MRC, involving the use of animals. These were described in Paragraph 2 of a note (Buffalex (55) P/3) prepared by the Chairman; and required:-

- (a) The ingestion of fission products by sheep.
- (b) The detection of fall-out, if any, on neighbouring sheep stations and the collection of samples.
- (c) The exposure of live animals to blast.

The executive agreed that, item 2(b) could probably be included without operational difficulty by linking it with the Continental survey, although discretion on the purpose of the investigation would be necessary.

It referred items 2(a) and 2(c) to the Trials Planning Sub-Committee responsible for Biological measurements and asked for a statement of the practicability of conducting such experiments.

A preliminary meeting was held between representatives of M.R.C., A.R.C., and A.W.R.E., on May 19th to discuss details of 2(a) and a full meeting of the Biological Sub-Committee, under Chairmanship of [redacted] was held on May 27th at which the War Office representatives included [redacted] of Birmingham University.

The following is a brief statement of the experiments required, and an indication of how they might be conducted without prejudice to the main purpose of the trials:-

1. Ingestion Experiments.

- (a) The essential feature of the experiment is that sheep can be fed on live grasses on which fall-out has been deposited.
- (b) It is not possible to simulate this aspect of an atomic explosion by the scattering of radioactive materials over pasture land.
- (c) In order that the grasses should have fall-out of a particle size small enough to be profitably investigated, the grasses exposed must be down wind of the explosion.
- (d) Suitable conditions for the experiment should arise from a ground burst explosion and, therefore, the experiment would be carried out on Round 2, thus relieving the target response programme on Round 1.
- (e) Since the direction of fall-out cannot be estimated until a few hours before firing, a prohibitively wide arc of naturally growing pasture would be required and, therefore, the only practicable approach is by the use of trays of grasses disposed within the most probable fall-out sector.
- (f) This method limits the number of sheep that can be grazed. The minimum number that can be usefully employed is considered to be 3 plus 3 controls.

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042100

VICE DIRECTOR'S OFFICE,

[REDACTED] 28/1/85
[REDACTED] 3/1/85

Ref: 343/7/54/V

30th July, 1954

Dear [REDACTED]

KITTEWS TRIALS

I gather from [REDACTED] that you are handling this matter during his leave.

I attach a draft reply concurred in by [REDACTED] and [REDACTED] but assume you will wish to clear it with [REDACTED] and M.O.S. (C.A.W.) before asking C.R.O. to despatch.

Perhaps the reference to "recent proposals for Maralinga" mean that this telegram should be TOP SECRET. C.R.O. can best advise on this.

Yours sincerely,

[REDACTED]

(Retd.)

[REDACTED]

Department of Atomic Energy,
St. Giles Court,
London, W.C.2.

E.R.

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DRAFT

21/1/55

31/1/55

Initiator tests have been discussed by [redacted] with [redacted]
[redacted] who is satisfied that they will present no difficulties from
safety and contamination aspects.

As to choice of site it is not clear whether our recent proposals
for Maralinga site will alter Australian preference for Emu. We can
do trials at either site provided logistic and civil engineering
support is available. In this connection we prefer whichever site
is already in occupation and thus has these facilities. If neither
site is so occupied our preference would be for Maralinga area so
that more use could be made of wheel transport (e.g. caravans for
instrumentation).

Decision whether or not these tests will be required cannot be
given for a week or so.

30th July, 1954

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JULY, 1954

ES FEB 1954

DEPARTMENT OF ATOMIC ENERGY

GENERAL NOTICE NO. /54

PROJECT HEALTH COMMITTEE

422 II
Health Committee Report

1. Introduction

The Executive have decided to establish a Project Health Committee as a Committee of the Authority.

2. Terms of Reference

It has been agreed that the terms of reference of the new committee should be:-

- (i) to consider the effects on public and occupational health and safety of the programmes of the Authority and to advise the Executive thereon,
- (ii) to identify research problems on which work is required in relation to the control of health hazards in the development of atomic energy,
- (iii) to co-ordinate the medical and health physics work in various Establishments of the Authority, and to discuss this with medical and biological consultants.

3. Membership

The Chairman of the new Committee will be [redacted] and the Secretary will be [redacted] of the Health Physics Division, Harwell. The following have agreed to be members:-

[Large redacted area]

4. Meetings

It is not expected that the Committee will need to meet more often than two or three times a year, but more frequent meetings of a Technical Sub-Committee may be necessary. The first meeting will probably be held in London.

5. Further information may be obtained from [redacted] Health Physics Division, Building 364, A.E.R.E. Harwell, Didcot, Berks. (Telephone Abingdon 620, Ext. 2886).

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422 II
Health Committees
papers etc.

To the Project Health Committee

FHC/PL

UNITED KINGDOM ATOMIC ENERGY AUTHORITY

ATOMIC WEAPONS RESEARCH ESTABLISHMENT

Preliminary Report on the work of the Medical and Health Physics Branch at A.W.R.E. Aldermaston

I. Medical Division.

The Medical Division at A.W.R.E. was set up in August 1951, on a full time basis in a temporary building, with a nucleus of four Harwell trained staff. It is now housed in a permanent building and the present staff consists of a Principal Medical Officer, one medical officer (a further medical officer is expected early in 1955), five state registered nurses, two laboratory technicians and one radiographer, clerical staff etc.

The principal medical functions are:-

- (a) Supervision from a preventive aspect of the health of:-
 1. Personnel handling relatively large amounts of mainly emitting radioactive substances, both long and short lived.
 2. Personnel engaged in work with conventional explosives, such as RDX, TNT, Baratol etc.
 3. Personnel working in laboratories associated with these main projects.
 4. Personnel in ancillary services, such as, engineering, electronics etc.
- (b) Advice on the health aspects of potentially hazardous substances likely to be used in the future.
- (c) The day to day treatment of injuries and illness occurring at work.

It is considered advisable to have a basic picture of the health of all employees on entering and a system of pre-employment medical examinations has been set up. It was recognised from the beginning however, that routine annual examinations were time-consuming and unnecessary in many cases. It is the practice therefore, to re-examine annually only those whose work or state of general health warrants this procedure. Others may be examined for special health reasons at two yearly intervals and the majority at five yearly intervals.

The pre-employment medical examination consists of a very full history, clinical examination, chest x-ray, blood examination and urinary analysis, and as a result, an employee may be found fit, or fit with specified limitations. Very few persons have been rejected on medical grounds since in a growing establishment, it is relatively easy to place persons with medical or other disability without embarrassment to the establishment. The results of this policy have been found to be sound in practice.

All employees receive an annual check x-ray and this has been found of value in detecting early disease among the younger staff. Routine check x-ray examination is an accepted policy in the services and major industries.

The extreme care in design of plant and the rigid discipline in the observance of the Health Physics regulations, have made work with radioactive material probably safer than other work being carried out at A.W.R.E. Bio-assay for radioactive material in urine has been carried out by the Health Physics branch (plutonium and polonium) and by the Medical Division (uranium). In the case of plutonium, one person only has shown a urinary figure indicating more than the permissible body burden. All others are consistently well below this figure. With polonium, three persons have shown relatively high urinary figures which can be traced to specific incidents. These latter cases are not considered however, to constitute more than minor injuries and no detectable ill effects are expected. With uranium, routine fortnightly urinary analyses have always been below the limits of accurate detection.

[REDACTED]

rooms and shoe-changing barriers. Liquid effluent is similarly divided into Active Effluent, which comes from Active areas and may have various degrees of activity, and Non-Active or Sewage Effluent, which comes only from Non-active areas and should have no activity whatsoever. Ventilation systems are designed to carry all air-borne activity away from the operators and to discharge it through a vent or stack. The height of the stack and the degree of filtration in the system are based on the calculated resultant activity around the site from estimated possible releases at some point in the system. There is a close liaison between the Health Physics staff, the User Scientists and the Engineering staff throughout the planning, construction and testing periods.

3. When the building is completed and taken into use, the day-to-day control of activity begins. This is achieved by advising the scientific staff on the precautions which should be taken and by various check measurements to ensure that these precautions are sufficient. Routine measurements which are made regularly include the following:-

- (a) Film Badges. Although the β/γ dose is a very limited hazard in the work at Aldermaston, Film Badges are routinely issued to all personnel going into Active areas in the course of their work. They are issued fortnightly and about 700 are dealt with in each period. Running records of individual cumulative dose are maintained and in addition to the fortnightly reports, a quarterly summary report is issued.
- (b) Area Surveys. These are done mainly by means of smear testing and are so planned that a spot check of typical places in all areas is made each week. About 1000 smears are taken and evaluated weekly and the results reported to the scientists in charge of the laboratories.
- (c) Air Sampling. All the major stacks are monitored continuously, and the principle laboratory areas are monitored during the 8-hour working period. The samples in both cases are evaluated daily. In addition to these samples which are taken by installed samplers, special tests are made where necessary by portable samplers. Some 200 samples are taken each week.
- (d) Urine Sampling. The frequency of this sampling depends on the nature of the individual's work. Those whose contact is greatest are sampled monthly, others three-monthly and those with only occasional contact are sampled six-monthly. About 60 samples are taken and assayed per week.

4. Close touch is maintained with work in progress by means of Health Physics Surveyors who are attached to all Active areas. These are Industrial staff who have been carefully selected and trained so that, in addition to normal survey duties, they are able to give useful advice on precautions to be taken. They are capable of summing up a situation and while relieving the Health Physics scientific staff of a number of minor queries, are able to present them with an accurate picture in those cases where the surveyor himself is unable to give a decision.

5. In order to supplement the formal regulations for handling radioactive materials which were issued at an early stage, a number of informal lectures on radiological safety have been given from time to time and have been attended by some 500 personnel of all grades. Recently a simplified explanatory manual on General Radiation Safety has been prepared and issued to all personnel working in Active areas. It is felt that these efforts to explain the underlying principle of protection have contributed very largely to the helpful and co-operative attitude which the Health Physics Branch meets with in carrying out its work.

6. The disposal of active solid waste and of liquid effluent is the joint responsibility of the Engineering and the Health Physics Branches. Solid waste is sealed and checked in the laboratories and then handed over to the Engineering Branch who store it and concrete it for disposal. When ready for disposal the concrete block is checked for gamma dose-rate and for freedom from external contamination. Surveyors travel with the consignments to deal with any contingency which may arise on the journey.

[REDACTED]

8. As indicated above, a large number of practical problems of varying degrees of complexity have to be dealt with and it may be worth while to give a few examples of these.

- (a) High levels of surface contamination and of air-borne activity were occasionally found and this was traced to heavy contamination of transfer boxes through which materials enter and leave a dry box. This was cured by renewing all transfer boxes and introducing a drill whereby all articles leaving the very active dry-box were wrapped in clean cellophane bags. This simple measure cured the spread of contamination.
- (b) The penetration of polonium through dry-box gloves has resulted in persistent contamination of hands. Advice has been given on improvement of handling techniques so as to avoid as far as possible direct contact by the gloves with high activity. These improvements have reduced the penetration considerably but have not eliminated it. Further work is in hand to improve the glove material.
- (c) High levels of activity were observed in the "frog-man" changing area. This was associated with heavy contamination in the working area and, as the two areas are only separated by an air flow, it was first suspected that this was inadequate, particularly since the "frog-men" had been carefully washed and monitored until all removable activity had gone. However, air-sampling in a series of locations during the transit and undressing processes showed that the activity in the dressing area was in fact coming from the suits. It was concluded that the handling and stretching of the rubber was releasing the activity which had resisted washing. To prevent this the washed and dried suits were sprayed with a glycerine solution so as to hold the active material during undressing. This has proved to be completely successful.
- (d) Faulty construction in a building resulted in highly active washing water penetrating into the service basement where it spread in a thin film over a large area. Decontamination was very difficult and prolonged and since the original defect could not be quickly cured and repetition of the occurrence could not be avoided with certainty, it was decided to divide the floor into a number of sections, each about a yard square, by means of low cills. The contamination is now limited to a few of the sections and is much more readily cleaned up. This device is being applied to all buildings where such an occurrence could cause trouble.

9. In conclusion it may be said that, due in a large part to the ready co-operation of the scientific and engineering staff, the methods adopted and developed by experience have proved themselves flexible and simple in operation. In spite of the large quantities of active materials which have been used in processes previously untried in this country there has been no major shut down and such minor spills as have occurred have involved stoppages for a few hours at most. The results to date indicate that full protection has been given both to the operating staff and to the general public without any significant restriction in the work of the Establishment.

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[REDACTED]

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[REDACTED]

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UNCLASSIFIED

Buffalex(54)P.1

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

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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 29.7.1954

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.

[REDACTED]

/(b)

1093

[REDACTED]

- (b) We should be most appreciative if Australian Government would agree in principle to holding of further series of weapon trials in Australia in April or May 1956 and would again extend their co-operation.
- (c) Since necessity for atomic weapon trials is likely to continue for ten years or so, we should like to consider in consultation with Australian Government whether it is desirable in interests of efficiency and economy to establish a proving ground of more permanent nature than has existed hitherto.
- (d) The choice of site would seem to be between Enu Field and a new site at Maralinga. Our experts consider that under suitable meteorological conditions Maralinga would provide an adequate margin of safety for bursts of atomic weapons of somewhat higher power than those used in previous trials.
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Buffalo Trials Arrangements - Papers +
Correspondence, 1952-54

From: [REDACTED]

0228 Ia

To: [REDACTED]

4th August, 1954

Trials Planning

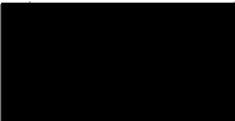
29/11/85

It is inevitable that some points, connected with planning the next series of trials should cross my mind during discussions and deliberations on our commitments. No doubt they have occurred to you as well but I feel that there may be some advantage in putting them down on paper as they occur so that they are not overlooked when the appropriate stage of the planning is reached. The things which appear to need emphasis at the moment are these:-

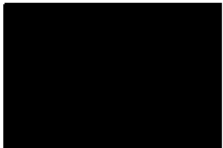
1. For the first time we are embarked on a trial which has a fair number of "bangs" and this fact coupled with the somewhat depressing met. probability means that we are likely to spend a great deal of time at the site unless we plan the trial in such a way as to minimise delays in all ways. In particular I feel that the whole duration of one operation should be limited to a time of about 6 hours so that we can snatch the first suitable met. condition which comes along without having to go through an unwieldy sequence of preparations. The trial should be laid out so that it is possible to carry out preparations and tests for at least 2 of the explosions at any one time.

It is very likely that we will strike a period similar to that which occurred before Totem I during which the met. conditions are consistently unfavourable. A normal "stand-by" routine must be evolved for such periods and the matter of staff moral cannot be emphasised too strongly. I suggest that one of your staff should be nominated to function as a welfare officer and that we should discuss with the Australian Mission, when they arrive, the facilities which can be extended from Commonwealth sources. In addition to the obvious things such as reading material, gramophone records, games facilities, I suggest that we set up a reasonably good radio receiving station and some form of crude rediffusion. This would avoid a multiplicity of improvised radio sets working off inadequate aeriels etc. and could insure that the best reception practicable in the area could be achieved.

2. The live drop is likely to present some novel problems. It will be essential that we carry out the live drop in the same approximate target area as the static explosions, because our aeriels, cameras etc. will already be trained on that area. In planning the live drop I feel that we must assume that the weapon will fire on impact, that is we take the most pessimistic view and assume that the radar fuses will fail to function (my apologies to S.L.W. for this suggestion). The implications of this are obvious enough. Should such an unfortunate thing happen, the contamination will be severe, ground shock will be greater and a number of other undesirable consequences are likely to occur. The live drop presents another problem; the R.A.F. will certainly ask for a number of practice drops to establish their aim and ballistic performance and this they will probably do with small bombs weighing a few hundred pounds. In addition it will be necessary for us to have a few drops of a complete F4 weapon in order to check our telemetry system and the synchronisation of the limited amount of ground equipment involved in the trial. The problem that will arise is the synchronisation of these practice drops, with the activities connected with the static bursts, which they can either be carried out before or between the static bursts, which will imply clearing the field during the practices and running the risk of damage to installations, cables etc., or they can be fitted in after the last static burst which is likely to lead to a long time interval before the live drop takes place. A further alternative is to carry out the practice drops in the region beyond the static trial area but sufficiently close for telemetry and photographic checks to be made. The practicability of this is governed partially by the radio and optical problems involved and, to a much greater extent, by the nature of the terrain of the whole trials area.



3. Items 1 and 2 above only serve to emphasize the importance of communications and transport. If, as is suggested, preparations are to proceed for 2 trials simultaneously there is likely to be an extra burden on transport and we should give some consideration to providing an additional intercommunication net so that test activities can proceed on the two trials independently up to a point. As far as is possible the equipment used in the trial should be common to all the explosions and the amount of equipment which has to be expendable should be kept to a minimum.



9/9/54

5 AUG 1954

[Redacted]

[Redacted]

DECLASSIFIED

Permanent Proving Ground 0171 Id

INWARD TELEGRAM TO COMMONWEALTH RELATIONS OFFICE

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA.

D: Canberra 19.05 hours 4th August 1954
R: 11.55 hours 4th August 1954

CYPHER

No. 563

[Redacted]

DOWNGRADED TO UNCLASSIFIED MOD 2/19

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 sub paragraph (k) of your telegram No. 634 and scotch any suggestion that we had been thinking of Canada as an alternative.

B-2-85

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.

Copy to:-

- C.R.O.
- M/Supply (First Avenue House)
- " (Castlewood House)
- Atomic Energy Authority
- M/Defence

[Redacted]

ALLOTTED TO DEFENCE DEPT.

SJK. 56 FEB 1955

0242 14

REFERENCES TO

UNCLASIFIED

FINANCE 2,

[REDACTED]

1582

FIN/63/1

[REDACTED]

, 1954.

Dear [REDACTED]

C.R.O. Signal 631 was an acknowledgment of Canberra Signal 511. We have now agreed a draft full reply with the Lord President's Office and with Ministry of Supply in the following terms:

" Proposed Initiator tests have been discussed by [REDACTED] with [REDACTED] who is satisfied that they will present no difficulties from safety and contamination aspects.

As to choice of site it is not clear whether our recent proposals for Maralinga site will alter Australian preference for Emu. We can do trials at either site provided logistic and civil engineering support is available. For this reason we prefer whichever site is already in occupation and thus has these facilities. If neither site is so occupied our preference would be for Maralinga area so that more use could be made of wheel transport (e.g. caravans for instrumentation).

Decision whether or not these tests will be required

[REDACTED]

Commonwealth Relations Office,
Downing Street,
S.W.1.

/cannot

cc. [REDACTED]

~~SECRET~~

cannot be given for a week or so."

In view of the reference to Maralinga you may wish to upgrade this letter and the signal when sent to

[REDACTED]

Yours sincerely,

[REDACTED]

COPY/DC

0242 1a

28/1/85

Copy 8A

OUTWARD TELEGRAM FROM COMMONWEALTH RELATIONS OFFICE

TO: U.K. HIGH COMMISSIONER IN AUSTRALIA

(Sent 17.20 hours 6th August 1954)

CYPHER

NO: 668 TOP SECRET

My No. 631

DOWNGRADED TO
UNCLASSIFIED

MOD 6/11

ATOMIC TESTS

Proposed initiator tests have been discussed by [redacted] with [redacted] who is satisfied that they will present no difficulties from safety and contamination aspects.

2. As to choice of site it is not clear whether our recent proposals for Maralinga site will alter Australian preference for Emu. We can do trials at either site provided logistic and civil engineering support is available. For this reason we prefer whichever site is already in occupation and thus has these facilities. If neither site is so occupied our preference would be for Maralinga area so that more use could be made of wheel transport (e.g. caravans for instrumentation).

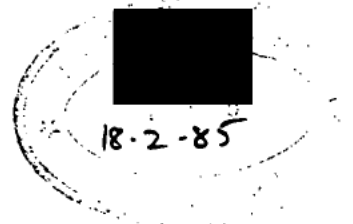
3. Decision whether these tests will be required cannot be given for a week or so.

Copy to:-

C.R.O.
Atomic Energy Authority
(St.Giles Court)



DEFENCE DEPT.
DEF. 55/56/15



DOWNGRADGD TO

UNCLASSIFIED

0421a

United Kingdom Atomic Energy Authority,
Weapons Group,
Aldermaston,
Berkshire.



13th August, 1954. E

Ref. 12/B/14

[Redacted]

28/1/85

[Redacted]

3/1/85

Dear [Redacted]

We have gone over our programme of "Kittens" and finally decided that we really must do the trials next March or April in Australia. Can you therefore please arrange to have the following signal sent through the C.R.C. to the U.K. High Commissioner for onward transmission to the Australian authorities:-

- (1) REFERENCE PARA. 3 OF MY NO. 666 THE DECISION IS THAT INITIATOR TESTS WILL BE REQUIRED IN AUSTRALIA.
- (2) AGREED AUSTRALIAN AGREEMENT WE NEED TO KNOW THEIR OPINION BETWEEN MARALINGA AND RMI.
- (3) PROPOSED DATE IS MARCH OR APRIL 1955 AND NUMBER OF TECHNICAL STAFF ABOUT 12.
- (4) IF MARALINGA IS CHOSEN AUSTRALIAN SUPPORT IS REQUIRED ONLY ON LOGISTIC ASPECT AND COMMON USE CIVIL ENGINEERING FACILITIES NOT COMPETING WITH REQUIREMENTS FOR PERMANENT RANGE WHICH INCLUDES KITTENS SITE. IF RMI IS CHOSEN SOME CONSTRUCTION WOULD IN ADDITION BE REQUESTED FROM AUSTRALIA.
- (5) DETAILED REQUIREMENTS COULD BE DISCUSSED WITH AUSTRALIAN MISSION WHICH WE HOPE WILL VISIT U.K. SHORTLY TO DISCUSS "WELL BE REQUIREMENTS FOR MOVING SECURED."

Yours sincerely,

[Redacted signature block]

U.K. Atomic Energy Authority,
St. Giles Court,
London, W.C.2.

Copy

[Redacted]

1100

DOWNGRADED TO O24210

L 10

UNCLASSIFIED

28/1/85

Ref: 20/8/52

th August, 1952

31/1/85

[Redacted]

Details

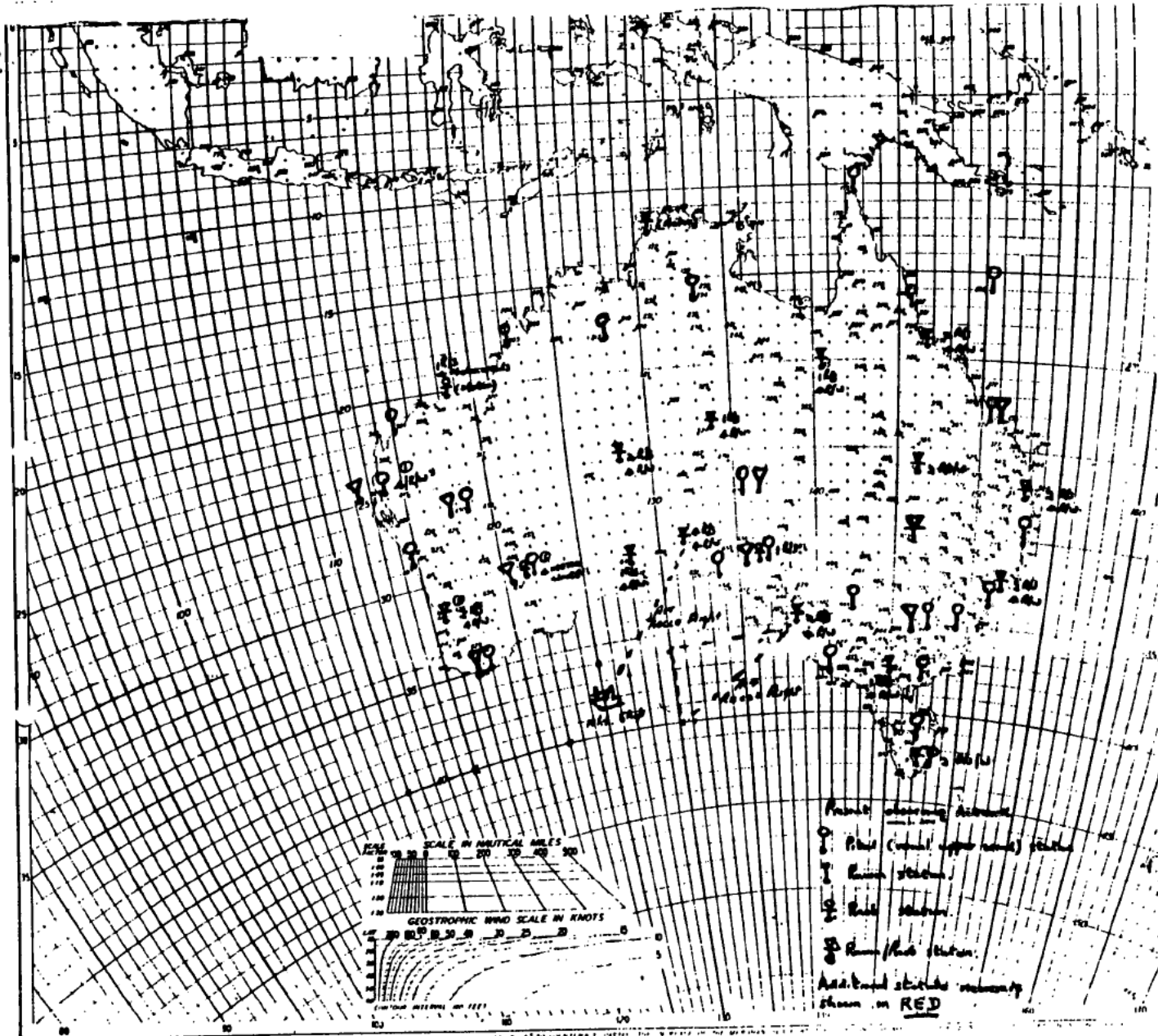
(1) We have found it necessary to request "Kittens" trials in Australia early in 1955. A copy of a signal which I have asked to be sent to J.K. High Commissioner for onward transmission to the Australian Authorities is attached.

(2) Although this is an occasion when we propose the use of the site for small scale trials of our own it can probably be very useful in rehearsing the arrangements now under consideration for major trials. We should be very glad to have your co-operation with our Trials Division in the relevant administrative aspects arising in the mounting and execution of the trial.

Director/A. [Redacted]

Copy. [Redacted]

map



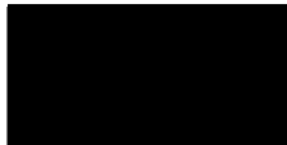
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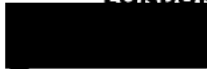
19/8/54

02421a



FIRST AVENUE HOUSE,
25/1/66 HIGH HOLBORN,
LONDON, W.C.1.

627



3/1/85

COMMUNICATED TO

17th August, 1954.

Telephone No.:
CHANCERY 6898

UNCLASSIFIED

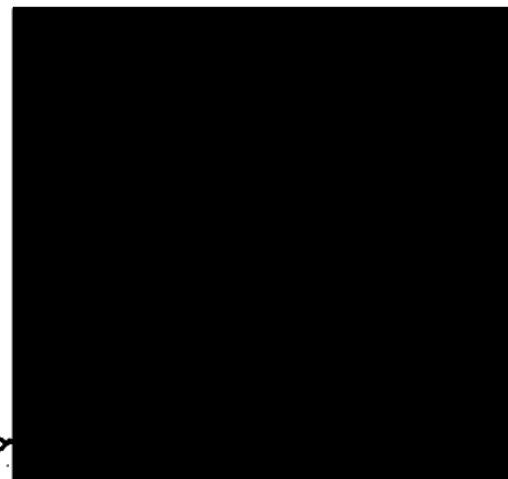


MINISTRY OF DEFENCE

D.A.W.R.E.

I shall be very pleased to do what I can to help in the preparations for the "Kittens" trials which you intend to hold next year and to which you refer in your 20/8/54 dated 13th August.

I note that the proposed date is March or April 1955. This means that there is no prospect of the health control vehicle to which reference was made by your S.S.T.D. at a recent meeting with D.G.F.V. being ready in time for these "Kittens" trials.



0242 12

11/8/54

UNITED KINGDOM ATOMIC ENERGY AUTHORITY,

Call

[Redacted]

Copy to

[Redacted]

3/1/55

Downgraded to
UNCLASSIFIED

[Redacted]

28/1/80

17th August, 1954

Dear

[Redacted]

Would you please arrange for the following cable to be sent to the U.K. High Commissioner for onward transmission to the Australian Authorities:-

1. Reference para. 3 of my No. 468 the decision is that initiator test will be required in Australia.
2. Assuming Australian agreement we need to know their choice between Maralinga and Emu.
3. Proposed date is March or April 1955 and number of technical staff about 12.
4. If Maralinga is chosen Australian support is required only on logistic aspect and common use civil engineering facilities not conflicting with requirements for permanent range which includes Mitten's site. If Emu is chosen some construction would in addition be requested from Australia.

* should it be chosen ~

[Redacted]

Commonwealth Relations Office,
Downing Street,
LONDON, S.W.1.

5. Detailed requirements could be discussed with Australian Mission which he hopes will visit U.S. shortly to discuss whole requirements for proving ground."

Yours sincerely,

P.S. 

KITTENS

Operational Planning

First Statement

1. Introduction

The Director has instructed that a series of Kittens Trials should be carried out as soon as possible. A signal has been sent to the Australian Authorities asking that facilities be made available in March/April, 1955, for a technical group of about 12 staff to carry out the trials. A reply has not yet been received and it is not yet known whether Emu or Maralinga will be offered.

If Maralinga is offered, the Kittens firing area will be that proposed in the plan for the permanent range. The structures required for the permanent Kittens site would probably not be ready in time, and temporary accommodation will need to be provided by the use of simple structures such as Nissen huts. Mobile recording labs at present being fitted out in the U.K. can, however, be used at this site.

If Emu is offered, use can no doubt be made of the Totem base camp and suitable firing sites chosen conveniently near. Mobile recording huts would then need to be provided by the Australians on site.

Detailed requirements for the Kittens expedition as outlined below are to be discussed during the forthcoming talks with the Australians about the construction of the permanent range at Maralinga. It is probable that representatives of the Trials Division will visit Australia for these talks, and that S.E.M. will be represented by [redacted]

2. Date and Duration of the Trials

A maximum of 12 rounds will be fired over a period of about three months. It is anticipated that the expedition will be on site not later than April 1st, 1955.

3. Staff

The Trials Superintendent will be [redacted] S.E.M., who will have charge of four teams totalling 14 staff recruited as follows:-

<u>Team</u>	<u>Duty</u>	<u>Staff</u>
KR	Functioning of the radio-active system	6 from S.E.M.
KX	Functioning of the explosives system	4 from S.F.R.
KP	Health Physics and Radiation Measurements	3 from S.H.P.
KT	Trials Administration	1 from S.P.T.

In addition to whatever logistic support is considered necessary by the Australians to maintain an expedition of this nature, a task force of 10 men will be required for technical assistance throughout the trial.

4. Site Requirements if at Maralinga

4.1 Base Camp

Living accommodation for 15 U.K. staff, plus hatted or tented accommodation for progress meetings, report writing, etc.

4.2 Forward Laboratories

A schedule of temporary accommodation showing layout, power, etc., is being prepared as an appendix to this statement. It presumes that none of the Kittens laboratory area as specified for the permanent range will be complete by April 1st, 1955.

The temporary requirements are to the following scale:

- (a) Magazine: half Nissen (18' x 16') with concrete floor.
- (b) R.A. storage: " " " " " "
- (c) Laboratory: 1 Nissen (36' x 16') suitably sub-divided.
- (d) Health Physics: 1 Nissen (36' x 16') suitably sub-divided.
- (e) Security and safety check lodge and mess hut: 1 Nissen (36' x 16') suitably sub-divided.

Since the chosen site is likely to be about 20 miles from the Base camp, lunching facilities will need to be provided.

4.3 Firing Site

The network of firing sites as planned for the permanent range (Site Plan SP/7) will be required, including the flank pilot lanes for subsequent trials.

Apart from mobile recording laboratories ex U.K., no other accommodation is required in this area.

5. Site Requirements if at Emu

5.1 Domestic and Technical

It is assumed that, should Emu be chosen for the Kittens firings, domestic and technical accommodation, on the lines indicated in paras. 4.1 and 4.2, can (with the exception of the Health Physics requirement) be provided from the Totem base camp.

5.2 Firing Sites

A pattern of firing sites as described in para. 4.3 will be required at about four miles from the Base camp. It is suggested that it be positioned in the bush at the north-west corner of the airstrip, with the Health Physics unit on the edge of the airstrip.

If it is not possible to take to Emu overland the U.K. mobile labs planned for Maralinga, then three mobile recording huts similar to those provided at Totem will be required at the site.

6. Roads

The roads from the Base camp to the forward laboratories, firing sites and within the network of firing sites, should be at least graded. The two flank pilot lanes parallel to the firing sites pattern need be only bulldozed.

7. Power

7.1 Stabilised Power

Six of the Coventry Climax 6 KVA generators, ex U.K., used at Totem and now with L.R.W.S. for overhaul and storage, will be required at the Kittens site.

7.2 Unstabilised Power.

One 10-20 KVA generator, trailer mounted, to feed two cooling units in the firing area.

One 25 KVA generator, static, to feed one cooling unit in the Base area and to provide general purpose power.

Both these generators to be provided by Australia. —

8. Cooling Plant

Three air cooling units are required:

Two mounted on a trailer to feed 2 mobile recording laboratories drawn up on either side of it.

One, static, to feed the magazine Nissen in the laboratory area.

One water cooler (Kelvinator) will be required to provide $1\frac{1}{2}$ gallons of water at 65° daily for photographic and other purposes.

9. Water

Distilled water for photographic purposes: 20 gallons a week

Raw water for Health Physics purposes and general domestic use at the laboratory area: 250 gallons a week.

Drinking water (25 men estimated): 200 gallons a week

10. Transport

The following is required at all times operational:

5 light trucks of the Landrover type.

1 three-ton, four-wheeled drive lorry. 100% used for first two weeks, 20% subsequently.

1 five-ton mobile crane with jib of about 20 ft.

3 ten-ton trailers to take mobile labs 16' long, 8' wide, 7 $\frac{1}{2}$ ' high.

2 trailers. One for mobile generator, one for mobile air cooling plant.

11. Communications

11.1 Local

(a) Telephone link between Base camp, forward laboratories and firing sites.

(b) VHF radio, ex U.K., between forward laboratories, firing site and two Revolvers for Health Physics survey. This to be obtained and maintained by S.E.M.

(c) Walkie Talkie radios to be supplied by S.E.M.

11.2 Site to U.K.

Provision must be made for the Trials Superintendent to exchange classified messages directly with S.S.T.D. It is presumed that this will be done:

- [REDACTED]
- (a) Site to Woomera - written message in clear by aircraft or local W/T cypher.
 - (b) Woomera to Melbourne - L.R.M.E. teletype cypher.
 - (c) Melbourne to Castlewood House - teletype cypher.
 - (d) Castlewood House to L.R.M.E. - written message in clear.

So that this service may be provided with existing facilities, and to avoid setting up a special cypher office at site, the message will need to be transcribed at Woomera, Melbourne and Castlewood House.

S.F.T. will arrange through C...7.

12. Technical Task Force

1 NOC and 1 man for cable laying, generator maintenance and other technical duties.

1 man for security and safety check point.

5 general service, one to operate W/T.

2 drivers.

13. Seaborne Stores

13.1 Quantities ex U.K.

General scientific stores: 28 tons

3 mobile labs: 7½ tons

2 charge assembly huts: 1 ton

13.2 Assembly

S.E.M. stores (code KR), S.H.P. stores (code KP) and S.P.T. stores (code KT) will be assembled at the Trials Division Store, Aldermaston, and S.F.R. stores (code KX) will be assembled at the Foulness store, for packing by the nominated contracting firm.

13.3 Packing

It has been positively said by all Groups concerned that only a standard of packing set by L&P contractors in past trials will be acceptable. Arrangements have therefore been made for a contract to be placed with this firm for packing the stores, at the two assembly points, on a continuing basis over the next few months. The contract should require that the method of packing allows for easy and sound re-packing by non-specialist staff.

13.4 Inventories

Coding, addressing, inventories, customs clearance, etc., will be dealt with by [REDACTED] after he has arranged for receipt and storage in Australia and has obtained the address to which the stores should be despatched. He will make arrangements for the return of any stores on the same basis.

13.5 Sailing Dates

The majority of stores should be ready for packing by mid-November. All should be packed by mid-December and ready for despatch on January 1st, 1955.

13.6 Benzene

[redacted] will make arrangements with Mr. Martin for the special despatch of benzene early in November.

13.7 Overseas Storage

[redacted] will try to arrange that all stores are held at a suitable storehouse at Salisbury or Woomera and are forwarded to site only a few days prior to the arrival of the Kittens Party. He will also arrange that adequate storage is made available for storing any equipment that can be left in Australia during inter-trial periods. To facilitate these arrangements he will ask for a named person to be made responsible at each of the receiving centres, including site, for receiving and routing Kittens stores.

14. Airborne Stores

14.1 Quantities ex U.K.

Packed H.E.: 10 cwt.

Packed R.A.: 10 cwt.

14.2 Flight Arrangements

Two flights are required, each taking half the R.A. and H.E. load. Each flight will have an R.A.F. escort and a scientific escort. Suggested departure dates for each flight are March 21st and April 7th, 1955.

[redacted] will arrange for Transport Command to provide the two flights from Lynham to Woomera via the Red Route with the condition that, apart from the escorts, no passengers may be carried. He will also arrange with R.A.F. for the onward transport of the H.E. and R.A. from Woomera to site by air. He will provide the two R.A.F. escorts who will escort the load through to site and then return. He will also look into the possibility of having an R.A.F. officer nominated for liaison between the Scientific Superintendent and R.A.F.

The Scientific Superintendent of the Kittens Trials will provide the scientific escorts.

Separate arrangements will be made through [redacted] for the return of R.A. items if any.

15. Safety

15.1 Explosive packing

[redacted] (S.F.R.) will be responsible for ensuring that all regulations governing safety of explosives are observed in the packaging of explosives for air travel.

15.2 R.A. Packing

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

15.3 Air Safety Instructions

[redacted] after consultation with S.E.M., S.H.P. and [redacted] will arrange for instructions to be issued to

Captains of the Transport Command aircraft on the actions to be taken in the event of mishaps en route. He will arrange that the same instructions are issued to R.A.A.F. Captains taking the stores from Woomera to site.

Instructions to the scientific escorts will be written by S.H.F./SE..

15.5 Range Safety

- (a) While the Kittens Group is on site, the Trials Superintendent (S.E.M.) is at all times responsible for R.A.A.F. and explosives safety.
- (b) Regulations governing radiation safety during the expedition will be written by S.H.F. for issue by the scientific Superintendent.
- (c) These will include regulations subsequently to be issued by the O/C construction forces, after the Kittens expedition has left the site, forbidding entry into an area to be defined by the Trials Superintendent.
- (d) The site will be cleared of all explosives before the Kittens party departs (arrangements will be made by [redacted] with the Australians for a supply of L.T. detonators).
- (e) 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 [redacted]. S.E.M. will provide him with provisional return dates to be confirmed by signal with at least 3 weeks notice, and will provide scientific escorts.

16. Meteorological Data

In order to keep some measure of control on contamination, to ensure that it falls within the permitted arcs laid down for the range, and in particular to avoid contaminating proposed living quarters, recording sites and test areas, certain meteorological information will be necessary. A statement of wind structure up to about 1,000 feet up to the time of firing will be required. For this no more than visual theodolite tracking of a balloon would appear to be necessary, and it may be possible to meet this requirement by asking the Australian Meteorological Service to attach a junior meteorological officer to the Trials Superintendent. A 24-hour forecast of wind structure up to 1,000 feet will also be of assistance if this could be provided without installing elaborate facilities on site.

17. Future Trials

Provision must be made against the possibility of a further series of Kittens firings in late 1955. S.E.M. accepts that since future firing sites will be within the area into which he will have advised the O/C construction forces to prohibit entry, further firing sites cannot be prepared until the Kittens party have arrived at the range and surveyed the flank pilot lanes for contamination.

The Australian Authorities will be asked to have a further 6 Coventry Climax generators ready for a Kittens trial series in 1955.

18. Administrative Arrangements

18.1 Pay and Allowances

[redacted] will obtain a directive about pay and allowances for staff working in the Maralinga range. These are at present under consideration by the London Office; it was presumed that they would be on the same scale as for the Totem expedition.

[REDACTED]

18.2 Clothing

Members of the expedition would themselves obtain working overalls, etc. from official sources.

[REDACTED] will arrange for a clothing allowance, which would presumably be on the same scale as Tatum.

18.3 Passport and Medical Services

During December 1954 [REDACTED] will obtain from members of the Kittens expedition their passports, and make all necessary arrangements for visas, etc. He will also inform the P.M.O. now of the names of the staff involved so that the P.M.O. can make all necessary arrangements for medical certificates and inoculations.

18.4 Air Bookings

[REDACTED] will arrange air bookings direct from London to Melbourne at a date to be decided by S.B.M., and will arrange with the appropriate authorities for reception at Melbourne and onward flights to site.

18.5 Classified Documents

[REDACTED] will determine the best way of passing classified documents between U.K. and site.

18.6 Local Purchases

[REDACTED] will make arrangements for the purchase of stores at Melbourne or Adelaide, and for them to be forwarded to the nominated stores representative at site.

18.7 Personal Mail

[REDACTED] will find out how personal mail should be addressed.

5 FEB 1985

[REDACTED]

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8/1/85

E.1/A.25.

[REDACTED]

[REDACTED]

25/1/85

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WIRE PAGES DIAGRAMS

[REDACTED]

[REDACTED]

Initiator Trials

A request has been sent to Australia to provide range facilities for initiator trials in 1955. No reply has yet been received but as regards any action which should be taken now in order to mount the trials, it should be assumed that they will be held.

S.E.M. will be responsible for the organisation and execution of the scientific aspects of the trials.

S.S.T.D. will be responsible for all administrative arrangements, which will link with the proposals for the permanent range for major trials.

S.S.T.D. is, therefore, requested to co-ordinate the preparations for the trials in consultation with S.E.M. and any other Branches concerned.

cc [REDACTED]

[REDACTED]

Room 113,
Building [REDACTED]
Aldermaston

[REDACTED]

2/9/54.

5 FEB 1985

[REDACTED]

Downgraded to

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WIRE PAGES / DIAGRAMS

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[REDACTED]

Initiator Trials

A request has been sent to Australia to provide range facilities for initiator trials in 1955. No reply has yet been received but as regards any action which should be taken now in order to mount the trials, it should be assumed that they will be held.

S.E.M. will be responsible for the organisation and execution of the scientific aspects of the trials.

S.S.T.D. will be responsible for all administrative arrangements, which will link with the proposals for the permanent range for major trials.

S.S.T.D. is, therefore, requested to co-ordinate the preparations for the trials in consultation with S.E.M. and any other Branches concerned.

cc [REDACTED]

[REDACTED]

C.S.O.

Room 113
Building [REDACTED]
Aldermaston

[REDACTED]

2/9/54.

THIEME

76/4en/9305

folio 42A

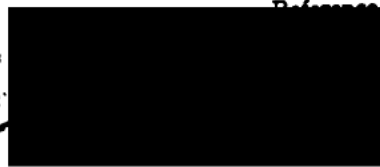
3 pages

Downgraded to

513/85

DIS

9 SEP 1954
W.A. OFF



LM to 86/Research/875

42A
56/16

R.A.C.M

1. We attach herewith copy of a report on the radio activity of the Centurion tank by the Commonwealth X-Ray and Radium Laboratory, University of Melbourne. R.A.E.M.E. will now be able to commence their stripping and inspection of this vehicle and a report on this will follow in due course.

2. You will notice that the report states that "the material remaining (at 26th July, 1954) could be ingested into the body with some effect". Actually a check by the Radiological Hazards Group on 1st November, 1953 showed that this activity did not constitute any hazard. A whole body radiation check of [redacted] who worked on the tank during and after this time, showed that no effects could be observed due to the activity from ingested material.



Science 1
M.B. Ext: 1112.
7 September, 1954.

Copy to:- 86/Research/986

ORAC.	
GSO. 1	
GSO. 2	
RO. 3	



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(1989)
JCS Ltd
Gp734/210
(REGIMITE)
Code S-55-0

in reply
please quote: 1220

COMMONWEALTH X-RAY AND RADIUM
LABORATORY, University of Melbourne

3rd August 1954.

REPORT ON TESTS FOR RADIOACTIVITY MADE ON AN ARMY VEHICLE
AT PUCKAPUNYAL, 26/7/54

Introduction

The vehicle was a Centurion tank (No 169041) which had been in close proximity to the explosion of an atomic weapon some eight months previously. At the request of [REDACTED] RAEME, tests for residual radioactivity were made on this vehicle on the morning of Monday, 26/7/54.

Preliminary Survey

A survey of the whole vehicle was made with a portable radiation monitor responsive to both beta and gamma radiations. This showed that some radioactivity was present, the principal radiation appearing to be beta rays. The activity was found on surfaces both inside and outside the body, but was rather higher on the outside. In general, it was greatest where surface dust and mud had collected to some depth in cracks indicating that the activity was associated with deposits on the surface rather than in induced radioactivity in the metal.

Further Tests

Sensitive x-ray film was fixed firmly against various parts of the body and left for periods of at least 90 minutes. Samples of mud were taken from areas where the activity was relatively intense and other areas which are apparently clean were wiped with paper.

Results of Tests

The x-ray film on development showed no definite evidence of having been affected by radiation.

Assay of the mud and wiping paper carried out with sensitive Geiger counters in the Laboratory showed that the radioactive contamination was associated with deposits on the surface of the tank, the activity being due mainly, if not entirely, to beta rays of energy less than 1.5 MeV. This is consistent with the contamination being due to fission products arising from an incident several months ago, the activity remaining being due to products of relatively long life. The average degree of contamination was responsible for approximately 300 counts per minute with counts in excess of that where the deposit of mud was heavier.

It was not possible to make tests underneath the turret ring where a deposit of radioactive material may be encountered.

Decontamination

Although the present activity of the vehicle does not present any hazard to personnel in the vicinity, the material remaining could be ingested into the body with some effect. It is recommended therefore that the surfaces should be thoroughly cleaned before any mechanical work is done on the vehicle. The simplest decontamination procedure, probably sufficient for the present case, would be to wash the outside with a fire hose to remove all dust and mud, special attention being paid to cracks and cavities. It is not considered that the degree of contamination would require the use of live steam, detergents, or wet sandblasting.

To clean the inside of the vehicle dust could be removed with a vacuum cleaner or removed by local swabbing. The contents of the vacuum cleaner and any swabs used should be buried.

[REDACTED]

Personnel carrying out the decontamination should not be permitted to eat, drink, or smoke until their surface clothing had been removed and their hands and faces thoroughly washed, in particular the nails cleansed with a scrubbing brush. Overalls used during the decontamination should be thoroughly washed separately from other garments before again being worn.

It is not considered that the present degree of contamination is serious, but its removal can serve as useful training.

[REDACTED]

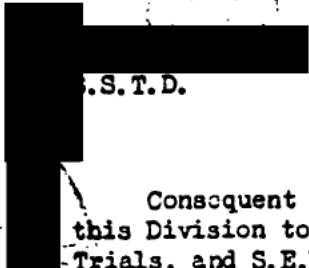
Director.

Test by J. F. R.

[REDACTED]

DOWNGRADED TO

Copy No. 1 of 20 Copies



SECRET



1/1/54
3/1/54

S.T.D.

Kittens

Consequent on C.S.O's directive K.1./A.26 of 2/9/54 in which he instructed this Division to be responsible for operational arrangements for the Kittens Trials, and S.E.M. to be responsible for the scientific conduct, a meeting was called on your behalf on 9/9/54 to obtain requirements from those concerned, and so to formulate the initial operational statement attached.

Action on some of the items listed, particularly booking for air freight, is being held back until a favourable reply is received from the Australians. Action on others will necessarily depend on discussions with the Australians.

The following attended the meeting:



- (SHP)
- SEM
- (SFR)
- (SEM)
- R.F./WRE
- (SPT)
- (SEM)
- (SPT)
- (SEM)
- (SPT)
- (SFR)
- SPT (Chairman)

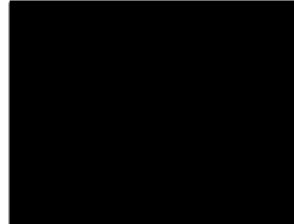
S.E.M. has obtained the ruling that this project must be regarded as Top Secret until UK -Australia negotiations are completed when it will become Confidential.



S.P.T.

A.W.R.E.,
Aldermaston, Berks.
16th September, 1954.

c.c. V.D./A.W.R.E.
 C.S.O.
 S.S.M.D.
 S.E.M.
 S.F.R.
 S.H.P.
 S.L.T.



- (SEM)
- (SFR)
- (SHP)
- (SPT)
- (SPT)

R.F./WRE

0242 la

1118



Buffalo Trials Arrangements; - Papers +
Correspondence, 1954. C228 10

S.S.M.D.
Building A1.2

29/1/55

Subject : Protective Clothing for future trials


1. It is now clear that U.S.A.D. expects protective clothing at future trials to be provided from this Branch. The question of quantities required can only be settled by consultation between S.P.T., and myself in the fulness of time, however, it is possible to begin now the choice and development of suitable clothing for such trials. T40
2. A meeting of all the interested parties was held in [redacted] on 28th June, 1954, at this meeting, which was attended by SC/EM, it was agreed that the most suitable branch to undertake the development of the clothing would be SC/EM. I am therefore giving this request for SC/EM to undertake the development and choice, in consultation with me, of suitable protective clothing for use at Trials held in tropical desert country.
3. (a) The items requiring development will be:-
 - (i) A protective suit and hood
 - (ii) Suitable gauntlet gloves
 - (i) for delicate work
 - (ii) for heavy work.
 - (iii) Respirators and anti-dim ointments.(b) Items which can be chosen from existing commercial patterns are:-
 - (i) Socks
 - (ii) Boots and overshoes
 - (iii) (a) Lightweight combination underwear
 - (b) Winter weight combination underwear.
 - (iv) Absorbent neckcloths
 - (v) Laboratory clothing.
4. All the above work must be completed early enough to allow manufacturers ample time to guarantee delivery to Aldermaston by 1st November 1955.
5. After SC/EM has completed the work shown above, I will in consultation with S.P.T. and SC/EM decide the quantities required. To enable me to do this I shall need from S.P.T. a statement of the following:-
 - (a) Total A.W.R.E., other U.K., and Commonwealth, Scientific Staff involved together with labour force attached to the Scientific staff.
 - (b) Tasks to be carried out by the various groups involving work in, or near, expected contamination areas and in Active Labs. and Active Areas.
 - (c) An estimate of the man hours work required on each task, and of the number of days over which it can be spread.
 - (d) Numbers of staff engaged on the above tasks, having in mind the sole use of 1 member of each team as a Health Escort.
 - (e) Priorities of the tasks.
 - (f) Times by which tasks must be completed if this is important.
6. When quantities have been estimated orders will be placed through A.D. (Contracts) [redacted] for delivery to A. R. S. by 1st November, 1955.
7. The prototype equipment, or samples of existing designs, should be inspected and approved by both SC/EM and myself in consultation with the Stores Technical Adviser. Thereafter the Stores Technical Adviser, with such assistance as he may require, will carry out inspection in the normal way, except that in a new design S.P.T. and SC/EM should also inspect and approve the first 50 items manufactured.

/S. I

3. I shall be grateful if you will request SC/EM to undertake the above work on my behalf.

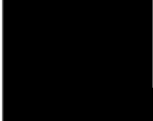


S. H. P.

Building 
A.F.R.E., Aldermaston,
3rd September, 1954.
HEG/1729(c)

c.c. S.S.T.D. ✓
SC/EM
S.P.T.
E.O (Contracts)
Stores Technical Advisor

Your attention is drawn to para. 5 above
Your attention is drawn to para. 6 above
Your attention is drawn to para. 7 above

 H.P.B.
H.P.B.
H.P.B.
H.P.B.

CIA/JG.

56

Totem planning.
0261 XII e.

22/1/85

24/1/81

TRC/A.54.

DOWNGRADED TO

20th September, 1954.

(S.A./A.C.),
Science 1,
War Office,
Whitehall,
London, S.W.1.

Dear

Your Figure I for your Totem reports gives three curves, one for blast and two for heat effects produced by a nominal weapon at 2,000 feet. These appear to be based on the information given in "The Effects of Atomic Weapons". I understand that at the Washington Conference it was established that although the shape of the blast curve is correct, the actual values correspond with a significantly higher value than 20 K.T. I presume that you have access to the reports of the Conference and you may wish to modify the curve.

All best wishes.

Yours

Copy to

1121

4. L.S.Ops. (C) agreed that a meeting of this nature was essential and that his Department urgently required information on earth shock effects similar to the list prepared by Ops. (C) 3. As the instrumentation needed for the recording of earth shock was considerable he felt that we must insist on getting all we can and not be sidetracked into avoiding the issue by C... One of the major items to be considered was earth shock against a runway and he suggested that a scaled runway might be a possibility, but that difficulties would be encountered due to the type of earth between the runway and the explosion and that on which the runway was laid out as this was not a true representation of the type of earth to be encountered in Asia. He stated that he was meeting a representative of ... to discuss this point and would members of the results.

5. L.S.Ops. (C) and L.S.Ops. (C) both said that this must not stop the ... from laying out a runway for testing and that we must insist on it in the face of all opposition from C... After further discussion it was decided that a runway 100 yds x 50 yds. with an ... of 100 should be asked for and that ... should be requested to work out how much actual material would be required to construct a runway of this size and whether it would be a true representation.

6. L.S.Ops. (C) asked whether it would be possible to lay out ring main facilities and storage tanks and L.S.Ops. (C) thought that if he had full information on earth shock effects it should not be difficult to work out damage criteria for these two items. As a fuel storage tank had a number of compartments L.S.Ops. (C) asked whether it would not be possible to test only one of these compartments to obtain full information. Similarly, only a section of ring main piping need be laid out if ... could supply the information as to how much would be required.

7. L.S.Ops. (C) also asked if fighter aircraft blast pens could be tested and L.S.Ops. (C) explained that if the pens had no roof to them the blast effect would be greater than that encountered with no protection at all. L.S.Ops. (C) asked if plans were finalised for the building of these pens, to which the reply was no, but plans for dispersal areas with appropriate buildings had been finalised. It was decided that a fighter pen plus blast walls and a building containing equipment should be added to the list of requirements and if anything had to be deleted by C..., the blast walls could go.

8. It was generally agreed that a radar or radio vehicle plusserials should be laid out, but that a check should be made with R... first to see if they could erect a scale model of a Type 80 serial onto this vehicle.

9. C.R. 19 stated that his main requirements were figures for aircraft safety, but L.S.Ops. (C) said that he understood that the R... would be flying Queen Bees and Jindiviks in the areas and we would be able to obtain our information from them. C.R. 19 have been asked if specially painted metal panels could be laid out to note the various effects of thermal flash. This was agreed.

[REDACTED] said that he was mainly interested in the actual airdrop and the workings of the aircraft equipment, but he thought that it would be useful if a guided weapon and some associated equipment could be placed in the fighter dispersal area. This was agreed.

See
833A

11. C.M.E. were worried about the cracking of aircraft canopies and it was agreed that canopies of various types of modern aircraft should be laid out, some curtained to determine the thermal effects against them. ...C.M.E. suggested that we went a step further and pressurised small cockpits and canopies and even put some filters in them. This was agreed.

12. After discussion it was agreed that no useful information could be gained by laying out obsolescent aircraft.

13. ...C.M.E. asked if an underground operational centre could be constructed for the test, but it was pointed out that the Home Office were conducting shelter tests and, as with ring mains, if ...C.M.E. had the earth shock information, damage criteria to underground buildings could be worked out.

14. C.M.E. (Recco.) said that as we were dealing with larger items to be laid out on the ground, this was not the time to raise his requirements which were for the installations of camera and H2S sets into aircraft to see if photographs were blurred and whether atomic clouds showed up on the screen, together with other details on which the whole future of the Reconnaissance Force depended. He agreed to bring the matter up again at a future meeting. At the same time he asked if information with regard to the cracking up of the ... runway had been obtained from either the Americans or the Ministry of Supply. ...C.M.E. said that he had not come across this information, but would contact someone in the Ministry of Supply in an effort to obtain it.

15. The question of whether the airdrop should be carried out using a visual compass or by ground controlled radar was briefly discussed and it was decided to leave this point until a later date. Similarly, the number of R.A.F. personnel to take part in the trials, including air and ground crews, would be discussed later.

16. Before the meeting closed at 12.25 hours it was decided to include in the preliminary list to C.A.W. "various small items of equipment" which would allow the R.A.F. to submit a detailed list of these items at a future date. This list was to include all items of equipment required to be tested by the various Departments represented at the meeting.

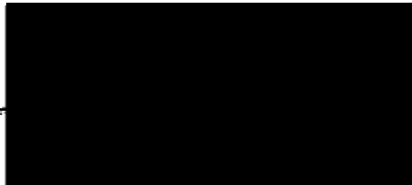
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UNCLASSIFIED

02 MAR 1985

E.R.



So. 2/436.

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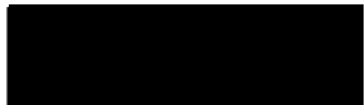
A.C.A.S. (Ops) ✓
A.C.A.S. (O.R.)



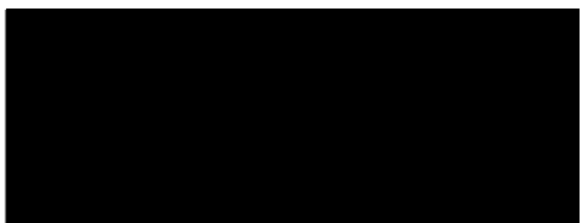
Operation Totem

I pass for your information and retention an Interim Summary of Trials Results obtained by the Army Equipment Group in Operation Totem. It will no doubt appear later as a formal Totem Report.

27th September 1954



A.S.A. (O)



AF/CMS-39/64 pt 1

So. 2/429

R

F.R.

A.G.A.S. (Ops)
A.G.A.S. (O.R.)
C.M.E. Bullologist

Atomic Weapons Effects: Tripartite Conference
February 1954

Please find attached one copy for retention of the thirteenth paper received as a result of the above Conference. It is entitled "Medical Aspects of Atomic Warfare".

May I remind you please of the special security conditions attaching to these papers.

28th September 1954

A.S.A. (O)

On information available this document is unlocatable. We approached the USA sources but they couldn't help either.

5/2/54

Copy

1126



Totem planning
0261 XII e

DOWNGRADED TO

36/res/1047



25 September, 1954.



24/1/81

Dear

Thank you for your letter TRC/A.54 dated 20 September 54.

The Figure 1 I produced for the Totem Reports was indeed based on the information given in "The Effects of Atomic Weapons". I used this information because as this book is unclassified there is no difficulty about security. In addition, many people in the War Office are only familiar with the 20 kilo-ton weapon and need to equate over-pressures and heat doses to relevant distances from ground zero of such a weapon burst at 2,000ft.

I have had access to the reports of the Washington Conference and presume you refer to Dr. Scoville's presentation on Air Blast (Slide 2). However, as I understand it from reading paragraph 3 of [redacted] notes on this presentation the curves in Slide 2 refer to Nevada tests at which precursors were found. Thus, although the side on over-pressures were significantly lower for a scaled 20 kilo-ton the drag forces at any particular over-pressure were greater and the damage done greater. I have not yet had the opportunity to check how this would balance out but I assume provisionally that the curve I have given as Figure 1 still applies to a nominal 20 kilo-ton burst over cities or in conditions where a precursor would not be formed.

I was proposing to retain this curve as

- (a) I assume it is still correct for non-precursor conditions.

/(b)

[redacted]
United Kingdom Atomic Energy Authority,
Atomic Weapons Research Establishment,
Aldermaston, Berkshire.

~~SECRET~~

(b) If we put in a new curve which shows the over-pressures to be significantly lower, and which must be based on information received under ~~SECRET~~ ~~US~~ ~~AND~~ ~~ONLY~~ classification, it may be difficult to circulate my Total Reports on their present security grading. Perhaps you would like to let me have your views.

Incidentally, the heat curves also are being modified by a Washington Conference letter, but I have allowed for this to a certain extent by giving two of them!

With best wishes.

Yours

cc to:

[Redacted] (Retd.),
United Kingdom Atomic Energy Authority,
Atomic Weapons Research Establishment,
Fort Halstead,
Nr. Sevenoaks, Kent.

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TO

T2

UNCLASSIFIED

28/1/85

2/1/85

Telephone Number:- Reading 0060 Int. 243

Health Physics Branch
Building
A.R.E.,
Aldermaston.

1st October, 1954.

Dear

A "KIBBENS" Trial is to be held in the Spring of next year. I have nominated you to be a member of the staff of the trial.

[redacted] S.M.L. will be the Superintendent of the trial, which is expected to last for about 3 months. The party will it is anticipated leave the U.K. in mid March 1955.

The following staff from this Branch have been nominated as members of the Trial staff.

[redacted]

- Health Physics Adviser
- For Health Physics Duty
- Nuclear Instrumentation

[redacted] will be the senior S.H.P. officer present and will be responsible to the Trial Superintendant for the work of the above officers.

All administrative arrangements are being made by S.P.T. who will inform you of them in due course.

Will you please let me know at once if you have any reasons for not wishing to take part in the Trial and will you please inform me immediately in the event of any circumstances arising which might prevent you from taking part.

Yours sincerely

[redacted signature]

Superintendent Health Physics

Distribute to all officers named above.

Copies for info. to S.S.H.D., S.S.T.D., S.E.H., S.P.T.

0242 1a

1129

Record of a meeting held in Building [redacted] on 30th September 1954 to discuss air sampling from aircraft and aerial surveys at [redacted] trials.

11/2/84

T4c L 3/1

1. The following were present:-

Chairman [redacted]

[redacted]
RMP/ARS
RMP/ARS (Attached GIP)

Radio - Active
Sampling
OSIZ

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[redacted]

(part time)

2. [redacted] stated that approval for cloud sampling in the first six hours after burst was likely to be given. [redacted] stated that as far as he was concerned he had received approval to go ahead with planning for this requirement. [redacted] stated that he would undertake to get any further confirmation that he needed.
3. [redacted] stated that an early sample was essential. He had requested unguided rockets to obtain a very early sample. [redacted] pressed for a definition of the importance of the various early samples. [redacted] replied that the very early sample, say in the first three minutes, was highly desirable but not absolutely essential. A sample not later than twenty minutes was vital. [redacted] stated that he would prefer a sample earlier than twenty minutes, but that the rocket technique was unsuitable. The twenty minute sample was acceptable failing anything earlier. [redacted] stated that the twenty minute sample would best be obtained by piloted Canberra aircraft. He expected that a trained RMP sampling Flight would be available. [redacted] said it was most desirable to photograph the approach of the twenty minute sampling aircraft towards the cloud up to entry from a second aircraft.
4. [redacted] stated that the cloud sampling task should not cause the crew to receive more than the Trial Higher Integrated Dose. The aircrew who did the twenty minute sampling would therefore not be available for later sampling. [redacted] agreed and added that the RMP accepted that the aircraft would become contaminated. The six hour sampling requirement would be made by a different aircrew and the requirement would be combined with an eight-hour Air Ministry sampling requirement.
5. [redacted] asked if extra personnel would be required at base to handle the aircraft. [redacted] replied that only a small party, not more than thirty, would be required at [redacted] airstrip, at which final briefing would be done.
6. [redacted] asked where the aircraft would be decontaminated. [redacted] stated that only preliminary decontamination would be done at [redacted]. Further work would be done on the Australian RMP base or, as perhaps in the case of engines, in U.K. In reply to a query by [redacted] stated that there was planning provision for personnel decontamination facilities at the airstrip.
7. [redacted] stated that he was waiting for final authority for the Trial before he could settle details of flight procedure, because these would require an approach to the RMP.
8. [redacted] stated that the Australians might possibly wish to use the Jindivik drone. [redacted] stated that if the Australians operated Jindiviks very early he would wish to instal a simple integrating dosimeter of about 10 lbs. weight. [redacted] stated that his equipment would weigh about 60 lbs. A camera for photographing the approach to the cloud might also be desirable. [redacted] considered that it would be preferable to photograph the Jindivik's approach from a Canberra. [redacted] stated that, to avoid radio interference, launch of the Jindivik, or at least control in the active area, would have to be delayed until after burst. [redacted] stated that the Jindivik would require a forward flying control and landing at the air strip would have to be fully controllable. The

- Jindivik payload was about 200 lbs. and its endurance approximately one hour. [redacted] stated that his need did not justify the considerable operational complexity of the Jindivik, but he wanted to ensure that if for any reason Jindiviks were used his claim should not be overlooked. [redacted] said that this was also his view.
9. [redacted] pointed out the importance of the general mechanical arrangements. Easy detachability was essential. He suggested quick release wing tip filter nozzles. The filters would have front doors and would be readily removable from the outside casing. [redacted] stated that he thought [redacted] should accept responsibility for sponsoring the design of a standard airborne filter and its external casing. [redacted] agreed.
10. [redacted] stated that [redacted] would be responsible for co-ordinating all requirements of the Radiological Measurements Group. This would include air sampling and integrated dose measurements. [redacted] stated that he would require for dose measurement some apparatus inside the aircraft fuselage connected to an external thin walled chamber. He wanted the best obtainable all round symmetry. [redacted] pointed out that the chamber would have to be located at an aerodynamic stagnant point.
11. Cloud tracking, as distinct from radiation measurement within the cloud, was necessary to protect civil aviation. There was some doubt about the responsibility for determining the cloud track. [redacted] stated that the Air Ministry might be interested in this requirement and he undertook to investigate. [redacted] stated that if the cloud tracking involved aircraft he would like to take the opportunity to make measurements.
12. Possibilities of dyeing the cloud were discussed but dismissed as not feasible.
13. [redacted] stated that an aerial survey of ground contamination (fall-out) which must overlap the all ground survey was a requirement. Additionally he understood that the Home Office wished to undertake a close-in survey by helicopter. [redacted] stated that the Dakota/Bristol freighter aircraft were probably the most suitable available types for the larger survey. He suggested that the Australians be asked to undertake this task. [redacted] stated that this was a suitable task for the Australians, but it was essential that full co-operation over installation was obtained. [redacted] stated that a great deal of preliminary installation work could be done on a similar aircraft in U.K. He would not be able to go further on this item until the Australians could be approached. He did not foresee any difficulty over the navigational training of aircrews. As for the helicopter he would prefer this to be a RIF commitment.
14. [redacted] stated that he wanted a comparable effort exerted at each round of the next trial. [redacted] emphasized the importance of the maximum effort on the first round likely to cause ground contamination. In the case of an airburst it was essential that the Radiological Measurements Group knew, after burst, the burst position.

15. The table below is a summary of the tasks discussed.

Suggested Principal Sponsor	Interested User Groups	Nature of requirement	Aircraft Type
1. Possibly Australia	S.C.M	Very early cloud sampling say, 3 mins	Australian Jindivik
2. SCM/SHF	-	Early cloud sampling, say before 20 mins	R.A.F. Canberra
3. SCL/SHF	Air Ministry	Six hours cloud sampling	R.A.F. Canberra
4. Possibly Air Ministry	SHF	Cloud Tracking	R.A.F. Canberra
5. SHF	-	Ground survey up to 500 miles	Australian Dakota/Bristol Freighter
6. Possibly Home Office	SHF	Close-in ground survey	R.F. * Helicopter

*NB. It has since been learnt that the Home Office have been considering the possibility of commercial hiring.

for Superintendent Health Physics

Building [redacted]
 A.W.R.E. Aldermaston
 5th October, 1954.
 W6/HG/1729 (c)

Distribution:-

[redacted] S.S.T.D. ✓
 [redacted] S.C.M.
 [redacted] S.H.P.
 [redacted] S.P.T.
 [redacted] R.F./HRE
 [redacted] S.C.F.
 [redacted] S.P.T.
 [redacted] S.H.P.
 [redacted] S.H.P.
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 File (1)
 Spare (3)

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UNCLASSIFIED

407/057/54
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24 JAN 1965

INTERDEPARTMENTAL EXECUTIVE FOR ATOMIC WEAPONS TRIALS - EXTENSION OF TERMS OF REFERENCE

At their meeting on the 5th October 1954* the Committee agreed to the establishment of an Executive under the Chairmanship of Controller Atomic Weapons, Ministry of Supply, to deal with a series of atomic weapons trials in Australia.

2. Subsequently it has become necessary for the Atomic Energy Authority to carry out as a matter of extreme urgency an experimental trial at an earlier date than the series for which the present Executive was set up. This trial, it is proposed, should take place on or near one of the Monte Bello Islands since, among other reasons, Maralinga will not be ready. This means that a Naval expedition is necessary.

3. Since the two trials will take place within a matter of months from each other and those concerned both in London and Australia with the planning will be largely the same individuals, it seems appropriate that the present Executive should be responsible equally for the new trial. Since, however, there is a large naval interest, it is suggested that the Executive should have a Naval Vice Chairman and that the Secretariat of the Executive should be strengthened by the addition of an Admiralty representative.

4. I invite the Committee to agree to the extension of the terms of reference of the Interdepartmental Executive and to the appointment of a Naval Vice Chairman and Naval additional Secretary.

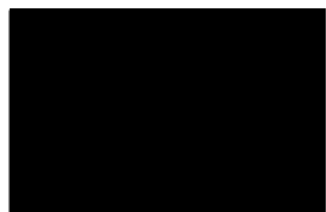
* A.E.(O)(54)14th Mtg. Item 4.

L

INTRODUCTION TO THE COOPER REPORT
OPERATION HURRICANE

Whilst the attached document is considered to be UNCLASSIFIED and therefore released without restriction, to the Australian Royal Commission, it should be noted that the report is in a draft form and was never published.

The contents can not therefore be treated as official MOD information.



Science(Nuclear)2

13/2/85

J.L.S.



24/1/85

Downgraded to: -
UNCLASSIFIED

Reference..... 461/10/54/V

L

PERSONAL

Deputy Director.

Copy to: - C.S.O.

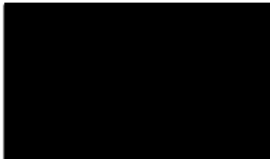
This report by [redacted] deals fully and honestly with the problems and difficulties of this first seaborne Atomic Bomb test.

It gives the reader the impression that much friction could have been avoided if better relationship had been reached at the top, that is between [redacted] and [redacted]. It also gives a few pointers to the Navy to show how they could have improved the position.

I agree that such a report is worth writing, and may be of value if such an operation is ever repeated.

I doubt, however, whether it is within D.A.W.R.Es. responsibilities to let such a report go outside his own Establishment, without asking the Admiralty for their concurrence.

The question to be answered is do you wish to rake up old sores by referring this to Admiralty, or do we only file it in A.W.R.E. for future use?



7/10

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

4th October, 1954.

(1793)WetY12695-4210
11/51 800.000 JCAS
Lrd. Gp733 210
(REGIMITE)
Code S-35-0

Both sides to be used

R.O.F. Form 2a

Minutes to be numbered consecutively

Q.P. No.....

Ref. to..... T.R.C./A.64.

30 SEP 1954

Subject {

V.D./A.W.R.E.

... We discussed some aspects of [redacted] general account of Operation Hurricane and I attach the draft herewith. I have held up reproduction in case you think it is inappropriate that it should be issued.

The original intention was that [redacted] should write a history and in fact he went on the operation under the title of "Historian". He compiled a very voluminous set of notes on which [redacted] has drawn heavily. If [redacted] had not been overburdened with other jobs, particularly Totem, he would have been expected to issue a report. It was with his agreement that [redacted] who had more time, undertook the task of writing this comparatively short account. [redacted] has seen this version and has agreed with me that if it is published it will cover the type of report that he would otherwise have written (although, no doubt, in a rather different style).

Personally I still think the report should be issued. My only second thoughts since holding up the publication at your suggestion are that [redacted] might perhaps have made a fuller acknowledgement of his indebtedness to [redacted] for the material.

... Encl. [redacted]

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

24th September, 1954.

1136

MEMORANDUM

Sept. 27/54 1954

Tel. No.

From ~~MINISTRY OF SUPPLY,~~

(Branch) C 16

(Room No. & Bldg.)

Our Ref.:

Your Ref.:

Subject:

Herewith [redacted] draft report on C-16 from [redacted] which reached me today.

[redacted]

ANY REPLY SHOULD BE GIVEN OVERLEAF.

Room 26. Q7.

10. 9. 54.

~~1. DD. AWRE (CWS)~~

2. CIO.

I forward herewith Part 2 of the Hurricane Group Reports — a general account of the operation.

Suggested circulation:— all DCSO's and above, SHP, STP, SWP, SPT, SLT, SLW, SXX, SFR, [REDACTED]

Received by CIO
on 27/7/54

[REDACTED]

V - K - A - E - A -

A - W - R - E -

REPORT NO T/54.

Operation Hurricane Group Reports
(PART 2)

a General account of the operation

[REDACTED] RN, (retired).

Summary

as A - A.

[REDACTED]

Department of Atomic Energy

ATOMIC WEAPONS RESEARCH ESTABLISHMENT

Report No. T / 54

~~Hurricane Operational Report~~
a General Account of the Operation.
[REDACTED]

SUMMARY

A — This report gives some account of the planning and execution of Operation Hurricane, a Combined Services Operation, staged to explode the first British atomic explosion in October, 1952.

The report contains only such references to scientific aspects as are necessary to present a reasonably complete picture.

The author, who was ^{not} only instructed to write the report ^{until} in March, 1954, has relied chiefly on his memory and on what documents are available. He is much indebted to an account of the Expedition written by [REDACTED] who took part as ~~historian~~.

Views and opinions expressed, though believed to be representative of the scientific staff who participated, must be regarded as solely those of the author.

A.

HURRICANE OPERATION^{A-} REPORT

Introduction

1.1 This account of the explosion of the first British atomic bomb in the Montebello Islands on Friday, 3rd October, 1952, is intended to cover the general planning and execution of the trial and does not include, except where necessary for clarity, any technical details of actions of various scientific terms. Written some long time after the event, the report may have omissions, but it is hoped that it is otherwise factually correct.

1.2 A large scale operation of this type is perhaps best described in a manner somewhat different from that normally employed to cover a scientific project in a laboratory or establishment at home. In the latter, the background picture is taken for granted; in Hurricane an account and understanding of the feelings and morale of the scientific teams, and relations with their colleagues in the Services, the provision or lack of facilities both technical and domestic are all important if a balanced and useful picture is to emerge.

For this reason, domestic detail will be found which may now be thought trivial but, in this trial, civilian scientific staff, Naval staff and Army staff worked and, for the Operation itself, lived together in a self-contained community and technical and domestic problems rubbed shoulders - so it will be in this report.

Planning

2.1 Any records of the early planning of Hurricane which may still exist (March, 1954) were not available to the writer of this report and only a very brief reference to this period can be given, mostly extracted from Admiralty Confidential Book O4570 - Operation Hurricane - Report by the Naval Commander.

2.2 The Operation was first discussed at Ministerial level in 1949. By July, 1950, informal discussions were in progress between C.S./H.E.R. (old title) and the Assistant Chief of the Naval Staff (later Deputy

Chief) on the possibility of using the Montebello Islands as a site for detonating an atomic weapon in a ship (see Appendix A for map of the locality).

2.3 In October, 1950, Divisions of the Admiralty likely to be concerned were introduced to the project and major requirements, including the need for a survey of the Islands, were discussed.

2.4 With the approval and assistance of the Australian Government, a preliminary survey of the Islands (Operation Epicure) was carried out in November, C.S./H.E.R. being represented by [REDACTED]

2.5 The first point which must strike any reader of this account who is acquainted with the Operation as a whole, is the successful foresight of the reconnaissance party in planning possibilities which gave such satisfactory technical results. The second point, however, is the failure then and later to appreciate the difficulties which might be attendant on the necessary ship movements and boat work for the whole conduct of the Operation. Even the somewhat unpleasant ^{regarded} ~~experience associated with it~~ ^{at that time} ~~was not~~ ^{put it no stronger, experience of one sort made by [REDACTED] in a motor} ~~boat~~ did not bring home to those who might have appreciated its significance, the over-riding effect water transport was going to have on the Operation.

2.6 While this reconnaissance was in progress, [REDACTED] S.S.I.R. (old title) had drawn up a preliminary statement and outline of the scientific requirements. This statement stressed two points, namely the likely difficulties of extensive work in small boats and the ravages of white ants. The latter proved no real menace in practice.

2.7 It having been decided that the Montebello Islands provided a suitable site, in March, 1951, a formal approach was made to the Australian Government and, at the same time, approval was given for the necessary preparations to be put in hand.

2.8 Within the Admiralty, a Commander (later promoted to Captain) had been appointed specially for the Operation and, in consultation with S.S.I.R., suitable ships had been earmarked and plans for their conversion put in hand.

2.9 A Committee, known as the Hurricane Executive, under the Chairmanship of the Deputy Chief of the Naval Staff (D.C.N.S.) was appointed, to conduct the Operation on behalf of the official Committee on Atomic Energy. Representative members on this Committee were appointed from:-

Ministry of Supply (A.C.S./H.E.R.)

Ministry of Defence

Commonwealth Relations Office

War Office

Admiralty (Finance)

Ministry of Supply (Finance)

Air Ministry (from December, 1951)

2.10 The first action of the Hurricane Executive was to define the divisions of responsibilities of the Services and other Government Departments concerned in the Operation. Details of this decision will be found in Appendix A of C.B. 04570 (see paragraph 2.1) and only a summary will be given here.

The Admiralty Provision of ships and boats, their conversion, manning and operation. Provision of fuel, any stores and cash. Provision of communications other than those purely for scientific purposes.

The War Office Provision for 'civil engineering' and generally all works and transport on land.

The Air Ministry Provision of air transport required.

Ministry of Defence Security policy.

Commonwealth Relations Office Political advice and conduct of policy negotiations with the Australian Government.

Ministry of Supply Design of the scientific procedure for the trial and provision of scientific equipment.

Co-ordination of the interests of all other Ministries and Departments so that the Executive and Naval Commander deal only with the Ministry of Supply on scientific matters".

2.11 At the same meeting it was laid down that a Naval Commander (in the sense of over-all command and not 'three-striper' rank) would be responsible (inter alia):-

(a) for the planning and execution of the Operation in accordance with the policy of and under the direction of the Hurricane Executive

(b) for the command of all H.M. ships comprising the trial force and of all those embarked thereon. The term "command" includes all measures for collective discipline, welfare, administration, security and health; but as regards the last, he shall be advised on radio-activity hazards by a specially appointed Safety Officer;

(c) that, subject to his responsibilities in (b) above, the trial is conducted to meet the technical requirements of the Technical Director (S.S.I.R. was appointed as such) representi.)
the Ministry of Supply; and

(d)

2.12 It should be placed on record that the responsibilities given to the Naval Commander as recited above were never more than grudgingly accepted by S.S.I.R. and, from start to finish, caused a sense of discord at the head of affairs.

2.13 In May, 1951, the Naval Commander (designate) was promoted to Rear Admiral and appointed to the staff of D.C.N.S. as Rear Admiral, Trials Planning Section. At the end of June, the Commander mentioned in 2.8 was promoted to Captain and became Chief Staff Officer to R.A., T.P.S., and, later, was Flag Captain of H.M.S. Campania.

2.14 Meanwhile, much other activity was afoot. The Australian Government were asked to undertake a more detailed survey of the Montebello Islands and H.M.A.S. Warrego was nominated for the task.

2.15 In May, 1951, also, the Prime Minister of Australia consented to the use of the Islands' site and gave assurance of full Australian assistance and co-operation in the trial.

2.16 The War Office were asked in May, 1951, for Military assistance in connection with civil engineering required for the project and, in May, C.R.E., [REDACTED] and a small party commenced work at Fort Falstead. In July, after an extremely hurried turnover to his new Second-in-Command, [REDACTED] left for a personal reconnaissance of

the Islands accompanied by [redacted] of Foulness.

2.17 In July also, a retired Naval Officer was appointed as special adviser to S.S.I.R., mainly to provide a channel for professional liaison between the scientific staff and the naval authorities concerned with the Operation, both in the Admiralty and at the yards where ships were being converted for the trials.

2.18 During the remainder of 1951, scientific planning closely allied with civil engineering aspects, and collection of the necessary equipment, continued at great pressure. Simultaneously, work was proceeding with the conversion and fitting out of the ships and, somewhat separately, the Naval Commander's plans (Hurricane Trial Orders) were being prepared.

Conversion of Ships

3.1 The largest ship conversion, so far as scientific staff were concerned, was that of the frigate, H.M.S. Flym, to make her suitable as the target vessel. This work was carried out at Chatham Dockyard and involved a large amount of gutting and reconstruction of some forward compartments, and the special construction of other compartments aft.

3.2 Some of the scientific requirements were complicated and not easy to convert into a practical form suited to ship construction and the peculiar conditions of having to withstand the rigours of a voyage to Australia before being put to use. However, in spite of some minor difficulties over liaison in the name of security, direct contacts were established between the clients at Fort Halstead and the actual men on the job in Chatham Dockyard. With the personal interest and assistance of the Admiral Superintendent and Heads of the Departments, the conversion work was just completed in time, though with many anxieties.

3.3 At yards on the Clyde, H.M.S. Zeebruggee and Tracker (landing ships tanks) were taken in hand. In the former, an ingenious arrangement of a folding steel structure in the main tank deck was arranged to provide a chemical laboratory after the space had first been used for the transport of considerable heavy civil engineering equipment and stores for the land sites.

[REDACTED]


3.4 An oversight in planning in connection with H.M.S. Zeebruggee resulted in lack of accommodation for the scientific staff who would be working in the laboratory and, rather late in the planning stage when it was decided that Zeebruggee should become a Captain's command and already designated to take the Commander, Royal Engineers and his headquarters, the accommodation was altered in the direction of better quality at the expense of quantity. Later in the Operation, this caused a critical situation and resulted in great discomfort to the scientific staff.

3.5 The conversion of H.M.S. Tracker was another major piece of improvisation for a special purpose, namely to accommodate and operate the Health Physics Group who would be responsible for the safety from radiation aspects of the expedition as a whole and for much of the scientific measurement of radio activity.

The conversion involved mainly the building of a new deck just forward of the main hatch and about 5' above the tank deck, in which to accommodate a series of offices, laboratories, store rooms, changing and washing accommodation. In addition, a considerable array of telemetry aerials and receiving equipment was also fitted.

3.6 This conversion has its peculiar difficulties, in that security, the very supplies and novel requirements and the distance of Glasgow from the Woolwich area, all had their hampering effect. When the time came for the particularly specialised work of fitting out the compartments, it became necessary to acquaint the heads of the firm of the underlying purpose of the conversion, and from then on the work progressed smoothly.

3.7 H.M.S. Narvik the third L.S.T. of the expedition, required no special conversion and was hardly concerned with the scientific side of the Operation. A large proportion of the R.E. complement was accommodated in Narvik and her Commanding Officer was responsible for the laying of all under-water cables for which two landingcraft (L.S.M's) were specially fitted.



3.8 H.M.S. Campania the designated flag-ship and base-ship for the expedition, as soon as she was freed from her Exhibition of Britain duties, was taken in hand for conversion at Birkenhead.

3.9 The main and considerable work necessary was the provision of additional evaporating plant, the building of extra cabin accommodation and conversion for extra offices, store rooms, workshops and laboratories.

The work proceeded with but little reference to the scientific staff and there was a lack of timely liaison over the accommodation which would be needed and which proved in the event unsatisfactory in several features.

3.10 One other Naval conversion to which considerable thought and effort was devoted, concerned the means of providing safe sea transport through water which might be contaminated by the products of the explosion. To achieve this, a canopy arrangement to cover completely the ^{masts} ~~new~~ pinnaces and launches carried in ships of the expedition was designed and fabricated. In a number of these boats arrangements for the motor cooling water system to be self-contained by means of keel cooling were also added. The canopy, as expected, proved somewhat bulky and awkward for transport and was more restrictive to operation than had been hoped. The need for their use in principle was, however, confirmed by experience during the trial.

Scientific Preparation

4.1 This part of the report covering Phase I of the Expedition will attempt no detailed description of the work of the various groups' responsibilities for the scientific aspects of the Operation, but will touch on such work which is of general interest and which affects the Operation as a whole.

4.2 The necessary experimental work in laboratories followed by the design of suitable equipment left, in many cases, woefully short time in which to arrange manufacture, test and delivery. In some instances, ^{of which} ~~and~~ electric cable was an outstanding example, the very quantity required precluded its timely provision by any ordinary priority arrangements.

Much was achieved locally within H.E.R., by many hours of overtime, and the rest was gathered in from various contractors by the use of special over-riding priority obtained by the Ministry of Supply and well supported by all their branches and officials.

4.3 The U.K. rehearsal. It was soon apparent that for an Operation of such novel complexity, as full a scale rehearsal as possible should be carried out in the U.K. and, since the use of H.M.S. Plym was essential for this purpose, there was soon a vicious circle of her date of completion controlling the rehearsal dates and yet the completion date itself being controlled by dates of completion of scientific equipment or even designs for equipment for fitting in her. ^{initially} After it became essential to be available for trials on a date planned, ^{and} quite a number of items not essential for the rehearsal were fitted afterwards in the interval before sailing.

A point perhaps not sufficiently appreciated in scientific circles at that time, was the need for Plym to carry out a sea trial ^{and} ~~with~~ short "shake down" ^{coming} crews if there was to be a reasonable chance of her making the voyage to Australia without misadventure.

4.4 A small committee was set up to plan the rehearsal and it soon became evident that quite an Operation in itself was involved. Those concerned were already well laden ~~with~~ with their tasks of technical preparation and could spare but little time to consider the additional and different requirements for the U.K. rehearsal.

4.5 Planning started in January, 1952, and the rehearsal started on Monday, 17th March. It terminated on Friday, 9th May, with an interval from 4th - 15th April, which included the Easter holiday period. The terminating date was some fortnight later than that originally planned.

4.6 No very complete records of the results of the rehearsal are available but the following is thought a fair summary.

The rehearsals were a rush. Late deliveries of equipment; the need for important alterations to apparatus during the period of actual trials and the imminence of the Expedition's departure all contributed to the rush.

Nevertheless, by the end of the period, the various teams concerned, some previously unacquainted with each other, were clearly beginning to work together, to understand each other's problems without undue heat and with success.

Technical success was nowhere 100 per cent, but it was high enough to ensure that design of equipment met requirements, that construction was generally sufficiently robust and performance within the required degree of efficiency.

Operational and administrative experience gained was invaluable and one of the major direct results of the rehearsal was to draw attention to certain essential points which must feature in the actual plan of the trial itself.

4.7 For the purpose of this report, scientific preparation may be said to have finished in the U.K. with the end of the rehearsal. However, much work, both scientific and of a more general nature, remained to be completed ~~in H.M.S. Plym~~ in H.M.S. Plym before she was due to leave Chatham finally to embark the weapon and thence to a rendezvous with H.M.S. Campania off the Isle of Wight.

Departure and Voyage

5.1 H.M. Ships Zeebrugge and Narvik detailed to take the bulk of the civil engineering stores and equipment and to transport and accommodate the R.E. force loaded at Marchwood (Southampton waters) between the 4th and 12th February, 1952. They sailed from Portsmouth on the 19th February, arriving at the Montebello Islands on 26th April, calling at Fremantle, where a considerable additional quantity of stores was embarked.

5.2 H.M.S. Tracker arrived at Chatham during the period of the U.K. rehearsal, opportunity being taken of her presence in the Nore to carry out telemetry tests of her equipment. H.M.S. Campania arrived at Chatham at the end of April and loading of stores into all three ships, Campania, Tracker and Plym commenced.

5.3 In spite of considerable forethought and planning, the arrangements for the transport of scientific stores did not work well. There were a number of reasons for this and the subject is more fully covered in Appendix B of this report.

5.4 Scientific staff (9) to take passage in H.M.S. Tracker embarked at Chatham on the 4th June, and that vessel then left to proceed independently via the Suez Canal arriving at Fremantle on the 28th July.

5.5 H.M.S. Campania proceeded to Portsmouth on the 28th May to embark aircraft and further stores and her scientific passengers (85) joined on the 9th June. Sailing was delayed from 09.00 until 14.30 on the 10th June on account of fog.

5.6 H.M.S. Plym, having proceeded to Sheerness to embark the weapon, sailed thence on the 9th June, with 5 members of the scientific staff on board and, being unaffected by the fog in Portsmouth, proceeded down Channel independently until overtaken by Campania well in the Bay of Biscay.

5.7 Essentially the intensive phase of scientific activity began with the arrival of the main force at the Montebello Islands early in August, and the journey to the site might be dismissed as a mere interlude, certainly essential but meriting little more than a brief description.

However, the transfer of such a large number of civilians in ships of H.M. Navy on a long voyage was without precedent and ^{the unloading} unloading had its problems, difficulties and peculiarities, many of which had a bearing on the ^{actual} phase, after reaching the Islands. Further, the profit and loss account from the aspect of a large amount of scientific effort being semi-unemployed for a considerable period is not without interest and value to future Expeditions.

5.8 As stated above, the scientific staff joined Campania during the afternoon of Monday, 9th June. After completing various routine matters, they found their cabins which had been allocated and promulgated previously and began to settle into the new and, for most, unusual life on board a naval ship. First impressions were of the novelty and interest of life on board, but it was unfortunately not long before some drawbacks of travelling as a passenger became apparent.

5.9 A bewildering feature experienced by all early in the voyage was that in the morning from about 09.00 until "stand easy" at 10.30, it was most difficult to find a refuge while the ship was "scrubbed over".

Simultaneously, it seemed that all parts of the ship were in the process of being cleaned - cabins had to be vacated, the ward room had to be vacated, and it was not easy to know just what to do and where to go. The two offices allocated to the scientific staff, one for administration and one for technical services, were only large enough for the men already working and so these did not offer any refuge. Therefore, in the early days, these hours which normally represent a useful working period, were not particularly useful to the majority because there was nowhere suitable to work.

Later, it was arranged that the "upper" ward room which was large and airy should be available, and the fact that this was not done at once, even if the need could not have been foreseen, gave scientific staff a feeling that they were somewhat an encumbrance in the ship and certainly not "of the ship". This was not good either for morale or efficiency.

5.10 On the whole, in the early period, scientific staff seemed to settle down quite well. Civilians outnumbered the Service members of the ward room by about two to one and such a sudden impact upon a very conservative organisation called for considerable give and take on both sides to achieve the easy and unrestrained relationship so necessary for the success of such a mission as Hurricane. Though the Expedition required close fusion of Service and civilian activities, the personnel involved on each side possessed a background of very different social and domestic outlook and a code of conduct and method of working which was vastly different. It is,

[REDACTED]

therefore, perhaps not surprising that the somewhat difficult and delicate problems, both domestic and technical, lead occasionally to times of tension when the naval and civilian staff simultaneously held very poor opinions of one another.

5.11 The weather was calm during the early period of the voyage and, in fact, remained relatively so for the whole of the journey, a favourable factor which should not be forgotten.

5.12 By the time Gibraltar was reached on Saturday, 14th June, a reasonable routine for the scientific staff had been achieved. Acquaintance had been made with the recreational facilities available and some integration into the running of the mess achieved.

5.13 A matter which early exercised the minds of senior members of the staff and which was to exercise physically many of those not so senior for the whole of the voyage and longer, concerned the stowage and state of the stores. Appendix 'B' contains more detail on this subject, but during the voyage it was found necessary to sort and re-station ^{slow} every one of the odd thousand packages of ~~the~~ various sorts which had been loaded in a rush in the U.K.

5.14 The short stay in Gibraltar was much enjoyed by the scientific staff and the ship proceeded towards Freetown on Monday, 16th June.

5.15 By now, the two relatively large spaces amidships which had been specially equipped as a workshop and laboratory were regularly occupied. Some teams had long term practical work to complete before the site was reached, others had instruments to calibrate and some, ^{in some cases} after ~~only a few~~ ^{several} weeks, found need to test and adjust instruments, thought to have suffered from transport ^{and} stowage.

Occasionally the laboratory became overcrowded. Both it and the workshop were well equipped for all jobs which arose. In general, these two facilities, augmented occasionally by assistance from the naval engineering departments, functioned well throughout the Expedition, and it is doubtful whether they could have been substantially improved.

[REDACTED]

5.16 The hotter weather met soon after leaving Gibraltar revealed some of the disadvantages of accommodation in Campania. Some cabins situated near the engine exhausts became too hot for occupation and unpleasant, if no worse, fumes reached to a large portion of the other accommodation. Wind scoops, though of some value, were not designed apparently for the size of Campania's scuttles. Re-allocation of cabins, only possible because their intended occupants were travelling later by air and a limited issue of camp beds, alleviated the situation somewhat, but the overall position was that cabin accommodation became considerably more congested than had been anticipated.

5.17 A fairly standard daily routine for the scientific staff gradually evolved. Part of the forenoon was usually occupied by meetings of the Assistant Directors and other senior members present, to discuss and arrange as far as possible for the Operation phase at the Islands. Apart from the organisation for handling scientific stores, discussion of which occupied much time and is given in more detail in Appendix 'B', discussion centred on the boat routine requirements, of which more details are given in Appendix 'C', and tentative consideration of the actual action organisations.

Useful as were these discussions, mainly in the "get together" affect they had on the scientific teams, they were invariably inconclusive due to the fact that several senior and important members of the staff were not on board and because there was much uncertainty and lack of information on Service aspects.

5.18 A naval staff meeting was held on most days immediately after breakfast which the Technical Director usually attended. Although these meetings should have been a means of constant and intimate touch between scientific and naval staff, they seldom achieved this desirable state and covered normally only service affairs. There was unfortunately a continual difficulty in getting closely together at any stage of the Operation.

5.19 Scientific staff involved in any high level discussions, had invariably some work to do at team level, either helping with store handling, working in the laboratory or on their own particular schemes and problems.

5.20 Ship's Officers, on a number of days, gave a course of short talks on organisation in the various departments of the ship and on wider naval topics. These discussions were much appreciated and were supplemented by conducted tours of the various departments of the ship. A navigational course was run for a number of those interested.

5.21 Later, during the voyage, a series of lectures, films and practical demonstrations on the health physics aspects of the Operations were organised for all scientific staff and for a large number of Service personnel who would be concerned more intimately with the Operation, e.g. boats' crews.

5.22 Recreational and social activities increased and teams for deckhockey, net-ball, table-tennis, bridge and other games were formed. A photographic club was very active.

5.23 Hot weather introduced, or perhaps rather emphasised, a dress problem for the civilian staff; the notes on dress circulated prior to departure had indicated no strict formality need be observed, but it soon became clear that naval and civilian ideas on this matter were not in accord. The difficulty was fundamental since civilian staff could not be expected to be equipped with the equivalent of "whites" and it can only be said here that it was a pity that this minor but vexatious problem had not been better considered on both sides before departure.

5.24 Monday, 23rd June, saw a call at Freetown to fuel, only members of the film unit being able to get ashore.

5.25 The event of interest between Freetown and Simonstown was the ceremony of 'Crossing the Line', performed with all the traditional pomp and sky-larking on Thursday, 26th June. The resultant certificate was a real work of art.

5.26 Simonstown was reached on Friday, 4th July, and at this stop a large consignment of scientific stores was transferred to Plym, mainly to provide more space for re-stowage in Campania.

5.27 The four days' stop at Simonstown was very welcome and most scientific staff disappeared to Capetown for the whole of it.

5.28 Rather rough weather on leaving the Cape on Tuesday, 8th July, caused a delay of one day in arrival at Mauritius on Thursday, 17th July. Here, the stern buoy in the harbour allocated to Campania proved inadequate and, ^{as a result} eventually exit to an anchorage outside had to be ~~resorted to~~. A somewhat strenuous round of official engagements was carried out because Campania was substituting for an official visit of the East Indies Squadron.

5.29 The last long sea passage to Freemantle commenced on Sunday, 20th July. The weather became cooler and the passage was mostly calm. Opportunity was taken to clear a large quantity of stores to be off-loaded at Freemantle on to the flight deck and ~~of~~ re-stowage of all the remaining items was completed on this passage.

5.30 A series of first aid lectures to scientific staff by the naval Medical Officers, completed the course of interesting and instructive discussions held throughout the voyage.

5.31 The ships arrived at Freemantle on Thursday, 31st July, seven weeks and two days after leaving Portsmouth and before going on to record more Operational happenings thereafter, it may be appropriate to make some summary of the effects of the voyage and conclusions to be drawn from it.

5.32 First, there was a positive gain from the feature of ~~the~~ closely packed life on board ship, in that a very mixed staff got to know each other through sheer force of circumstances. Members of the various branches of H.E.R., previously unacquainted, soon became friends, and the close mixing with members of scientific teams from other departments, was equally valuable. Friendships and close contacts with the naval personnel were slower and only partial at the best, but in spite of natural criticisms of their respective points of view, a great benefit was obtained from the intermingling; on the other hand, there were points of friction and trouble. Most of them were small, taken independently, but in the aggregate they fostered the feeling which unfortunately existed at levels that the Navy thought the civilians rather a nuisance, and the civilians thought the Navy were not being sufficiently helpful as :

Nearly all these small troubles could have been avoided or much reduced if it had been possible, prior to sailing, really to brief both parties concerning the other but this was, in fact, quite impossible.

5.34 On the more technical side, apart from the real^y interlinkage which grew amongst those of the company on board, the voyage gave only limited opportunity for preparation, due mainly to the absence of several important members of the organisation, and partly to ignorance of practical working conditions at the Islands.

5.35 On balance, it is believed that a great majority of both naval and scientific opinion would recommend air travel in any future Expedition, at least for the greater portion of personnel. Measured solely on a works' value basis, there is no doubt that a sea voyage is wasteful and it is open to grave doubt if there are compensating advantages.

End of Phase I

6.1 While with the arrival of Campania and Flynn at Fremantle, the majority of the scientific staff took themselves to Perth and stayed there until the next sailing date, the stay at this port and the meeting which was possible with L.S.4 and C.R.E., provided the first opportunity for definite planning of the next phase of the Operation.

6.2 H.M.S. Tracker had arrived a few days previously and H.M.A.S. Hawkesbury joined the Squadron the day after Campania's arrival.

6.3 L.S.4, [REDACTED] R.N., (also Commanding Officer of H.M.S. Zeebrugge) and [REDACTED] C.R.E., brought with them their Staff Officers, and meetings were arranged at all levels to acquaint staff of the situation at the Islands, and to draw up plans for unloading and starting the scientific work.

6.4 As recounted in more detail at Appendix 'B', an idea of transferring most of the stores from Campania to an L.S.T. for unloading in The Lagoon was abandoned on the advice of L.S.4, and general plans made on the voyage out were ^{revised} attempted in principle. From all accounts the sites were ready for scientific operation and so it proved to be.

6.5 Stores, mostly chemicals, for use in connection with the collection and analysis of air samples to be obtained by aircraft, were unloaded at Fremantle for delivery to land bases in Australia, and a considerable load of other stores, including food, to be deployed near the explosion was taken on board.

6.6 H.M.S. Tracker proceeded on Monday, 4th August, followed by H.M.A.S. Hawkesbury, who was proceeding via Exmouth Gulf, and on Tuesday morning, 5th August, Campania and Plym followed.

6.7 The journey north was made in pleasant conditions and many of the stores were got up and put ready on the flight deck. The period was a busy one because it was now possible to ~~arrange~~ brief most personnel on the nature of their next and immediate tasks.

6.8 The Islands were sighted early on Friday, 8th August, and by 12.30 p.m. Campania was moored to her buoy in Parting Pool and Plym had followed Tracker into The Lagoon to take up her final resting place. The weather was perfect.

Phase II

Preparation

7.1 Unloading of Campania started almost at once and, with the willing assistance of every otherwise unemployed member in the ship, naval or civilian, work which was expected to take six to seven days, was 95 per cent completed by Sunday afternoon i.e. some 48 hours after arrival. The Operation is more fully recorded in Appendix 'B'.

7.2 A few scientific staff landed on Trimouille on Friday afternoon, and on Saturday, sufficient staff to handle stores were on both Trimouille and Hermite. A map of the Islands, showing principal sites, is included as Appendix 'D'.

7.3 The scientific staff were most impressed by the high standard of site preparations. A system of roads had been laid which, considering the short time available and the difficult terrain, looked very effective and proved themselves so throughout the Operation. Buildings were well up to

specification and the standard of workmanship impressive. The stores compound at Gladstone Beach on Trimouille (T.3) was particularly well planned and plenty of space for manoeuvre was available for the landing, sorting and deployment of stores. The shelters at all main landing points fashioned from scaffolding poles and expanded metal looked flimsy but, in use, proved remarkably strong and adequate for the purpose. The small block of ~~msc~~ laboratories at H.1 on Hermite Island looked very compact and while electronic apparatus and Kerr Cell cameras were being uncrated and erected, it all seemed much like the laboratories at home.

7.4 The requirements and facilities for the necessary boat routine are discussed more fully in Appendix 'C' to this report, in which many of the difficulties are recounted. By the time of arrival at the Islands, it had been only too well appreciated on the scientific side that boat facilities were likely to fall far short of the desirable minimum and, on Saturday evening, 9th August, a further disquietening feature was added. It was found that the "trot" established too close to Campania mooring was too exposed for night moorings for the pinnaces which were to form the pool of boats for casual trips and the only alternative, since they could not be hoisted nightly, was a mooring in Stephenson Channel, many miles away. For this reason, pinnaces could not be made available until 9.30 a.m. each morning and it was usually later, and had to be moored up so that crews were back to Campania before dark. It was only after much pressure and long delay that arrangements were made for crews to spend the night ashore, so that boats could be available first thing in the morning.

This is but one instance of the apparent complete lack of understanding and unsympathetic interest for the scientific conduct of the trial which arose again and again and which maintained a constant sense of antagonism between the naval and scientific staff.

7.5 Sunday was a full working day and, as stated previously, stores in Campania, except the three electronic cabinets, were ~~partially~~ ^{virtually} cleared (the cabinets were finally disembarked on Saturday, 16th August).

Concentration of effort shifted to unloading Tracker which proceeded apace and all scientific teams were represented ashore, so that sorting and unpacking of stores proceeded rapidly.

7.6 On Monday, however, a sharp and no doubt ^{fortunate} warning of what was in store was administered. Though on Sunday the sea had been too rough for Campania's pinnaces, on Monday, no craft of any sort could leave The Lagoon early in the morning. About 11.00, an L.C.M. made the passage but attempts to lie alongside Campania were abortive though at some peril, a few, including four scientific staff, were able to board her. The L.C.M. returned to The Lagoon and the scientists afore-mentioned, were able to give much needed assistance in sorting stores at Gladstone Beach, but all other scientific work was suspended.

7.7 Previously, planning had taken some account of the action needed to deal with parties marooned on shore for the night, but the effects of the greater part of the scientific effort being marooned on board all day had not even occurred to anyone. The rude shock brought a quick reaction, and it was decided to set up shore camps on Trimouille ^{T.2} and on Hermite ^{H.1} just as rapidly as possible. Helicopters at once proved their value by collecting C.R.E. and L.S.4 for a meeting in Campania and, later, by landing certain selected scientific staff who could most progress activities. The camps were ready and occupied by the following Monday, 18th August.

7.8 The swell continued with little moderation on both Tuesday and Wednesday, so that no boat work could be attempted from Campania during the day. ~~the day.~~ In the evening it dropped a good deal and on Monday evening, 11th August, the first airborne party arrived from Onslow ^{on} H.M.A.S. Hawkesbury and were safely transferred to Campania.

7.9 On Thursday, the sea was still rough but L.C.M. trips were possible and scientific staff were ashore all day and made good progress with unpacking and setting up equipment.

7.10 At this stage, it will be appropriate to mention that the weather of this week was typical. From the point of view of living conditions and working ashore, the weather was all that could be desired, fine and sunny with a nice breeze which tempered the heat of the midday sun. The swell, however, in the Parting Pool was capricious and varied with considerable rapidity. At its worse, which was fairly often, boat traffic was impossible, and in varying stages between very rough and quite calm

weather, the ~~boating-off~~ and disembarking from craft alongside Campania was more-or-less hazardous. Scientific staff naturally acquired "sea legs" in this respect and accomplished much which on Monday, 11th August, they would have considered impossible. Only on very few occasions and for short intervals was boat traffic in The Lagoon and between Trimouille and Hermite made impossible.

7.11 Work forged ahead well for the rest of the week, and it was decided that a halt should be called generally from midday on Saturdays until Sunday evenings. Several individuals were very averse to this idea and anxious to make the most of every moment available. However, the auxiliary services needed to allow small numbers thus to work through were relatively large and could only be provided at the cost of great unpopularity generally. In spite of this, individuals did continue frequently to work over weekends and the situation which arose was one of constant irritation which should have been dealt with firmly by 'Yes' or 'Nay'.

Scientific Organisation

7.12 It will be appropriate here to indicate broadly the scientific organisation set up for the trial.

7.13 The Technical Director had under his charge a number of divisions each headed by an Assistant Director, responsible for one main technical aspect. Each division was, for convenience, further sub-divided into teams, each team being headed by a Team Leader. Further details are given in Appendix 'E' and full particulars can be found in the "Hurricane Plan", copies of which are held in the A.W.R.E. Technical Library.

Scientific Layout

7.14 The target vessel, H.M.S. Plym, carrying the weapon, was moored in Main Bay. A few of the scientific staff lived on board and some journeyed to and fro each day. Electric cables run to the adjacent beach at T.2 and telemetry provided means for the essential conduct of the trial, while a further long cable via the chain of Islands from North Delta to Hermite connected Plym to H.1, mainly for communication purposes.

7.15 Cocoa Beach (T.2) became the focal point of activity on Trimouille, after the stores deployment staff, centred on Gladstone Beach (T.3) had finished. Here, one of the shore camps was established, which accommodated about 60 men and the jetty there became the main setting down point for staff coming to the Island each morning.

7.16 Trimouille as will be seen from the map (Appendix 'D') formed an ideal area in which to site apparatus which would measure the physical effects of the explosion at different distances from the bomb. On Trimouille, therefore, was set out a multiplexity of gauges and other equipment to measure blast, thermal effects and radio activity. Set up on Trimouille also were various structures and items of Service equipment, e.g. parts of aeroplanes, to obtain practical observations of the explosion effects. Also on Trimouille were a number of telemetry installations to relay both information obtained via cables from Flyn to H.1 and information on radio activity to H.M.S. Tracker which, it may be remembered, was to be the floating health control.

7.17 Before giving some outline of the main control stations on Hermite, reference will be made to the Islands around The Lagoon. The approach to these Islands was tidal, see Appendix 'C', and, consequently, a few hours work there always entailed specific planning of time schedules to suit tides.

7.18 On North-West Island at N.4, a camera and telemetry station was established and at a site south of Moselle Bay, two rocket projectors were set up for firing rockets through the cloud to ^{collect} ~~collect~~ samples.

7.19 On Alpha Island at A.4 was another camera and telemetry station, and on North-West Alpha and many of the smaller islands, instruments for measurement of radio activity, were installed.

7.20 Accurate survey was a necessary feature of the trials, and to effect this use had to be made of triangulation stations on many of the islands. As surveyors will well appreciate the need to visit a number of sites by water and at appropriate intervals of time with inadequate transport facilities, was somewhat frustrating.

7.21 The ~~main body~~ of Hermite Island served no scientific purpose except for cable running and the main scientific station was established on a high bluff at H.1. Here was assembled the hub of the recording equipments and here was stationed at the appropriate time the controlling staff.

7.22 Close to H.1, the second camp for scientific staff had been set up and it became the weekly home for nearly all staff employed on the Island. A good road ran from H.1 ^{to} H.2 on Brandy Bay where terminated the boat trips from The Lagoon and Parting Pool. At H.2 also was a large camp inhabited by the R.E. employed in the construction and maintenance of installation on Hermite.

7.23 H.3, not strictly on Hermite, since there was a small gap between an Hock Bay and Stephenson Channel, was/unmanned observation station for recording effects on certain equipment on Trimouille. H.3 was approached via a pier on Stephenson Channel, though any heavy equipment had to be landed in Geneva Bay.

7.24 To return to H.1 and a description of the installation there, the feature which caught the eye, was an array of telemetry aeri-als and, inside the building, the layout in a series of laboratories was equally conspicuous for its electronic aspect.

From this station, telemetry control of the firing, monitoring of performance and some indication of immediate results and effects was arranged and organised. Second only to the telemetry effect, was a considerable display of photographic effort, including Kerr Cell cameras and many conventional cine machines. Thermal effects teams were there represented together with other minor interests and activities.

Land

7.24 Much has been said already in this report concerning movement by sea and it is necessary now to describe briefly the facilities for transport on land. C.R.E., when at Fremantle, had already stressed the fact that motor transport was not available in great quantity and that it had been used very hard during the construction phase. Consequently, he hoped that most of the transport of scientific staff would be by sea. This account will already have indicated the state of movement by boats and, with the formation of camps, the need for adequate road transport, particularly on

Trimouille, became paramount.

7.26 The road network laid down by the R.A.A.F. construction squad and the R.E.'s enabled full exploitation of the vehicles available.

7.27 No transport was kept on the smaller islands, though occasionally a Landrover was taken to North-West Island when heavy stores had to be transported.

7.28 On Hermite, the main use of vehicles was in the direct transport of men and materials from the jetty at H.2 to the control building at H.1, which was adequately met by one three-ton lorry and three Landrovers maintained and driven by men of the R.E.'s. It was found useful to equip one vehicle with a communication set and the scheme would have been useful on Trimouille ^{if} ~~only~~ ^{had been} ~~no~~ equipment was available.

7.29 On Trimouille, during the initial phase of intense stores deployment from Gladstone Beach all available vehicles were involved i.e. 9 Landrovers, 2 three-ton lorries, 2 bulldozers and mobile cranes. The movement was organised more in theory than in practice because of communication difficulties from the Technical Services division at Campania; but with the ^{main} ~~control~~ and assistance of the Army Transport Officer at Gladstone Beach, all requirements were met and personnel got to and fro for their work.

7.30 The services required on this Island, after the main stores were moved to sites, were two-fold:-

(a) A 'bus service to convey staff throughout the long island

which would coincide with boat transport, especially at T.2 jetty, and at lunch-time at T.2 camp.

(b) A pool of vehicles to be available for allocations to those teams needing their aid.

7.31 The first requirement was met by the use of two lorries or occasionally one lorry and one Landrover and the service was generally satisfactory.

The second requirement was covered by the provision of four Landrovers to be allocated against requests made to Technical Services in advance. This arrangement did not work well because the authorities concerned were badly understaffed. Later, when a man became available from a team temporarily unemployed, it was possible to station him as a Technical Services' representative in T.2 camp and the organisation was much improved.

In spite of this, however, land transport was never really sufficient.

Progress

7.32 With the above picture of scientific organisation, layout and transport in mind, the account of progress in preparing this stage will continue.

7.33 As stated previously, Monday, 18th August, saw the establishment at ^{H.I.} T.2 and H.2 of camps for scientific staff which were duly occupied, and the boat routine re-adjusted to suit the new circumstances (see Appendix 'C'). It soon came to light, however, that though the camps were generally welcomed and reasonably comfortable, some staff still preferred to live in Campania and travel as before, and the attempt to make the best of both worlds with facilities barely adequate for one, helped in no way to harmonise naval and scientific relations.

7.34 Batteries Both lead-acid and ^{batteries} knife were to play a considerable part in the trial and large consignments were landed on Tuesday, 19th August, and the following days.

7.35 During the next weeks progress was steady and reasonably uninterrupted, though the personnel immediately concerned and all transport were continually strained to the utmost. It will be appropriate to mention here the work of Royal Marine crews of the landingcraft. These boats had never ceased to run since their arrival, except through stress of weather, and their Coxswains and crews were untiring in their efforts and, in most cases, ^{the way in which} with which they handled their craft.

7.36 Any detailed survey of progress would in this report be out of place and unnecessary, but if it were required, it will best be found in the weekly progress reports rendered to C.S./H.E.R. by the Technical Director and in the minutes of various meetings held during Phase II of the trials. These papers are available in the Technical Library of A.W.R.E. Here let it suffice to give an overall picture as set out in the table below and to recount the more general events which occurred.

Tabular Statement of Progress

Friday, 8th August Arrival at Islands and in a few days good progress of unloading stores was made.

Monday, 11th August - Rough seas prevented ~~small~~ boat work so

Wednesday, 14th August causing a pause in the excellent progress already made. Decision to establish shore camps taken.

Monday, 18th August Shore camps ready and occupied.

Tuesday, 2nd September Three-and-a-half weeks after arrival. First large scale test by the Telemetry and Communication Division. As their remote control responsibilities were crucial for the success of the trial this was an important test.

Saturday, 13th September Five weeks after arrival. General scientific

S-Day rehearsal which included all teams who were ready to have their apparatus linked by telemetry and others whose apparatus started by delayed time switches.

Thursday, 18th - Friday, Six weeks after arrival. General full-scale

19th September. rehearsal of the actual test procedure involving the complete Squadron.

R-1 and R-Day

Friday, 3rd October Eight weeks after arrival. Weapon detonated.

D-Day

7.37 For most teams it was important that they should be ready for the scientific rehearsal five weeks after arrival. This rehearsal was designed as a scientific test of all equipment linked by telemetry to check performance of equipment in a co-ordinated test before ^{the} full-scale operational rehearsal planned for six weeks after arrival.

7.38 The time was short and some Assistant Directors pleaded no prior knowledge of the programme. However, progress continued good; telemetry conditions were found much better than experienced during the U.K. rehearsal; equipment had suffered little during its transportation and climatic conditions were kind.

7.39 Some troubles arose. Sand was a nuisance and dew in the mornings, nearly always heavy, was troublesome. More serious troubles occurred with generator maintenance and control and the overall difficulty of communications was ever present. Although it had been abundantly proved in the U.K. rehearsal that ~~physical~~ ^{inter-}inter-communication between sites was essential, the Admiralty had recommended and provided Service type R.T. sets for the purpose and unwittingly they had been accepted on the scientific side. Their unsuitability for continual use hour after hour was soon proved, and only the most strenuous efforts of the naval electrical maintenance staff kept communications open. A few commercial sets which had been brought for general purposes were pressed into use and were of the greatest efficiency and value.

7.40 On Thursday, 28th August, a Sunderland flying boat arrived from Singapore on a proving flight before bringing the weapon components at a later date. A somewhat involved re-fueling operation from the stern of Campania was successfully accomplished.

7.41 Large scale telemetry tests on Tuesday, 2nd September, gave promising results revealing only a small number of mechanical and electrical defects which were easily rectified before further larger scale trials.

7.42 On Thursday, 4th September, the Technical Director escorted a party of naval and R.E. Officers to H.1, where he gave them a description of the measurements to be attempted on the trial and where they were shown the general set-up of the control station. Visitors appeared to be impressed.

7.43 On Sunday, 8th September, H.M.S. Tracker came out to the Parting Pool and on Monday, she proceeded for a telemetry trial of communications from the various health monitoring sites. The trial was very useful and generally satisfactory, though partially vitiated because ^{some} equipment at shore sites failed for various reasons.

7.43 About this time, the fire risk to equipment, and particularly to records, deployed on Trimouille, became apparent and, in consequence, arrangements were made to clear vegetation around the more important sites, thus providing Islands which it was hoped would be free from fire. The effort proved worth while as, though the Island was

swept by considerable fire after the explosion, no records were lost from this cause.

7.44 On Thursday, 11th September, two further parties arrived having travelled from the U.K. by air and the scientific complement was nearly complete.

7.45 On Friday, 12th September, a lecture on the general scientific work of the Expedition was given to the ship's company of Campania, mainly in the hope of generating a little more sympathetic interest in the daily workings of the scientific staff. It bore some fruit and might well have been given much earlier in the proceedings.

Scientific Rehearsal

7.46 Scientific rehearsal took place as planned on Friday and Saturday, 12th and 13th September. Its essential aims were twofold:-

(a) To assess, as far as possible, because preparations were not complete, the degree of reliability and co-ordination of the weapon firing circuits and of the network of observational equipment controlled by the telemetry sequence from the main control at H.1.

(b) To reveal still hidden flaws which could be remedied before the main rehearsal.

7.47 Staff movements and activities were planned to imitate those which would occur during the operational rehearsal and, of course, on the actual trial. On the evening of Thursday, S-2 staff ~~were~~ occupying those quarters most suitable for the start of S-1 Day preparations. The mock weapon firing was scheduled for Saturday, S Day at 09.45.

7.48 Preparations proceeded without serious hitch, though with some unforeseen delays, partly due to technical ^{troubles} hitches and partly to some lack of co-ordination of planning. The final vital stages were run through on Saturday morning with composure and success and an examination of the results followed immediately.

7.49 In the main, all went as well as could be expected, with a number of difficulties and faults which it was the purpose of the rehearsal to find. Some highly technical troubles connected with radiated interference ^{due to} ~~in connection with~~ Kerr Cell camera ~~with the~~ ~~observed~~ and multiplication rate measurements, had a long range effect on preparation and planning for the actual trial and some difference in the interpretation of readings of weapon performance required a probing investigation.

7.50 A general point brought home to very many, perhaps for the first time, as a result of this rehearsal, was the now obvious need to test al equipment as far as possible exactly as it should function in the real trial. Tests in laboratories, tests by substitution and tests of representative percentages are no reliable substitute when it comes to co-ordinated major field trials. One other major point - a trial to a set date is very different and a more difficult matter than a trial when 'I' am ready ('I' being any individual team or person).

7.51 On completion of the scientific rehearsal, the tempo of preparations increased. Detailed planning for the actual trial which had occupied every spare minute of the earlier periods, had now to be finalised. The action planned in considerable detail is given at Appendix 'F' and only will be recorded in the body of this report as necessary for clarity.

7.52 At this stage of the Operation, domestic difficulties and disagreements again came into prominence - this time caused by conditions in the camp ashore and particularly at T.2. Though scientific staff were well aware of and made allowance for the difficult conditions and the efforts which were being made by many to make conditions as comfortable as possible, it became painfully obvious that all was not well. Food had deteriorated, flies had increased. Further, the different and better attention given to Naval Officers who used the camp at weekends was too obvious to avoid comment. No real solution was forthcoming, but conditions were made sufficiently tolerable to be borne to the end.

[REDACTED]

7.53 At this time also the lack of accommodation for scientific staff in Zeebrugge came to a head, and the indifferent arrangements made in H.M.S. Tracker for the Assistant Director of the Radiation Hazards Group and members of his team added fuel to a continually smoldering situation.

Full Rehearsal

7.54 Results of the scientific rehearsal being considered sufficiently satisfactory, it was planned to be ready for a full rehearsal on Thursday and Friday, 18th and 19th September. This entailed great pressure on those who could be made available for completing the scientific plans, but the orders were in the hands of Assistant Directors just in time.

7.55 The rehearsal involved naturally the participation of all units of the force and it was only appreciated somewhat late in the planning that tidal conditions would control the departure of the L.S.T's from The Lagoon. It was thought that it would not be advisable for more than two of these ships to come out on any one tide, which meant that two days with enough water would be needed. Weather prevented any movements on Wednesday and, in fact, all three L.S.T's were brought out safely on Thursday, 18th September, and the rehearsal commenced, one day late, on Friday, 19th September.

7.56 Friday was a calm day and all proceeded according to plan. The ^{efforts} of boat control from Campana, arranged specially for the action phases, became apparent and requirements, facilities and actual events were co-ordinated immediately round one table. The touch of realism was heightened when a landingcraft was holed in the vicinity of North-West Island, and rescue and recovery operations became necessary.

7.57 Technical features of the rehearsal passed off satisfactorily. During the night, a complete loading of the radio-active components of the weapon, took place - the first time such an operation had been attempted. Incidentally, the components themselves, together with their escort, had only arrived by Sunderland aircraft that same morning.

7.58 Time had not permitted any detailed planning of the reconnaissance and recovery stages which would be needed after the explosion, but the evacuation from all sites was successfully rehearsed and the first parties to reconnoitre Trimouille, recover rocket samples and carry out water sampling went through their planned routes. Helicopter flights were exercised.

7.59 For the rehearsal, fire parties composed of personnel not directly concerned in the trial, were left at the various sites and on board Plym as a security measure, and these parties, assisted by others sent by helicopter, were available to switch off equipment when the rehearsal ended.

7.60 The weather remained calm over Saturday and by evening H.M.S. Narvik had re-entered The Lagoon to act as a rendezvous for parties and boats with duties around the Islands, while the remainder of the force returned to Farting Pool.

7.60 From a technical aspect, the results of the rehearsal were satisfactory and it could confidently be stated that a few more days for final preparations would see all in order. There were, however, on the Services' side of the rehearsal, a number of lessons learned, mainly concerned with the operation of evacuation from Plym and with the subsequent health control organisation. Further, there was still a considerable amount of recovery work to be completed to clear Trimouille of all unwanted encumbrances and to re-deploy for the recovery staff, phase III of the Operation.

Final Preparations

7.61 Taking all things into consideration, it was agreed that Wednesday, 1st October, would be the first possible day for D-1 which would mean that firing would occur next morning at about 09.30 local time (local time equals G.M.T. plus 9½ hours), and the intervening 10 days were spent at high pressure to complete arrangements.

[REDACTED]

7.63 [REDACTED] arrived on Monday, 22nd September, accompanied by scientific representatives from Australia and Canada. A much needed stimulus to scientific morale promptly resulted.

7.64 It was during this last period of preparation that the one and only source of trouble between the R.E.'s and the scientific staff occurred. It concerned the premature dismantling of certain buildings with alleged risk of damage to scientific equipment housed therein and the incident could have so easily been avoided if facilities for staff work and proper co-ordination of effort had existed.

7.65 It will have become apparent from reading this report that the programme was set by dates somewhat arbitrarily decided and that planning was one continual rush and itself usually overtaken by events. Though it had been realised long before the rehearsal that the weather would be the controlling factor and that, consequently, it might be necessary to remain in a state of immediate readiness for some considerable time, and further that once launched on the Operation, cancellation due to change of weather might have to occur; though indeed all this had been recognised, for lack of staff and time the somewhat complex technical and operational problems involved had not been examined.

7.66 [REDACTED] besides making a more detailed examination of the wind structure required to permit safe conditions for firing directed that the problem referred to above must be studied and, in the event, the orders for D day contained a guide for action in the varying circumstances which might occur. It would be proper, however, to point out that there was little opportunity for full discussion of these possible actions and that it was perhaps fortunate that they did not need to be put into effect.

The Event

7.67 By the evening of Thursday, 30th September, preparations were complete though, in fact, there had been no opportunity to brief the crews of the landingcraft, and it was hoped their experience of R-Day

[REDACTED]

would be sufficient. However, the weather on Wednesday, 1st October, was not favourable and a most useful 24 hours' respite with everyone at their stations, but relatively idle, was of great value in finalising arrangements.

7.6⁷ Weather in the early morning of 2nd October, though just about the limit for boat work was likely to become suitable for the trial and the announcement for D-1 was made. Preparations proceeded smoothly and a lull in the wind during the afternoon facilitated boat movements to an anchorage in the Lowendall Islands, some fifteen miles to the south of Hermite.

7.6⁸ By 18.00 all scientific equipment had been set in order, Plym had been abandoned except for the action party, The Lagoon was clear, H.1 was manned and the force as a whole was moving south from Parting Pool. Preparations continued as planned and without any hitch throughout the night and the weather prospects remained favourable

7.7⁰ Soon after 06.00 on Friday, 3rd October, all was ready in Plym and the final evacuation, some to Tracker and Narvik and some to H.1, occurred. Preparations at H.1, slightly disturbed by a fire which occurred in a nearby undergrowth, also proceeded satisfactorily, and just before 09.30 I.K. (just before midnight G.M.T.) the weapon was successfully fired.

7.7¹ Evacuation of the party at H.1 from Rum Cove followed almost immediately and phase III had commenced.

Phase III

Re-entry

8.1 During the morning watch the wind had dropped, the sea was calm and the day indeed perfect. The party evacuating from H.1, being declared free from contamination proceeded directly to Campania except for a few whose duties took them to Tracker. Prior arrangements for the rendezvous of pinnaces and launches all suitably canopied (see paragraph 3.10) with survey and re-entry parties were executed according to plan.

8.2 The scene in H.M.S. Tracker was one of intense activity. In the health control room, the meters alongside the large map of the island area were recording the dose rates at the gamma flux meter sites. Most of these were performing well except those near T.2 which had been damaged by the intense blast. Next to the control room the telemetry receiving laboratory was at peak activity and the staff were to be busy for the next 10 hours or so during which the flux telemetry would continue. Apart from some instability showing as "judder" on the monitor traces, this service was working well. In the Health Control room, dosage contour maps were being drawn up which were providing excellent information to assist in the briefing of survey teams preparing to enter some of the sites. ^{South} View of the T.2 beach area adjoining the ~~monitoring~~ spot of the erstwhile target vessel ~~showed~~ the contamination was not too high. Fall-out of contaminated rain to the north of T.2 had, however, caused extremely high dose rates and the area was much too dangerous to enter.

8.3 Survey teams and boat crews were prepared for entry to the contaminated areas. Passing through the "clean" side of health control, they collected from various compartments protective clothing, film badges, wrist-watches, radiac instruments etc., and went to the changing room. Undressing there, they were weighed and then dressed in their protective clothing, proceeding thence to the embarkation space to await the boats which were to take them ashore.

8.4 Briefing of the survey parties and health escorts attached to recovery parties was made in the health control office. The briefing

schedule on D day was as follows:-

<u>Time</u>	<u>Party</u>
10.15	Three water survey parties and one land survey party.
10.45	De-briefing of health escorts from H.1. to
11.05	Health escort to party/reconnoitre a site suitable for the beta-gamma ratio measurements.
11.15	Second land survey party, beta-gamma ratio party and one boat's crew.
11.25	Health escort for rocket recovery party.
11.35	Rocket recovery party plus special crew. <i>dan busy</i>
11.45	Health escort for the beta-gamma <i>beta-gamma</i> recovery party.
11.55	Beta-gamma <i>Beta-gamma</i> recovery party plus special boat's crew.

8.5 All parties were briefed on the following pattern:-

- (a) The task allocated was defined, together with its probable duration.
- (b) The expected radiological situation in the area to be visited was outlined.
- (c) The maximum permissible radiation dose was stated and parties reminded that the health escort was responsible for radiological safety and that his instructions must be followed.
- (d) Personal measures for protection were described and men were reminded they could not eat, smoke or drink from the time they left health control until they returned.
- (e) Usually a navigational briefing and a short talk by the Medical Officer were added.

8.6 Throughout the day it continued to be busy on H.M.S. Tracker. One part of the deck had been roped off as a "dirty" area which men entered as they returned from their duties. Here, de-contamination teams relieved them of their contaminated records or instruments which were placed in special sections for subsequent monitoring. Their overalls, gloves, boots etc. were removed, monitored and placed in appropriate

bins to be dealt with later. The men, clad in under-pants, now passed below to the "dirty" side of the decontamination control. Further monitoring of various parts of their bodies was made and then they passed [^] into the clean side of the health control, were weighed, given a drink and some salt tablets and then they dressed. De-briefing generally took place afterwards in the health control office, where they gave details of their activities on the sites and any other information which was useful in building up a picture of the radiological conditions on the islands.

8.7 The almost totally enclosed nature of the protective clothing caused men to sweat profusely while on their duties on the islands. However, no genuine complaints were made that the clothing had been over-elaborate and the general opinion seemed to approve its suitability. Conditions were not unbearable in this rig and hardly ever even unpleasant. The average loss of weight by men on any trip was about 7 lbs., although 14 or 16 lbs. were occasionally lost - usually by men of ample proportions who could afford it. A few long drinks soon rectified the loss, although arrangements for obtaining drinks on H.M.S. Tracker could hardly be described as good. This was so throughout the recovery phase. Many men were forced to spend long periods waiting in this ship because of the nature of the Operation and paucity of transport. They brought sandwiches for lunch but the provision of drinks of tea or lime-juice appears to be more than naval arrangements could stand. The ship, it should be realised, had very limited messing facilities but, nevertheless, some reasonable attempt to provide adequate liquid refreshment might well have been made.

8.8 At first, the de-contamination teams were naturally slow in performing their duties which they did with perhaps more scrupulousness than was really necessary. This slowed down the flow of men through the health control and caused many to sit around in "dirty" clothing for periods of an hour or more, waiting their turn at the de-contamination reception. This was perhaps inevitable, since it was the first time this Operation had been done on such a scale. It produced, of course, many complaints from very thirsty men still muffled up in their overalls in the "dirty" pen, keen to be released to quench their thirst or have a smoke. After a few days of practice, a smoother "conveyor belt" system

[REDACTED]

was in operation as the de-contamination team became more experienced.

8.9 The recovery and survey duties on D day proceeded as planned. Samples of contaminated water were obtained by the helicopter crews. Four rocket heads were recovered from the south of Trimouille and were ideally contaminated. Indeed, the Rocket Recovery Party received a fair measure of contamination on their hands in the performance of their duties, but this was satisfactorily dealt with by health control. Land survey parties were active and the southern half of Trimouille was quite well explored. A boat tried to penetrate Gladstone Beach but had to turn back as the radiation level rose too high for safety. In general, everyone was very satisfied with the results of the first day of re-entry.

8.10 The following day, D + 1, was not suitable for re-entry as the seas were very rough, but on D + 2, a successful day of work followed. Records were being recovered from south of Trimouille and most of this area was down to mean working tolerance except for local spots where highly active parts of the target vessel had landed. In the northern area of the island, however, it was doubted if much re-entry would be possible before D + 28. Hermit was clean, although Stephenson Channel could not be used and a southern approach was essential. T.1 had to be approached from the east. It was decided that the Health Ship would operate daily from the Parting Pool, retreating at night to the vicinity of the Base Ship to distil and facilitate transfer of staff night and morning. On D + 2 day, the Health Ship operated safely in the Parting Pool.

8.11 By D + 7 day, many records had been retrieved from contaminated sites and a daily programme of recovery had been running. A party landed at Gladstone Beach on this day and penetrated by Landrover towards site T.4 until the dose rate became too high for further progress. The vehicle broke down and had to be abandoned and the party withdrew. Rose Island, Alpha Island and Jonquil Island were visited by survey parties. From the tower at A.4 it was possible to see, clearly defined by its grey colour, the limits of the "fall out" stretching north-east across Jonquil, North Blue-bell, Gardenia and Kingcup Islands. By this time, a complete picture of the radiological situation was being evolved.

8.12 Meanwhile, during D day and subsequently for some days activity in the base ship continued at high pitch. Innumerable photographic records awaited development, and a darkroom waiting list was prepared. Teams were allocated a few hours each day which continued throughout the first few nights without a stop. [REDACTED] was anxious to obtain some preliminary information on the effect of the weapon and a whole-hearted effort was being made to provide the results he required. There was an overall feeling of satisfaction and achievement and the number of observational failures on the trial was very low indeed. Unusually good fortune, not normally associated with the caprices of fate in field trials, appeared to have been the rule rather than the exception.

8.13 At the same time, parties were employed at H.1 dismantling, packing and back loading equipment and this part of the task was accomplished well within the time occupied by re-entry, survey and recovery of records on Trimouille.

8.14 On Thursday, 9th October, [REDACTED] and a small number of the scientific staff taking spare weapon components, left for Onslow in H.M.A.S. Hawkesbury and thence to U.K. by Hastings aircraft.

Recovery

8.15 The programme of recovery of records and apparatus continued as rapidly as weather allowed. From the 12th - 15th October inclusive, a strong south-westerly gale raised such a swell ^{at sea} that boat work was impossible and at Daisy Trot in the Parting Pool, now used as a mooring for "dirty" boats, an L.C.A. sank at her moorings. A motor launch was driven ashore but salvaged later and one motor pinnace was lost altogether.

8.16 On Thursday, 16th October, it was possible to recommence work and the recovery of all equipment on Hermite was soon effected.

8.17 It also became possible to approach various parts of Trimouille directly from the sea and the recovery of records and equipment not too badly contaminated was ^{thereby} ~~to be~~ accelerated. Thursday, 23rd October, (D + 20) was the last day of planned re-entry and recovery, after which transport and plant still fit for salvage was de-contaminated and embarked.

[REDACTED]

8.18 A programme of demolition to remove any tell-tale traces of the effects of the explosion was arranged and executed by the Royal Engineers.

8.19 During this period (phase III) H.M.S. Zeebruggee, who had moved there on D day as soon as rocket and water samples were received, remained off North Sandy Island about 40 nautical miles south of ground zero. This position was chosen to be clear of any back ground radio-activity and also in the hope that it would provide a sufficiently calm anchorage where the delicate balance used for weighing chemical samples could be used. This latter hope was not realised and what delicate weighing was possible was done on shore at Onslow.

Departure

8.20 The last few days at the site were devoted to stowage of equipment for the return trip and to making arrangements with H.M.A.S. Hawkesbury and a party of Australian personnel who were to remain behind as guards and observers on the Islands.

8.21 On the last night the sunken L.C.A. was raised, mainly because the Royal Marine Officer in charge of landingcraft was determined to return with his full complement.

8.22 On Thursday, 30th October, H.M.S. Zeebruggee, who had returned from Onslow on 26th October, proceeded thence again accompanied by H.M.S. Narvik. At Onslow, they embarked equipment from the staging camp established there and reached Fremantle a few days after Campania.

8.23 On Friday, 31st October, at 10.30 Campania slipped and proceeded leaving Tracker to follow as soon as satisfactory "cleaning" of H.M.A.S. Koala, who had been lifting buoys and the L.C.A. was accomplished. H.M.A.S. Hawkesbury remained as monarch of the Islands having established a small shore camp on the South-East Island.

8.24 Monday, 3rd November, found Campania in Fremantle, and arrangements for departure of most of the scientific staff by Hastings flights were completed. One party left on Wednesday, 5th November, as planned, but the second, due to leave on 4th November, did not get away until the 8th, on which day also Zeebruggee, Narvik and Tracker arrived from Onslow. The last scientific party to return by air transferred normally to Tracker to await arrival of the aircraft, and they got away on the 15th November.

8.25 H.M.S. Campania, with her remaining six scientific staff, although only one was truly scientific, left Fremantle on Sunday, 9th November, arriving back in Portsmouth on Monday, 15th December, after a very pleasant passage via Aden and Gibraltar. Campania moved to Chatham where she arrived on Thursday, 18th December, for unloading of scientific stores and personal baggage.

8.26 H.M.S. Zeebrugge and Narvik followed Campania though via more ports of call and reached Portsmouth in the middle of January.

8.27 Before starting the long home-ward passage, it had been necessary to repair the bow doors of H.M.S. Tracker and, consequently, she followed independently, arriving at ^{Doverport} Davenport in February, where her scientific stores were unloaded.

8.28 Thus was the Expedition brought to a close.

Retrospect

9.1 Technically and operationally the trial was an undoubted success. Social and administrative problems were, however, ever present and though this must be to some extent a matter of opinion, it is generally believed that the margin between success and failure was dangerously narrow.

9.2 That this was so is attributed to the lack of harmonious relations between the naval and civilian participants in the Operation. The demands on scientific staff in a trial of this nature can only be made when the staff have little else to worry about; in Hurricane they were, generally speaking, not well housed nor readily transported to their work, nor were they supported with facilities to which they are accustomed. All these disadvantages can be and were accepted for a period and with the spur of working to a date, much was accomplished. By great good fortune the planned chronological programme and favourable weather conditions were coincident. As events turned out, had firing not been possible on the 3rd October, the next forecastable occasion was about the 23rd October and the effects of such a delay, both technically and administratively though they cannot, of course, be stated with certainty, would have given cause for grave and legitimate doubt of the success of the Operation.

9.3 There were, it is suggested, two main causes of the difficulties which arose.

9.4 The fundamental one is perhaps psychological and the result of the inherent different training and outlook of the two services and essential difference in their duties. The fact that the civilian staff functions more as a democracy while the Navy is more autocratic, has a considerable bearing on the difference, and civilian staff undoubtedly obtained the impression that while the R.E's went all out in their collaboration, the Royal Navy were more concerned with going about their own business in their own way, and would deal with any requirements for Hurricane which they considered necessary, also in their own way.

9.5 The second cause, though more factual, perhaps stems from the first. There was no real co-operation and co-ordination of planning. During preparations in the U.K., the R.E. headquarters was at Fort Halstead and it was there essentially that all the scientific planning of the Operation had to be done. The beneficial effects of this feature were obvious in the excellence of the preparations for the site. How tremendously valuable would it have been had the Naval staff planners also been at the Fort and how almost inevitable would it have been for an integrated headquarters staff to have grown up. At the Islands, the situation was worse. L.S.4, with C.R.E., was in The Lagoon, and virtually in direct command of active operations, although both he and his staff were virtually unknown to the scientific staff. The Naval Commander and scientific controls situated in Campania in Parting Pool were still poles apart and it must now be very clear that this very unequalateral triangle made neither for harmony nor efficiency.

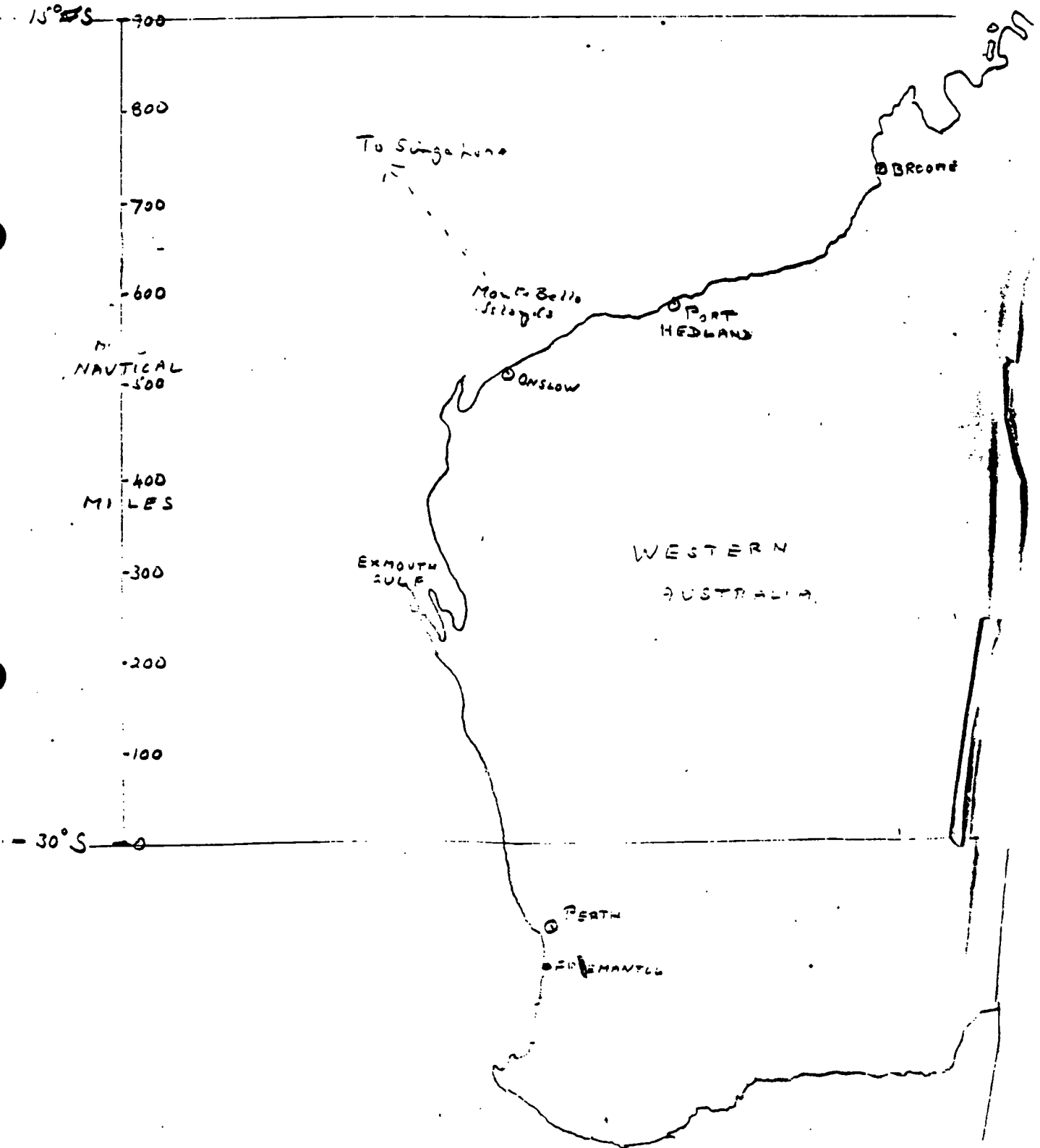
9.6 More detailed improvements should another and similar trial ever be staged will be readily apparent from the report and cover:-

- (a) Better accommodation and better working facilities for scientific staff.
- (b) Reasonable accommodation near to the scene of operations.
- (c) Best possible transport facilities.
- (d) Main journey to be made by air.
- (e) More ancillary assistance in the way of working parties, typing, messengers, etc.
- (f) Improved site communications.
- (g) Better store arrangements.



9.7 Finally, let not any criticism in this report cloud the essential fact that the first British atomic explosion was staged successfully under conditions inherently difficult in themselves and posing problems novel to scientific and Service personnel alike.

1100



Appendix B - STORES.

The responsibility for arranging the packing, transport and delivery of the Scientific Stores to be used in 'Hurricane' lay with the Assistant Director of Technical Services 2, but this was only one of his duties as officer responsible for the Ministry of Supply administrative details associated with the trial. Writing long after the event it can be stated categorically that this was a fundamental mistake and that only by the full time attention of a sufficiently experienced officer can that essentially necessary smooth handling of stores be achieved.

2. Initial arrangements were made for stores to be sent to Woolwich by teams concerned where they would be packed by professionals into cases already ordered and then transported to H.M. Ships Campania, Tracker or Plym as appropriate. It was hoped stores would begin to arrive at Woolwich by 1st April, 1952 and it was expected that loading would start early in May.

3. The plans miscarried from the start; sufficient skilled packers were not available, space and facilities at Woolwich proved inadequate.

4. By the 1st April the packing cases ordered had been received and despatched to the various outstations which had decided to do their own packing, namely Aldermaster Harwell and Shoeburyness.

5. A 'packing instruction' schedule had been drawn up and circulated to leaders of teams which, if properly followed, would doubtless have been of great value. Unfortunately, however, a combination of circumstances caused by lack of supervision in some individual teams and great delay in equipment being available for packing resulted in a fairly widespread neglect of the instructions. The effects of this will become apparent later in this review.

6. Liason with the Naval Staff was never satisfactory, partly on the score of security and partly because the organisation within the trials ~~set-up~~ was faulty. The stores lists provided bore little relation to the facts and attempts to arrange an orderly loading plan came to nought. Finally the delay in completion of the U.A. rehearsal until 8th May, remembering that stores had to be loaded by 23rd May, completed the chaos in the arrangements.

7. Stores packed at outstations, vide para. 4. above were loaded reasonably well to time, but their availability and loading order was adversely affected by the problem as a whole. As a last resort it became necessary largely to discard the Woolwich packing plan and to pack about 900 cases by local labour at Port Halstead. This considerable task was only just accomplished in time by an all out effort and in fact some twenty tons of stores remained to be sent from loading at Portsmouth when 'Campania' sailed from Chatham on 5th June.

8. The loading arrangements into Campania were very unsuitable. Many cases were known to have been tipped off the lift to the deck about four feet below and then rolled over and over into any available stowage.

For Tracker the arrangements were better though here again the planned stowage arrangements to facilitate timely unloading broke down. Some stores were loaded in the wrong ship, resulting in anxiety and doubt as to whether equipment had been loaded at all and consequent unnecessary signal communications.

9. On the day after departure from Portsmouth, Wednesday 11th June, a meeting was held at which the concern of all about the conditions of the stores was expressed. A tentative idea of the size of the problem involved was obtained and an outline plan of how it should be tackled was agreed.

10. Before loading, stores had been marked with a colour code to indicate destination; with a Team designation and number and also with gross weight. Further, the considerable number of cases required to be opened for attention during the voyage had been so marked.

11. The plan of action was based on sorting and further marking of cases into priority categories for landing and for this purpose these categories were designated:-

- 'U' - (Urgent). Loads for first day to get as many sites as possible started on work.
- 'E' - (Early). Loads which must be got out of the way to expedite the main unloading, and not because they are necessarily required early. (This category in practice disappeared).
- 'S.P.' - (Soon as possible). Loads to get every site well started on work.
- 'D.C.' - (Due Course). Loads to follow S.P. and complete supply of equipment needed for erection of apparatus.

For the considerable quantity of spare equipment carried, categories were allocated as under:-

- 'S' - (Spare). Which will be landed as and when required later, usually in bulk but some by retail.
- 'C' - (Campania). Which must be kept available on board for day to day use and landing retail.

(Note - The marking 'C' proved a mistake since it was often confused with 'U' when cases were other than the correct way up.)

12. All teams were asked to forward numerical lists showing their priority requirements and, as far as possible, to find and mark their cases accordingly. To a great extent this was done but some teams experienced difficulty, either because details of stores loaded were not available or because original markings had been confused.

13. Favoured with calm weather conditions, and this feature can hardly be too much emphasised, a start was made on the physical sorting problem. Assistance from ship's staff was meagre for some time and progress slow. By the time of arrival at Gibraltar it had become clear that a really major operation was involved.

14. After leaving Freetown (23rd June) a considerable quantity of stores for PLYM were moved to the Flight Deck preparatory to transfer at Simonstown and a small but regular party of seamen under a Petty Officer assisted by a varying number from M.O.S. started ~~on~~ on the re-sorting. Progress was still slow and difficult primarily for lack of space in which to sort the various categories. After leaving Simonstown, however, it was possible to move a further large consignment of stores for off-loading at Fremantle onto the Flight Deck and this provided the much needed working space.

15. Between Simonstown and Mauritius and again on passage to Fremantle moderate seas on two occasions of a day or two prevented further sorting of cases, but on the whole the weather continued remarkably favourable and by the time Fremantle was reached the stowage situation was completely in hand, all cases 'wanted on Voyage' had been found and the technical situation was satisfactory.

16. Though it was known that many of the cases had received rough handling the damage discovered in those examined during the voyage was slight and only relatively few cases of serious damage came to light subsequently.

17. Before reaching Fremantle the whole plan of unloading was re-considered in the light of the experience of weather conditions being reported by the advance party already at the Islands.

18. In the Farting Pool, where Campania would berth, it had been found that weather conditions were frequently too bad for loading or unloading stores into landcraft and even sometimes too bad for boats to operate at all. In the lagoon, however where Tracker and the other L.S.T.'s were berthed, conditions were more sheltered and it was exceptional to have a day when stores could not be worked. These factors lead to considering the advisability of transferring at least a portion of the stores in Campania into either Narvik or Zeebrugge at some suitable anchorage on the Australian coast with the object of ensuring, at the expense of the time taken to carry out the transfer, against any prolonged delay due to unfavourable weather on arrival at the Farting Pool.

19. A change of this nature involved a fundamental alteration in the general unloading plan and it was decided to suspend action on such a change until L.S.L. and C.R.E., who were to meet Campania at Fremantle, had been personally consulted.

20. In the event the insurance plan was dropped. It was made clear, by L.S.4. that bad weather conditions in Parting Pool, if they prevented landing of stores, might also prevent the passage of an L.S.T. into the Lagoon although once there she could probably disembark stores. Further, as a result of experience in unloading Narvik and Zeebrugge, L.S.4. and C.R.E. were of the opinion that it would only take a few days to get at least the Category 'U' and 'S.P.' stores disembarked from Campania and that acceptance of night work if necessary, when weather conditions were usually better, would be a better plan than the suggested transfer to an L.S.T. Lastly, the dislocation to the organisation and work in progress at the site by the temporary withdrawal of an L.S.T. for the transfer would be considerable.

21. On leaving Fremantle the final preparations for unloading were put in hand. It had been confirmed with L.S.4. and C.R.E. that initially stores were to be landed only at H.2. for Hermite sites and at T.3. for Trimouille sites. At T.3. a stores distribution centre had been arranged to facilitate the sorting of stores for the numerous sites on Trimouille and also as a holding point for stores subsequently to be transferred to N.W. and Alpha.

22. While a reasonable priority landing plan was possible and necessary in the case of stores carried in Campania, in Tracker such a plan was neither possible nor, fortunately, so necessary. The tank deck in Tracker was stowed to capacity and would have to be unloaded just as stores became available at least until a reasonable working space became free in which to sort and lay aside any low category requirements.

23. It had been decided and agreed that the craft available for landing stores from Campania would be two L.C.M.'s and five L.C.A.'s with more available if they could be worked. So long as weather permitted priority would be given to Campania but as soon as possible one L.C.M. was to be released to Tracker. Tracker would have all the remaining available craft.

24. It was estimated that an L.C.M. could carry 1000 cu. ft. with a limit of 35 tons and an L.C.A. 360 cu. ft. with a limit of 5 tons.

A calculation of the size and weight of the cases in which stores were packed proved that the unloading plan could be designed on capacity only and in practice it was found that while L.C.A.'s could take but little more than 360 cu. ft. a load for an L.C.M. was of the order of 1500 cu. ft.

25. In Campania lists on a 'priority destination' basis were prepared showing case markings and cubic capacity. Further blank lists were prepared for handing to the coxswain of the craft concerned on which was to be completed the case number and cubic capacity of each item loaded. The latter list was to come back eventually from the receiving end as a check in the event of cases mis-carrying.

26. In addition to the cased and crated stores, there were a large consignment both of lead-acid and of NiFe batteries to be landed and distributed to the various sites with a considerable follow up, 100%, of lead-acid batteries to be filled, charged and subsequently distributed. Lastly there was a considerable quantity of Naval R/T equipment to be landed and erected for scientific use which was included and treated as part of the general load.

27. On 6th August, therefore, and in accordance with the plans and arrangements previously outlined, a start was made with getting category 'U' and 'S.P.' stores on to the Flight Deck.

By this time it had been possible to get a good proportion of the category 'S' and 'C' cases into the smaller cages and clear of the main gallery spaces. By the time of arrival on site, 8th August, it had also been possible to clear sufficient of this main space of category 'D.C.' stores to allow the lifting of the portable plates over the three large cabinets stowed below. These cabinets were 'S.P.' category and their landing involved a very considerable operation in itself.

28. By the morning of 8th August preparations were as far advanced as possible and Campania secured to the buoy in Parting Pool at 1230 H., in perfect weather.

29. By 1600 three L.C.M.'s had been loaded, the extra one taking two Land-Rover urgently needed on Trimouille to assist stores distribution, the other two taking respectively one Land Rover and stores for Hermite and the two Kerr-Cell cameras and more stores for Hermite. The Kerr-Cell cameras stowed for passage on the fore well-deck of Campania had been transferred to the flight deck while at Fremantle. An M.O.S. party for a reconnaissance on Trimouille was also sent ashore but no M.O.S. personnel landed on Hermite.

30. Saturday 9th August brought rougher weather and delayed the landing of working parties to help unload and distribute stores, but by noon conditions improved and by late evening four L.C.M.'s had been loaded; one with stores for Trimouille and three for Hermite. L.C.M.'s proved easy and quick to load and, with the ready co-operation of almost every officer and man in Campania, by evening all category 'U' and 'S.P.' stores (except the Cabinets) were out of the ship and a very considerable proportion of D.C. stores were also away.

31. In the discussions at Fremantle, L.S.4. and C.R.E. had stressed that in their opinion the way to make best progress would be to concentrate on getting all stores ashore at beach-heads and then to distribute to sites, since resources of cranes, transport and man-power precluded both operations proceeding at once. Such a procedure, however, was most unacceptable to M.O.S., since it meant work could not start at sites until distribution was well under way. When the 'U' - 'S.P.' etc. organisation was explained and appreciated it was agreed that the transfer of the high category, but relatively small quantity, 'U' and 'S.P.' stores should proceed right through to sites but that as soon as this was completed all efforts should be concentrated on unloading and holding at beach-heads the remaining equipment

32. It was arranged that L.S.4. should have charge of the general unloading arrangements; that C.R.E. would be responsible for providing transport and man-power for distribution and that M.O.S. would send responsible officers to each landing beach as well as have team representatives at all the sites to receive and unpack equipment.

33. Arrangements for dealing with empty cases were also agreed and promulgated.

34. On Sunday 9th August the sea was again rough and Campania's pinnaces which had been hoisted out on Saturday were not able to run. This affected the unloading programme only to the extent that an L.C.M. had to be used for landing working parties and M.O.S. personnel.

Later in the morning conditions improved sufficiently to load L.C.M.'s and by tea time all stores for Hermite and Trimouille, again except the cabinets, were off loaded.

An operation which it was estimated might have taken 5 - 7 days was thus 95% completed within 48 hours, but the weather portents were ominous and it cannot be too much stressed how fortunate and favourable had been the conditions for working stores since departure from Portsmouth on 9th June.

35. On Monday 10th August conditions for an L.C.M. to come alongside and even embark personnel were too bad and attempts were abandoned.

Two of the three cabinets were hoisted on to the Flight Deck ready for better weather and good progress was made in re-stowing and arranging cases for 'S' and 'C' category stores.

36. Two of the smaller cages were turned over to T.S.2. and O.P.2. respectively for use as ready-use stores where items could be unpacked and set out on shelves and racks. In the larger cage 'C' and 'S' category cases were grouped according to leaving reasonable working space.

37. Weather conditions were worse on Tuesday and all that could be done was to get the third cabinet on to the Flight Deck and complete the re-stowing arrangements.

38. The enforced scientific inactivity was perhaps a blessing in disguise to the extent that it brought to light the need to ensure against being marooned on board and lead to the establishment, with considerable speed, of camps ashore for M.O.S. personnel on both Hermite and Trimouille Islands but in fact the rough weather had a negligible effect on the unloading of stores programmes.

39. Unloading from Tracker proceeded almost uninterrupted. On arrival there was considerable work to be done in clearing the upper deck, removing hatches, etc., before a start could be made and this, providentially, allowed the allocation of extra L.C.M.'s to Campania. By Monday 10th August a good start had been made and by this time the distribution to sites of high category stores ex Campania was virtually complete.

Thus a steady unloading shuttle service was run between Tracker and T.J. beach-head, where most of her equipment was consigned, and by Tuesday evening 60% of stores had been landed.

There was a risk that if rough weather continued a shortage of working parties might retard operations but, in the event, this did not occur and on Friday 15th August Tracker was empty.

40. Stores for Alpha and N.W., relatively small in quantity, had been retained in Campania with the intention of landing them at their proper sites on some agreed dates. Experience of weather conditions showed, however, that it would be more expeditious to land them at T.3. at the first opportunity for subsequent transfer to their proper sites when transport and man-power became available. Similar stores ex Tracker had already been landed at T.3.

41. On Thursday 14th August conditions had improved sufficiently to get parties ashore and on Friday 15th August the stores for Alpha and N.W. were landed at T.3. It was still too rough to attempt the hoisting out of the cabinets but, at this stage, their non-availability at sites was not delaying progress.

42. The swell died down considerably on Friday night and at 0700 on Saturday 16th August the first cabinet was hoisted out into an L.C.M. All three were away by 0900 and two reached their sites by the evening and the third on Monday 18th August.

43. On Monday 18th August the NIFE and on Tuesday 19th August the bulk of the first consignment of lead-acid batteries were landed. On Wednesday 20th August the bulk of stores for N.W. were transferred from T.3. and similarly on Thursday and Friday the transfer from T.3. to A.4. completed the main operation of landing and distributing scientific equipment. The minor operation of transfer of H.3. equipment from H.2. was completed on Wednesday 27th August.

44. Allowance was made in the daily boat routine for a stores delivery trip leaving Campania in the middle of the fore-noon. On the whole this arrangement worked well though bad weather often interfered and some teams insisted on taking stores and equipment with them on other routine trips, usually causing delay and extra work thereby.

45. On Trimouille and Hermite stores distribution centres were set up under the control of T.S.2., each with a store-houseman provided by C.R.E.

46. In paragraph 28 reference was made to the handling of empty cases. In considering this matter the probable methods of back-loading were taken into account and it was agreed as likely that very soon after D day it should be possible to commence packing and back-loading from Hermite but that it was not possible to forecast any programme for dealing with equipment from the other islands. It was decided, however, that all 'empties' which would be required for back-loading must be clear of Trimouille and the Western Islands before D day.

47. On this basis instructions were given that:-

(a) Teams should retain cases required for back-loading any equipment to be cleared before D day.

(b) Teams should mark all other cases 'M.T.' if required for re-packing after D day ~~or~~ 'U.S.' if not so required and place all cases on the nearest road approach to the site.

(c) Cases would be collected, as transport and personnel became available, under the general direction of C.R.E. and L.S.4. and disposed of as under:-

(i) 'U.S.' to be destroyed.

(ii) 'M.T.' on Hermite to be grouped in a convenient place and on Trimouille and the Western Islands to be shipped to Tracker if belonging to Teams M.E. and R.H. and to Hermite if belonging to any other team.

NOTE: It was originally hoped that both Tracker and Narvik would have been able to take back-loads of scientific stores, leaving only for Campania all the equipment from Hermite and other delicate electronic apparatus.

48. The press of work and higher priority requirements from the time of landing stores right up to the declaration of R - 1 day on Friday 19th September did in fact prevent any real attention being given to the clearing of empties from Trimouille and

the Western Islands nor could any serious consideration be given to a back-loading plan for scientific stores. Consequently between 'E' day and the declaration of the Stand-by period for D day there was some confusion and uncertainty over the state and progress of back-loading.

49. By the night of Tuesday 30th September, however, all back-loading for D day was completed with only relatively minor discrepancies of the plan.

50. Hitherto, while the nominal and paper responsibility for stores had remained with T.S.2., the executive responsibility for their handling had been taken over by T.S.1. from the time of leaving the U.K. From D day the responsibility for arranging back-loading was taken over by [redacted] on behalf of M.O.S. and in Campania he was assisted by [redacted] specially detailed for the purpose.

51. D day was on Friday 3rd October and on Monday 6th October the dismantling and packing of equipment on Hermit commenced. Rough weather interfered for two spells of about three days each but by Saturday 25th October 90% of all recovery and salvage had been completed.

52. On Monday 27th October all remaining equipment had been loaded into L.C.M.'s but it was not until Thursday evening 30th October that all these craft could be unloaded and themselves hoisted in Narvik, illustrating once again how dependant upon favourable weather was the progress of the expedition throughout.

53. The foregoing recounts, briefly, the history of the facts concerning the handling of stores for Hurricane.

Although the author believes that in no case did a stores hitch delay the operation all who were in any way closely concerned with the problems involved will probably agree that there was many anxious moments and many lessons learnt which can usefully be applied to any future expedition.

54. It is suggested that the most important lesson is the need for closer and more intimate co-operation between M.O.S. and Service representatives.

On the one hand we, in M.O.S. were unappreciative of the difficulties for stowage of stores in Campania while Officers of this ship were equally overwhelmed by the quantity, type and weight of equipment sent down for transport.

Fundamentally adequate time must be allowed for the proper receipt and initial stowage of stores.

55. A stricter system of control of the marking of cases, solely within the jurisdiction of M.O.S., would have obviated a number of minor problems. It is suggested that each team should contain a nominated and responsible stores member who would be available to work in close co-operation with the central responsible body.

56. A system of priority marking for unloading is valuable, though the danger of a multiplicity of code markings is realised. Markings should in all cases be on top and on all sides of every container.

57. At the site the contact between M.O.S. and Service representatives when stores were concerned was even more nebulous. Executive responsibility for almost all activities, both ashore and afloat, was delegated to L.S.4. and it was through L.S.4. that C.R.E. received his directions. What head-quarters organisation M.O.S. possessed was situated in Campania and dealt with L.S.4. through C.T.F.4. As stated paragraph 48, the stores were delivered and recovered - and in time but as an example of inter-service planning the organisation left much to be desired.

58. The most it was possible to achieve, under the geographical and weather conditions of the site, was for a representative of M.O.S. to attend the meetings held by L.S.4. on Saturday forenoons. These meetings were not, at any rate for the first few weeks, attended by any representative of C.T.F.4.

Even this minimum of direct contact between L.S.4. and M.O.S. was of the greatest value mainly because of the direct contact thereby with C.R.E., and there is no doubt, in the author's mind at any rate, that a bi-weekly meeting at least between C.T.F.4., M.O.S., and C.R.E., with L.S.4. present or represented to take the necessary executive action would have been a sure means of obtaining a smoother flow of activity. At the discussions at Fremantle the holding by L.S.4. of a daily meeting at 6 P.M. to discuss future activities was mentioned but it is believed no such meetings were held nor would they have in fact been possible unless all concerned were in close proximity, i.e. all in the Lagoon or all in Campania.

59. This point is one which is, of course, not confined by any means to the stores problem. It affects equally every aspect of the operation and because, thanks to the good will, common sense, and hard work of all concerned the operation went through with conspicuous success this will be no reason for complacency and it is to be hoped that the experience of Hurricane will assist the smooth running of any future expeditions.

This appendix G was accidentally left behind
when consignment 14 was sent.

It should be with [REDACTED]

Report, which is a thick document with
various letters ^{stapled} on top. The first one should
be ref 461/10/54 V to Deputy Director.
dated 4/10/54 & is about friction and relationships!
Very sorry [REDACTED]

Appendix C. - 3:17 PM 1952

During the planning stages of Hurricane it was understood at Fort Halstead that the craft available for water transport at the site would be:-

- 5 L.C.M.'s
- 12 L.C.A.'s.
- 6 Motor Launches.
- 8 Motor Pinnaces.

2. Details of the speeds and carrying capacity of these craft were also given and an estimate was made and tabulated of the length and time of the various trips which it seemed likely would be required.

3. On the voyage out some details of landing places, buoyed channels and boat routes which were being used by the advance party were received and with this information and an estimate of the volume of likely traffic a draft boat routine was made out.

4. The draft was based on the principle that there would be a large number of people to be landed for work in the morning and collected in the evening, and that during the day small parties would require to visit the more out-lying sites for at least half-a-days work at any of them. Although circumstances caused considerable modifications very soon after arrival on the site the principle adopted was the basis of all routines subsequently used.

5. After discussion with the staff of C.T.P.4. the draft was further considered with L.S.4. and his navigating officer who met Campania at Fremantle.

6. Three main points of criticism arose. Firstly the services were too tightly timed - a matter easily rectified by increasing the times allowed for calls and journeys. Secondly it was considered the routine would require more craft than could be made available and, nasty shock as it was, it had finally to be agreed that not more than 1 L.C.M. and 5 L.C.A.'s could be allocated regularly to a routine. Thirdly it was pointed out that many of the landing places were tidal, which necessitated special treatment for reaching some of the smaller island sites.

7. The small number of craft which could be made available for routine running, compared with the numbers quoted in paragraph 1, was based on the numbers which, it was thought, could be kept servicable, taking into account the need also to provide water transport for R.E. Working Parties, Provisioning of Camp on Hermitte and each ships' own requirements. Landing craft had already been running very hard for three months and were showing signs of wear and maintenance facilities were badly stretched.

8. The tidal situation presented another minor nandicap. Landings most affected were those for N.W. Island though approaches to Alpha and the beaches at T.2. and D.2. were also restricted at spring low waters. Enclosure '1' illustrates the situation as it existed for the month of September, 1952.

9. A further point made by L.S.4. concerned the fears of C.R.E. about shortage of land transport and the need to make the most use of boats. This, of course, aggravated the boat shortage problem and in the event it became necessary to make considerable use of land transport, running a bus service on Trimouille designed to connect with the boat routine.

10. The boat control organisation as laid down by L.S.4., and which it was agreed should continue, comprised radio control of all movements from "CONTROL", situated in one of the L.S.T.'s berthed in the lagoon. A Captain, Royal Marines was Landing Craft Control Officer (L.C.C.O.) and in charge of craft maintenance. He was usually but not always in the L.S.T. exercising 'Control' and on arrival of Tracker he had a [redacted] as his deputy and assistant.

11. In theory, at any rate, the system appeared fool-proof. A boat routine was to be established and no departure from it was to be permitted except with express permission of 'Control'. Control was so positioned that 90% of the craft journeys could actually be seen and so centrally placed that the best means of over-coming break-downs and delays could readily be organised.

12. Unfortunately in practice the scheme did not work so perfectly. Control was not sufficiently in touch with M.O.S. requirements, centred as they were in Campania. The system of requirements (by M.O.S.) linked by command (of C.T.F.4.) to control (L.S.L.) was never clearly defined and the misunderstanding which occurred were many, irritating and time wasting.

Much delay frequently occurred because some one person or small party was adrift. This was particularly noticeable and with worst effect during the early morning landing services and the return services at night.

13. A boat routine finally thought suitable was agreed and issued, with an explanatory memorandum to M.O.S. personnel. A routine, typical of all those issued is included as Enclosure '2'.

14. In addition to the routine service, to be run by six landing craft, it was arranged that up to three motor pinnaces from Campania should be available for extra and short notice requirements.

15. During the unloading period it had been agreed all craft would be needed for disembarking stores and accordingly a skeleton boat routine was made out to cover this period. In practice much wasted effort was put into the drawing up of this routine; the first edition had to be cancelled as being too ambitious, and the second edition was only used for one and a half days on account of weather conditions prohibiting boat work.

16. The incidence of rough weather during the first days at the Islands resulted in a major change of dispositions and thus in the requirements for a boat routine, consequent upon the setting up of camps on Trimouille and Heraite.

It was arranged for camps to be occupied during the working week; personnel returning to Campania in the afternoon of Saturdays for rest, baths and general recreation. Personnel were to be landed again first thing on Monday morning.

17. It will be remembered that the basis of the first agreed boat routine was the distribution and collection of personnel centred in Campania and while the new situation eased the problem considerably from the point of view of numbers to be carried, the frequency of the service required and the itineraries to be covered only differed in detail.

18. A routine to meet the changed circumstances was evolved, rather hurriedly, and issued on Saturday, 15th August to come into force on Monday, 18th August.

19. Experience soon proved that this routine was not sufficiently satisfactory (it was clear no routine within our resources could be entirely satisfactory) and an amended routine was issued to come into force on Wednesday 21st August.

20. In addition to the routine there was nearly always need for at least one extra L.C.A., usually for survey work and for two pinnaces. Berthing arrangements for the pinnaces were difficult as it was not considered safe to use the trot in Parting Pool laid down for that purpose. Alternative berthing was available in Stephens Channel off H.2, which meant that pinnaces could not be available before 0930 in the forenoon and needed a cutter trip in the evening to bring crews back to Campania. By the end of August, however, arrangements were made for one pinnace's crew to remain overnight at H.2, camp and one also to be accommodated in an L.S.T. in the lagoon. This greatly eased the situation and provided one boat at Heraite and one at Trimouille for an early start.

21. In practice all landing craft and boats were used extremely hard. As the tempo of preparations sped up there was a constant cry for boats and hardly an hour of the day between 8 a.m. and 9 p.m. passed without at least some minor point requiring attention.

22. The institution of a Stand-by Period (S.P.) prior to the declaration of D - 1 raised a further and new problem for a boat routine and it was hoped that this might be rehearsed prior to 'R' day since all experience to date had proved that actual running of a routine was the only way to reveal its defects. However, this proved to be impossible and the current routine continued to function until that of E - 1 on Friday 19th September took over. (All 'Action' Boat Routines are dealt with in the 'Action' report).

23. On Monday 22nd September another routine came into force necessitated by the redistribution of the Squadron and on Thursday 25th September yet another one when all L.S.T.'s came out into the Parting Pool.

24. On Wednesday 1st October the untried 'S.P. Boat routine commenced and ran successfully for the one day required. (In fact and by design the routine dated Thursday 25th September was very similar to that required for 'S.P.' and its minor defects probably helped to avoid similar ones during 'S.P.')

25. Weather conditions proving favourable, D - 1, with its consequent boat routine, was declared and operated on Thursday 2nd October followed by D day on Friday 3rd October. Two further routines connected with any possible post-ponement of the event were designed for use if required but, perhaps fortunately, they remained untried.

26. The boat requirements for Phase III, Re-entry, Recovery and Salvage, were an ad-hoc matter and were controlled entirely by C.T.F.4. direct, except in so far as 'dirty' boats were allocated to Tracker. The system appeared to work well. It was, in fact, controlled by the authority who knew the requirements intimately; who was in touch directly with the boat and crew availability situation and who could issue orders directly.

Had a similar system been possible to cover the earlier weeks of work better results, at much less cost of paper, signalling, physical and material effort and frayed tempers, would probably have been achieved. No doubt this is being wise after the event - but it is perhaps a lesson for the future.

27. A final comment concerns weather conditions. Boat work alongside Campania for M.O.S. staff was often difficult, sometimes even dangerous and for quite a considerable period of time in the aggregate it was impossible. Boat work in the lagoon was only stopped completely for a part of two separate days during Phase II.

Two accommodation ladders and three Mediterranean ladders were broken alongside Campania and the anxiety of working L.C.M.'s alongside under difficult conditions was considerable.

28. Even when camps were established ashore the situation was never entirely happy and the decision whether to run the boats was often difficult and a cause of friction and to which no complete solution can be offered.

29. Should any future expedition be faced with the problem of an open anchorage the utmost use of camps ashore should undoubtedly be made compulsory. This was not so in Hurricane and it may indeed be considered fortunate that the weather actually experienced just allowed the programme to be carried out so exactly but tightly to schedule.

30. Type of craft were not entirely suitable though it is difficult to suggest alternatives which would have been better.

A few more L.C.M.'s would have been very welcome but this type is unnecessarily large for much of the service required. Ideally a few craft capable of carrying ten passengers at about 10 - 12 knots, seaworthy and, if possible, capable of being beached would have been a tremendous asset.

31. Though there were some scares there was probably never any danger while under way at any time at the site.

Boarding and leaving was the hazard and the necessity for M.O.S. staff to wear Army boots did not reduce the risk. The use of a proper accommodation ladder was much preferred and experience seemed to show that the destruction rate of such a ladder was rather less than that of the vertical Mediterranean ladder. For personnel only, under difficult conditions, the scaling ladders fitted to L.S.T.'s are more suitable in all respects.

32. Much light equipment for sites and considerable quantity of stores and provisions for the camps continually needed transport and arrangements for its rapid handling were not always adequate. Inter-change arrangements in the lagoon worked well when it was possible, as it frequently was, for the craft concerned to come alongside each other but when it was necessary to hoist stores aboard an L.S.T., and subsequently reload them into another craft much time and labour were wasted.

33. Most if not all of these criticisms of events as they actually occurred would probably not have arisen if some closer form of integration had been possible between those with requirements and those responsible for services, a point already touched on in paragraph 26. For example, it was only very late in Phase II that it was realized that a routine trip to convey R.E. personnel to and from N.4. and A.3. was a daily occurrence and with which could readily have been amalgamated a service for M.O.S. personnel needing to visit those sites. Other instances of over-lapping of effort could be quoted.

34. Finally let it be stated that no serious catastrophe occurred; the only potential one being saved by the quick action of the Commander of Campania. In the bad weather and difficult and peculiar conditions of Phase III one motor pinnace was lost and one L.C.A. sunk at her mooring, being subsequently salvaged. All other craft were brought away in working order.

BOAT ROUTINE AUGUST 27th 1952

SERVICE:-	1	2	3	4	5	6	7	8	9	10	11	12	13	SERVICE.
		LCM			DSB			DSB			LCM		LCM	
H.2.	-	-	-	0820	-	-	0930	-	1300	-	-	1720	-	H.2.
H.3.(a)	-	-	-	(a)	-	-	(a)	-	(a)	-	-	(a)	-	H.3.(a)
B.S.	-	0800(c)	-	'	0930	-	1045(f)	1320	'	-	-	'	1800	B.S.
H.S.	0800	0835	0835(c)	0900	1005↔	1010	1120	1355↔	1355	1600	-	1800	1835(k)	H.S.
T.V.	(b)	QA	'	UA	QA	QA	(b)	QA	'	'	-	QA	(b)	T.V.
T.2.	0810	0845	'	0910	QA	1020	1130(g)	QA	'	'	-	1815	1845	T.2.
N.K.	'	-----	'	'	QA	'	-----	QA	'	'	-	'	-----	N.K.
L.S.	'	-	'	'	1030	'	'	1420	'	'	-	'	'	L.S.
A.3.	'	-	0855(d)	0930	(arr)	1045	-	(arr)	1415	1640	-	'	'	A.3.
	'	-	-----	(arr)	'	(arr)	-	'	(arr)	(arr)	-	'	'	
A.3.	'	-	-	QA	'	1100	-	'	1440	1645	-	'	'	A.3.
L.S.	'	-	-	'	1100	'	-	1445	'	'	-	'	'	L.S.
N.K.	'	-	-	'	QA	'	-	QA	'	'	-	'	'	N.K.
T.2.	0815	-	-	0955	1115	'	-	1455	'	1710	1710	1820	-	T.2.
T.V.	0820	-	-	(b)	QA	'	-	QA	'	1715	-	QA	-	T.V.
H.S.	0835(c)	-	-	1005	1125↔	1125	-	1505↔	1505(h)	1720↔	1720	1835(k)	-	H.S.
B.S.	'	-	-	1100(e)	1200	'	-	1540	-----	'	1755	1905	-	B.S.
H.3.(a)	(a)	-	-	(a)	-----	(a)	-	-----	-----	(a)	-----	-----	-	H.3.(a)
H.2.	0930	-	-	1200	-	1220	-	-	-	1800	-	-	-	H.2.

GENERAL NOTES:

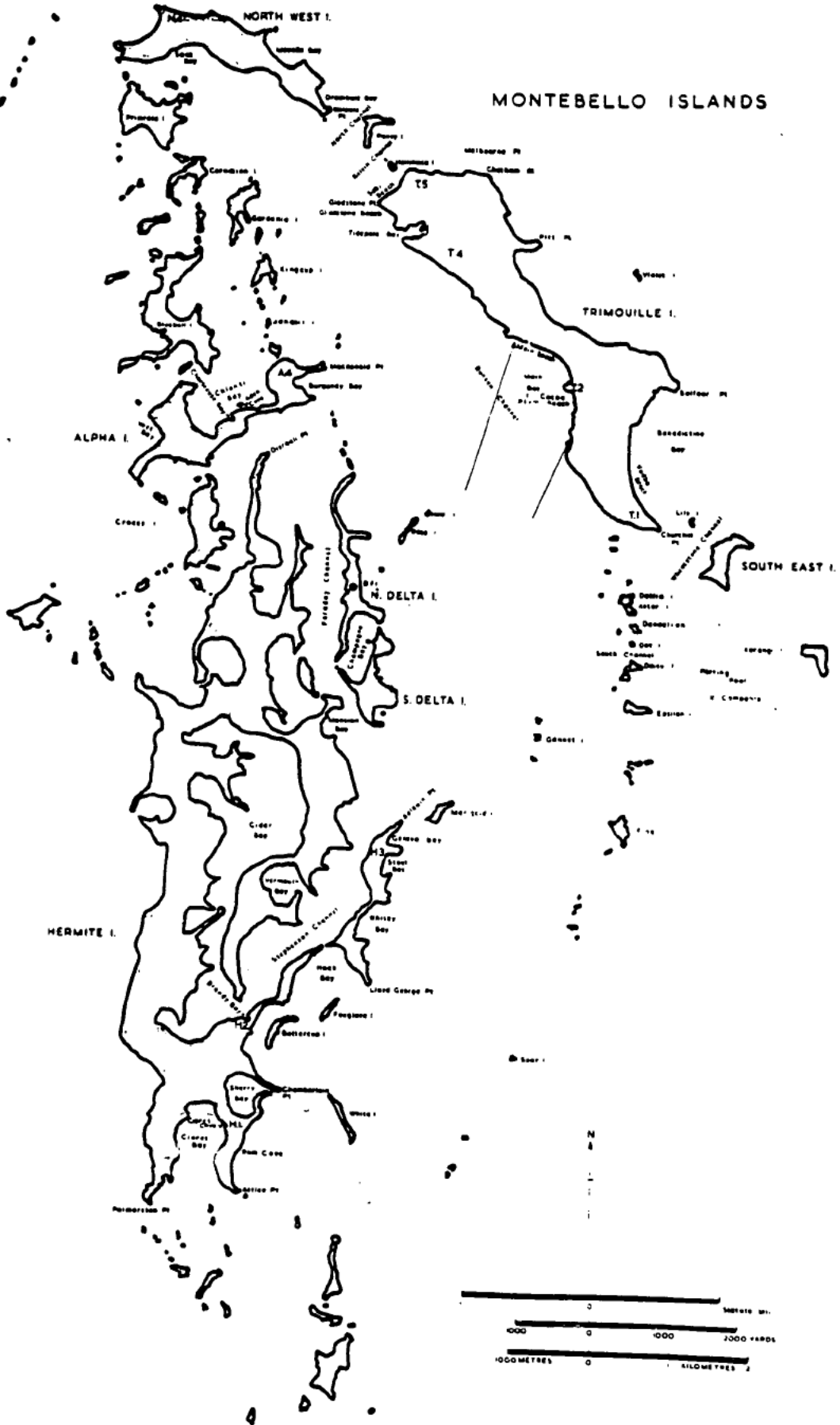
- N.4. Requires special arrangements through office 'B' in CAMPANIA. T.2. & T.V. Frequent service by request to C.O. of T.V.
- T.3. Passengers to travel via T.2. and land transport: stores by service 7. Horizontal arrows indicate connections.

LETTERED NOTES:

- (a) To call at H.3. only on request to coxswain or flag 'B' flying near pier.
- (b) To call at T.V. only on request to coxswain or flag flying in T.V. (c) Services 1 & 3 are to rendezvous alongside service 2 at H.S.
- (d) To deliver Survey Team to Kingcup and/or N.Delta. (e) Arrives about 1040 and continues with stores.
- (f) Arrives about 1030 and continues with stores. (g) To continue as required to distribute stores.
- (h) To continue to T.2. if required. (i) To collect Survey Team from Kingcup and/or N.Delta before leaving A.3.
- (k) In L.C.M. weather passengers are to change craft at H.S. and L.C.M. comes out to B.S.

PARCELS SERVICE:

Small parcels may be sent in charge of the Coxswain. The sender is responsible for arranging for collection at destination. Unless this is done parcels will be handed to O.O.D. in B.S. or H.S. at termination of trip.



Appendix E.

ORGANISATION OF SCIENTIFIC STAFF.

Technical Director.
Deputy Technical Director.
Historian.
Naval Adviser.
Health Safety Adviser to Naval Commander.



(retd.)

DIVISION

ASSISTANT DIRECTOR

TEAMS AND LEADERS

Technical
Services. T.S.

Weapon
Operation. W.O.

R.A.F.

Theoretical
Prediction. T.P.

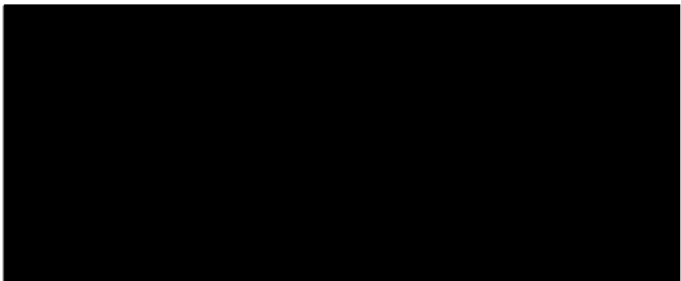
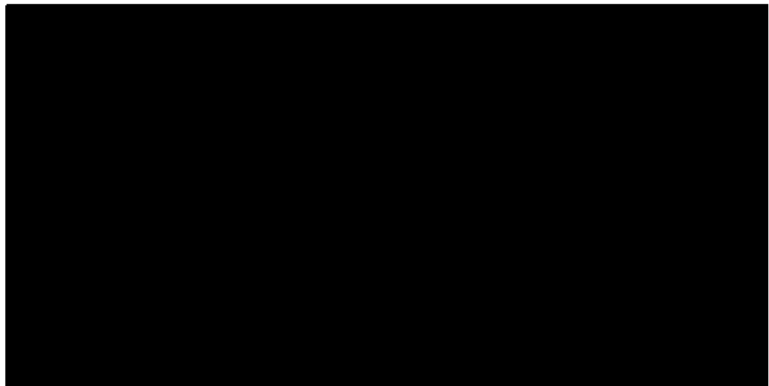
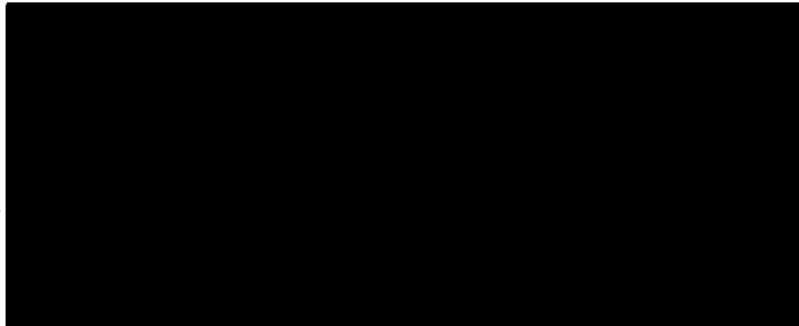
Mechanical
Effects. M.E.

Thermal
Effects. T.E.

Multiplication
Rate. M.R.

Atomic Energy
Effects. A.E.

Radioactivity
Measurements
R.E.



DIVISION

ASSISTANT DIRECTOR

TEAMS AND LEADERS

Radiation
Hazard. R.H.

Optics and
Photographs. C.P.

Telemetry and
Communications.
T.C.

Radio-chemical
Analysis. R.A.

Naval Scientific
Measurements. N.S.

Naval Construction
Measurements. N.C.

Civil Defence
C.D.

Naval Services
Trials. N.T.

Aircraft
Structures. A.S.

Radio-activity
Sampling. R.S.

Crater Survey.
C.S.

Meteorological
Services. M.S.

HURRICANE - ACTION ORGANISATION.

ABSTRACT.

1. This appendix describes the steps which were taken to draw up the organisation and instructions for setting off the atomic explosion and the executive control which was exercised to this end.

1.1. Some of the actual instructions issued are included as enclosures to this appendix.

1.2. A purely scientific rehearsal took place on 12th - 13th September; a full rehearsal by the whole force on 20th September and the event on 3rd October.

1.3. The report is not only one of 'Action Organisation' but covers, since it was so interwoven with this subject, the history of technical events between 12th September and 3rd October.

INTRODUCTION.

2. A scientific rehearsal for Operation Hurricane on a considerable scale had been staged in the U.K. before the expedition sailed. Although primarily designed as a check on technical performance of equipment the rehearsal showed the need for more integrated control of the various team's activities by some central authority.

2.1. From the earliest days of planning a general time table for the sequence of events had been drawn up but nothing more in the way of operational orders were attempted, nor could they have been, until much later when in the Monte Bello Islands.

2.2. On the voyage out some further but minor investigations into the organisation required were made but these could not proceed far in the absence of most of the senior team representatives concerned.

2.3. After the arrival at the site of the Deputy Director and remaining Assistant Directors the problem was tackled in detail. Shortage of staff for the work and the pressure of current events, however, combined to make progress difficult and the necessary instructions were only in the hands of some team leaders shortly before they had to be brought into force. For a somewhat complex organisation this was a grave hazard and it was perhaps a good thing that intervention of weather caused a delay of one day to both the 'R' and 'D' day programmes, giving a much needed breathing space.

INSTRUMENTS AND EQUIPMENT.

3. Though hardly appropriate to the heading it is perhaps relevant to remark here on the need for adequate typing and reproduction equipment. (and staff). May be inevitably in scientific trials on a large scale, instructions cannot be issued until the last moment but this only underlines the essential need for suitable machinery.

3.1. A situation was reached where detailed instructions for teams could not be written until the over-all instructions for the trial were received. These latter instructions, however, were themselves dependant upon receiving information from teams. Consequently a bottle neck of typing soon occurred and with the number of copies required and a distribution which took some time to accomplish, as in Hurricane, reproduction, sorting and addressing was a problem in itself.

3.2. Typing assistance was inadequate and the only one duplicator available broke down under the very considerable load.

PROCEDURE.

4. Without going into detail of the various features considered in planning before the expedition sailed in June the situation which existed on that date can be briefly stated.

4.1. Five weeks after arrival at the Islands it was hoped and intended that technical preparations would be complete so that a full dress rehearsal of the event could take place. Prior to a declaration of being ready for that rehearsal it was accepted that successful and purely technical rehearsals would have to be completed.

4.2. Quite soon after a successful dress rehearsal it was expected a state of readiness at twenty-four hours notice for the actual event would be declared.

4.3. So far as it had gone, detailed planning for the event envisaged the following:-

- (a) A Controller at H.1.
- (b) The event at about 0800.
- (c) Abandonment of T.V. by 0500.
- (d) Detting 0100 to 0500.
- (e) Arming 1600 - 1700 the previous evening.

(Note: Above times refer to local time, i.e. Zone HJ or GMT + 8 hrs. and in the event Zone IK was kept at the site i.e. GMT + 9½ hrs.)

4.4. All team activities, boat routines, ship movements and evacuations had been, roughly, calculated to fit in with the above timing.

(Note: The various 'H' memoranda issued during the planning stage should be consulted for more detail over this period).

Planning during voyage.

4.5. The Hurricane 'Plan' issued shortly before sailing provided the data on which the necessary operational organisation could be based but the only feature on which any progress, and that very little, could be made during the voyage out concerned the final preparations of individual teams sufficiently represented, on board.

4.6. Various meetings were arranged which lead to useful but by no means conclusive results, and some facts were established which enabled an estimate of transport requirements to be made in order to carry out all final preparations for the event itself.

4.7. A more useful result of the discussion, however, was to initiate an interest in all the relevant activities and provoke discussion on the operational problems involved.

4.8. In particular the situation with regard to the waiting period, for suitable met. conditions, was ventilated and its consequent effects considered. It was not, however, entirely clarified until about mid August, after the arrival of the Deputy Director, and Controller designated, at the Islands when it was promulgated as follows:-

"As soon as the Technical Director is satisfied with the readiness of all groups a 'Standby Period' will be declared. (Abbreviation S.P.) During S.P. each group must be in a sufficient state of readiness to implement their D-1 day activities on the receipt of instructions to do so at about 0700 on any day. Uncertainties in meteorological forecasting imply a possibility that an announcement of D-1 may be followed by a cancellation".

(Paraphrase of a memo. dated 29th August, 1952 - giving the general arrangements in full but not included herein).

Planning at site.

4.9. The Deputy Director arrived at the site on the evening of Monday 11th August and after a few days to obtain local and up-to-date knowledge and to arrange for the work of O.P. teams, of which he was the Assistant Director, he commenced the planning for 'R' and 'D' days as they were now called.

Planning for 'R' day.

4.10. It became clear that to ensure smooth working and hence the best chance of success some central authority must have available an up-to-date detailed plan of everyone's movements and responsibilities covering all foreseeable eventualities of common interest, leaving technical eventualities to team members' own initiative.

4.11. The Deputy Director, therefore, first compiled a complete list of every team member, showing his station for S.P., D-1, and D. (Note: Throughout this report 'R' should also be read for 'D' when appropriate).

4.12. Although the Hurricane Plan, as stated in paragraph 4.5., contained every detail of the operation, the information had first to be extracted and tabulated in convenient form. It then had to be checked with all Assistant Directors and the inevitable minor alterations brought into line.

4.13. This work, described in a paragraph, took many hours, not the least of them spent in checking the stations and making subsequent alterations with change of requirements.

4.14. Towards the end of August the plan began to form in sufficient detail to enable the Naval Staff to be informed of its general lines and the Naval Commander was so informed in a memorandum dated 27th August.

4.15. A further memorandum, covering much the same ground though in greater detail and dated 29th August was issued to Assistant Directors.

Scientific Rehearsal.

4.16. It had been agreed, as a result of the U.K. rehearsal, that before readiness for a full scale rehearsal could be declared a thorough and successful rehearsal solely of the technical equipment must be completed.

4.17. It was, accordingly, arranged to hold such a rehearsal on Friday and Saturday 12th - 13th September.

4.18. The organising of this rehearsal, though not extensive, involved an interruption in the progress of the general planning and its carrying out required the attention of the Controller. On the other hand useful experience in the sphere of general control was obtained.

4.19. The instructions for 'S' day are given in Enclosure No. 1 of this report and the rehearsal was, generally speaking, successful.

4.20. Various minor technical faults in equipment came to light and a few items were still not ready and so could not be included.

Continuation of preparation for 'R' day.

4.21. On Sunday, 14th September, it was decided, after long and heated discussion, that S.P. quarters were to be occupied on the night of Wednesday, 17th September and that therefore R-1 day could be declared on Thursday, 18th September.

4.22. The relevant minutes of the meeting held are given in Enclosure No. 2 but there was one other point of importance not covered by these minutes. A condition for S.P. (before D-1 day) was that all the L.S.T.'s should be out of the lagoon. Tidal conditions were such that the Naval Staff stated this could not be fulfilled for the R-1 day (Sept. 18th) chosen. The best which could be arranged was for the Health Control ship (Tracker) to come out on Wednesday, 17th and for Zeebrugge and Narvik to come out on R-1 day itself. As this made little difference to the scientific side of the operation the arrangements were made as stated above.

4.23. However, on September 17th the weather prevented Tracker's movement and R-1 day was consequently post-poned. It was agreed that if Tracker could come out on September 18th, the rehearsal would proceed twenty four hours late on planning and a chance would be taken on Narvik and Zeebrugge, in that order, being able to come out on the new R-1 day, September 19th. If weather prevented movement of Tracker on September 18th R-1 day would be post-poned till Tuesday, September 23rd at the earliest.

4.24. In fact the weather on September 18th was favourable and all three L.S.T.'s were brought out on one tide.

Technical Schedule.

4.25. To cover the operations of the actual trial the periods leading from S.P. to 'H' hour were divided into phases and each phase given a code name.

4.26. A full description of each phase with the relevant action involved is available in A.W.R.E. Technical Registry and only a synopsis of their significance is given hereunder:-

<u>PHASE</u>	<u>SIGNIFICANCE.</u>
Sugar Peter.	All essential technical equipment is ready for action if D-1 is declared at about 0645 on any day during the phase. Ships and personnel have taken up Stand-by positions.
Mercury.	Conditions are regarded as suitable and final preparations are put in hand, D-1 being declared.
Venus.	The main preparations completed and most personnel evacuated, ships move to safe positions as ordered.
Cupid.	Ships are in safe positions and there is a pause until further met. forecasts are received and considered.
Mars.	Loading takes place.
Jupiter.	Docking takes place.
Neptune.	Telemetry tests commence and continue until H hour.
Saturn.	The main body has left the T.V., and the remainder await met. report before setting Safe/Live key and retiring.
Uranus.	The complete evacuation of T.V. is carried out.
Boreas.	Local met. assessment at H.1.
Dog-Baker.	The period of the Danger Bracket.
Pluto.	The count down.
Sun.	The Event.

4.27. The above phases were integrated within the "serials" for the trial which were ordered by the Naval Commander and promulgated in Hurricane Trial Orders - thus the trial proceeded, as it were, along parallel lines of technical and naval control, the beginning and/or ending of certain phases and serials being linked.

4.28. For the rehearsal the phase arrangements were slightly different to those of paragraph 4.26. above and altered for D day as a result of experience from the rehearsal. The differences are not of sufficient importance to need further comment.

The Rehearsal.

4.29. As previously described, Friday 19th September was declared R-1 day, and on a morning perfect for boat work the machinery was put in motion. The relevant instructions issued to M.O.S. personnel are available in A.W.R.E. Technical Registry.

Special variations of procedure for R day.

4.30. As a precaution against fire or other accident, arrangements were made to leave fire parties ashore on Trimouille and Hermite and in the Target Vessel. On Trimouille and in T.V. Scientific Staff were attached to the fire parties and doubled the duty of adviser with that of switching off generators, etc., as soon as it was clear that they were no longer required. Personnel chosen for all these duties were those who would be otherwise non-operationally employed on D day.

R-1 Boat Routine.

4.31. To ensure complete and continual control of the activities during preparations and to be certain of the timely evacuation of all personnel a detailed boat routine had been drawn up. It is given in Enclosure No. 3.

4.32. Further, the senior M.C.S. representative on each service was given a schedule of passengers and held responsible for reporting them correct or otherwise at the end of the trip. A copy of the 'pro forma' is given in Enclosure No.4.

4.33. It was arranged that with the announcement of R-1 day boat 'control' should transfer to Campania. This was done and by 0830 it was established alongside Technical Director's control position in the Action Information Centre.

Land transport.

4.34. Arrangements were made for nine jeeps to be available on Trimouille and Hermite. Those on Trimouille were allocated to nominated individuals of teams who were responsible that they finished their trips in time to meet the embarkation programme. Finally six of the nine were evacuated to Hermite, and of the remainder two were taken to T.1. and one to T.5. and placed in as safe position as possible in the hope that they would be available for use by Recovery Teams.

4.35. The one Jeep on Hermite was allocated for services between H.2. and H.1. In fact there was a good deal of traffic on this route, the jeep gave trouble and a water-carrier, the only other available vehicle, had to be pressed into use.

Technical Control in Campania.

4.36. While the executive control of scientific operations was exercised, in accordance with the phases already described, by the Deputy Director acting as 'Controller' at H.1. station, over-riding command remained with C.T.F.4. (The Naval Commander) and the Technical Director in Campania.

Communications.

4.37. A voice communication system using Naval Types 86 and 87 was operated from the Action Information Centre used as Technical Director's Head Quarters.

4.38. On these V.H.F. sets there were four channels available and they were allocated as follows:-

- Channel 'C' : For technical control from H.1. (transferred to Tracker after 'H' hour).
- Channel 'B' : For inter-communication between Campania and H.1., primarily for the confidential use of Technical Director.
- Channel 'A' : For met. reports from H.1.
- Channel 'D' : Spare.

In addition, watch was kept at H.1. station on both boat wave and Naval Intercom. The complete communication net-work is given in Enclosure No. 5.

4.39. It cannot be said that these communications were satisfactory. They were just adequate thanks to the constant attention paid to them by maintenance personnel and fundamentally it became only too clear that types 86 and 87 were being called upon to function in a way for which they were never intended nor designed.

Exercise of Control.

4.40. Members of M.O.S. staff were selected and detailed for watches of two hours duration in the Action Information Centre (A.I.C.) in Campania so that a representative of the Technical Director was always on hand. The watch keeper also kept a log of all events as they occurred and was in constant touch with his Naval opposite number of C.T.F.4. staff.

Result of the rehearsal.

4.41. All technical matters in connection with the rehearsal will, no doubt, be covered in the various team reports and in this paper only matters of common interest will be recorded and discussed.

operation on R-1 day.

4.42. As stated earlier, conditions for boat work were so good as to be somewhat unrealistic but nevertheless useful experience in this sphere was obtained.

4.43. Lack of time for preparation meant that crews of landing craft had only the scantiest briefing and over-night preparations were neither correct nor complete. However, with but little delay in the morning the programme was started satisfactorily.

4.44. Various unforeseen and unexpected changes in the disposition of personnel had been made over-night, necessitating last minute amendment to the detailed schedules.

4.45. During the day one landing craft very realistically was holed on N.W. Island and relief and salvage arrangements had to be put in train. A few minor variations in passengers carried occurred during the day but the situation was always entirely in hand and the programme was completed with less than one hour's delay. The two services round the outer islands, which were expected to be difficult, were accomplished with much time to spare, thanks mainly to the previous experience of crews and other personnel concerned.

4.46. The scheduled phases, vide 4.26., proceeding according to plan. During Mars a complete rehearsal of assembly and loading took place with entire success.

4.47. Phase Saturn, the main evacuation from T.V., was planned in two motor launches, both belonging to Tracker. Even in the fairly calm weather of R day, it became clear that it would facilitate and quicken operations to use a launch from each of Tracker and Narvik, who were in company, and this alteration was arranged for D day.

The trip out from T.V. was not without adventure and as a result it was agreed that on D day it should start a little later and ~~that~~ better navigational facilities provided for leaving the lagoon.

Operations after H hour.

4.48. The rehearsal continued throughout Saturday 20th September to practice the early operations of Phase III, Recovery of Records. Helicopter flights for water samples were made and water and land survey parties and rocket and can-buoy recovery parties sent away.

4.49. Late in the afternoon a helicopter trip was run to the various sites to switch off equipment and collect records and by evening Narvik had re-entered the lagoon to act as depot ship for landing craft and the rest of the squadron returned to the Parting Pool.

Continuation of D day preparations.

4.50. At a meeting held on Sunday, 21st September it was agreed that the rehearsal had been a success and that C.T.F.4. should be informed that M.O.S. preparations were such that S.P. quarters could be occupied on the night on Tuesday 30th September.

4.51. There was much technical work ~~still~~ to be completed and also a great quantity of planning still to be done, especially on the aspect of action to be taken if a postponement, once D - 1 day was declared, became necessary.

4.52. This point, only briefly mentioned previously, had been seriously exercising the minds of the Deputy Director and his assistants but it was a problem with many technical complexities needing knowledge or advice on every team's activities. To collect this knowledge was extremely difficult and it can only be hoped that the efforts made would have been successful had the need to put the procedure into practice arisen. Fortunately, perhaps, the test did not occur.

4.53. Apart from this additional aspect the lessons and changes of R day had to be incorporated in the instructions both general and those issued by Assistant Directors to their teams.

4.54. The postponement preparations needed the preparation of two new boat routines, each considerably detailed while, as a current requirement, the movements of the squadron between R day and the declaration of S.P., were such that two new general boat routines had to be issued in the space of five days. The call on typing and reproduction facilities, once the drafts had been worked out, was almost overwhelming. (vide paragraphs 3.0. - 3.2.)

D Day Instructions.

4.55. All the instructions, transport routines, personnel schedules, etc., which were issued for the Hurricane trial itself were in the hands of recipients by the evening of Monday 29th September. They will be further discussed in subsequent paragraphs. (A full set of the orders, etc., is available in A.W.R.E. Technical Registry).

Events between R and D day.

4.56. Back loading of stores and equipment and the final preparations for the trial kept everyone fully occupied and every available craft fully employed up to the night of Tuesday 30th September.

4.57. Back loading and a certain amount of scientific work proceeded over Saturday and Sunday 27th and 28th September.

4.58. Except for the experience obtained on R-1 day there was no opportunity to brief and prepare craft for D-1 had it occurred on Wednesday 1st October. Fortunately weather conditions were not suitable and a very useful, and relatively quiet day, was spent at S.P. stations.

The S.P. organisation.

4.59. As stated previously there had been no opportunity to rehearse the S.P. state before 'R' day. There was always the possibility that it might be prolonged, but there had not been time to consider fully all the points which might be involved.

4.60. A boat routine thought suitable had been evolved and issued and T.C. division organised a telemetry check to cover a prolonged period of S.P.

4.61. As events turned out only Wednesday 1st October was spent at S.P. and the untried organisation stood the strain.

D - 1 day.

4.62. The declaration of D - 1 on the morning of Thursday 2nd October found weather and sea conditions difficult. The weather prospects for the trial were favourable; the sea conditions for operating the D-1 routine were dubious.

4.63. However, experience on R - 1 day had shown there was plenty of time to carry out the necessary work and there was a likelihood of the sea moderating.

4.64. Anxiety mainly concerned the ability of the two L.C.A.'s detailed for outer island sites to reach their objectives, and the possible risk in sending the pinnaces (required for Phase III) to their base in the Lowendal Islands. Both objects were accomplished. The L.C.A.'s got away early and safely from Tracker and had completed their tasks soon after mid-day. A fortunate lull in the afternoon and evening also enabled the pinnaces to proceed without anxiety.

4.65. There were no serious hitches and the routine was completed ~~satisfactorily~~ satisfactorily except for difficulty with the last load of jeeps from Trimouille to Hermite. Tidal difficulties at H.2. made a landing at Rum Cove necessary and caused a minor change of plan in the berthing of craft for the night of D - 1.

Possibilities of postponement.

4.66. Due to the difficulties of making an accurate met. forecast the necessary time in advance when preparations must start there was always the possibility that a postponement might be necessary.

4.67. The effects of this postponement which might occur any time between D - 1 day having been declared and the last local met. report at about 0845 IK on D day, had been carefully but rather hurriedly considered. The result is given in Enclosure No. 6.

FD-1 day.

4.68. Briefly a cancellation due to weather up to and including 0030 on D day gave the possibility that D-1 day routine might be repeated immediately. The day would be called FD-1 and a suitable boat routine and organisation was issued. Further a helicopter trip was arranged to visit sites and switch off any equipment which might otherwise start automatically by time switch.

Return to S.P.

4.69. If a cancellation due to weather was to occur after 0030 on a designated D day the current day could not be regarded as D-1 and a return, at least partial, to the S.P. state would be necessary.

4.70. The organisation for doing this, together with the L.M.S. (Last Minute-Scrub) Boat Routine was worked out for cancellations at either 0645 or 0845, when met. reports would have been considered. These are all given in Enclosure No. 6.

4.71. It is to be hoped that the 'cancellation' organisations would have worked but they were of necessity planned hurriedly without opportunity for any detail discussion with Assistant Directors, and never rehearsed. Perhaps it is as well they were never called into existence.

D day.

4.72. The organisation and routine, previously described for R day, functioned smoothly. A centre-temps, with fortunately no serious consequences, occurred at H.1. at about 0800 when a small fire started in the scrub and endangered visibility along the line to T.V.

4.73. There were no other untoward events, and almost exactly at 0930 IK the event occurred according to plan.

RESULT.

5. The technical results of Hurricane both from the overall and individual team aspects are dealt with elsewhere. Here it suffices to say that the organisation for carrying out the trial, as described in previous paragraphs, worked satisfactorily.

DISCUSSION.

6. One of the main reasons for this report, and particularly for its somewhat lengthy fourth part, PROCEDURE, is to make clear the amount of work required to arrange the operational part of the trial. It is likely that any future will involve a nearly similar amount of work.

6.1. The 'Hurricane Plan' gave no information on responsibility for drawing up the Action Organisation and it was done, in fact, almost entirely by the Deputy Director himself, assisted as far as was possible by members of Team T.S.1., when not employed on current work and also similarly by The Historian. Typing assistance from one nearly full time and one part time Naval writer and duplication by one, very part worn, Gestetner machine completed the team.

6.2. A further and considerable difficulty was that of getting in touch with Assistant Directors and even Team Members. Current work was at its highest pitch and the attentions of even the Deputy Director, himself, had between R day and D - 1 day to be devoted to a highly technical problem of his own concerning a matter of camera interference with another piece of equipment at H.1.

CONCLUSION.

7. It is to be hoped that the entirely successful outcome of the trial will not blind those responsible for planning any future trial and that they will arrange for more adequate staff and greater facilities for what is, after all, the core of the operation.

Enclosure No. 1 to Appendix F.

SCIENTIFIC REHEARSAL.

1. S day is planned for Saturday, 13th September with H hour at 1030 IK.
2. Participating divisions should arrange that staff who have duties on S-1 associated with the rehearsal are in appropriate quarters on the night S-2/S-1.
3. Confirmation that sea conditions are suitable for the necessary boat work on S-1 (Friday, 12th September) will be made from B.S. if the meteorological forecast is favourable and issued at 0730 approximately to H.1. The boat routine will be run as for a normal Friday and Saturday with additions as specified in Appendix 2. Land transport arrangements are also shown in Appendix 2. (not herewith).
4. If sea conditions are not suitable on the morning of Friday, 12th, the announcement from B.S. at 0730 will be one of the following alternatives:-
 - (a) There is a prospect of the sea moderating and it is expected that the S-1 boat service will be put in operation with X hours delay on the schedule as issued. This will not affect H hour.
 - (b) There is no prospect of sufficient moderation and S-1 day is now deferred to Monday 15th September.
5. This rehearsal is primarily a test of the functioning of apparatus and not of drill or time tables. Consequently:-
 - (a) The location of team members throughout the rehearsal, in particular on S day, is a matter for determination by divisions separately and should be arranged to obtain maximum information on the behaviour of apparatus.
 - (b) Departure from the programme for S-1 day can be arranged by agreement with H.1. throughout the day if such departures give prospect of obtaining more over-all information from the trial.
6. The approximate time table for general arrangements is given in Appendix 1, (not herewith). This will be confirmed or modified from H.1. on S-1 day.
7. The detailed arrangements for T.C. Division will follow the plan drawn up and circulated by [REDACTED] for "T.A. Rehearsal" with such modifications in times as he directs.
8. Where communication is referred to in Appendix 1, the individuals responsible for giving information or acknowledgment to Control at H.1. are:-

T.V. [REDACTED]

T.2. [REDACTED]

H.S. [REDACTED]

[REDACTED] is the controller at H.1.

9th September, 1952.

[REDACTED]
TECHNICAL DIRECTOR.

RELEVANT MINUTES OF MEETING HELD ON SUNDAY 14th SEPT.

1952.

5. R DAY.

██████████ discussed the arrangements for R day and associated periods which he had so far been able to detail. There was still much detailed work outstanding which required the collaboration of A.D.'s. In his opinion it would not be satisfactory to continue with 'R' day as scheduled and suggested that the rehearsal should be postponed until next week.

██████████ considered that it should go on as provisionally scheduled because the M.O.S. were ready in principle and it was most important at this stage to discover if the organisational side was also ready in principle for a full scale trial.

Discussion showed that if the rehearsal proceeded, the plan of rehearsing 3 S.P. days could not be met. R.H. and M.E. teams in particular could not afford the days thereby lost to work. Thus it would be a rehearsal of R - 1/R only and S.P. quarters would be occupied on Wednesday night.

██████████ reminded the meeting that there was much detailed administration to complete before even the R - 1/R rehearsal could run smoothly and that it would not be easy to complete it.

On the result of a vote of the meeting it was decided to proceed with this rehearsal, S.P. quarters to be occupied Wednesday night, 17th September.

██████████ insisted that A/D's should present to him any necessary details concerning team movements for the rehearsal during the evening and he would be available in Cabin A.

A meeting was called at 1830 Monday, 15th September, at which ██████████ hoped to present the final administrative details for the rehearsal.

██████████ finally asked ██████████ to attend a meeting at 1730 today in Cabin A to discuss the Technical Schedule of Phases for the Rehearsal.

Enclosure No. 3 to Appendix F.

R - 1 BOAT ROUTINE.

SERVICES	CRAFT	AT	TIME	DUTY
1	L.C.A	HS	0730	Proceed S-E, PANSY, N-W, BRIDGROSE, VIOLET; W.P. of 3. PRAM. BATTERIES. [REDACTED]
2	L.C.A	HS	0730	Proceed H.3., ROSE, BLUE-BELL, KINGCUP, GARDENIA, ALPHA W.P. of 3 PRAM. BATTERIES, [REDACTED]
3	L.C.M	BS	0800	
4	L.C.A	T2	0810	
5	L.C.A	H2	0830	
6	L.C.A	H2	0830	
7	PLYM MB.	T2	0835	To meet Service No. 3.
8	L.C.A	T2	0850	
9	L.C.M	T2	1100	
10	L.C.A	T3	1100	
11	L.C.M	T3	1330	Evacuate 3 Jeeps.
12	PLYM MB.	TV	1400	Proceed H.2. [REDACTED] and return about 1600 as ordered.
13	L.C.A	T2	1500	
14	L.C.A	BS	1500	
15	L.C.M	H2	1530	
16	L.C.M	T2	1600	
17	L.C.M	T3	1615	
18	L.C.A	H2	1600	
19	L.C.A	BS	1645	Proceed H.S. [REDACTED]

THE NAME UNDERLINED ON EACH SERVICE INDICATES THE RESPONSIBLE M.O.S. OFFICIAL WHO WILL BE FURNISHED WITH A LIST OF PASSENGERS AND WHO MUST REPORT TO BOAT CONTROL ON TERMINATION OF SERVICE IF ANY VARIATION OF PASSENGERS HAS OCCURRED.

~~The above are typical examples of boat services.~~

Handwritten notes:
 [unclear] duty [unclear] [unclear]
 [unclear] [unclear] [unclear]

To

You are the responsible Ministry of Supply Official for
Service Number..... on D - 1 Day.

2. This Service leaves.....at.....
for.....

3. You are responsible for :-

- (a) Seeing that the service does not leave before schedule time.
- (b) Asking for instructions from Boat Control if passengers are adrift.
- (c) Reporting to Boat Control on completion of service either that all is correct or the names of any extra passengers carried.

The Coxswain will assist you in making reports or will make them for you..

4. Passengers and their movements should be as under :-

FROM.

PASSENGERS.

TO.

Enclosure No. 5 to Appendix F.

OPERATION "HURRICANE" - TRIAL ORDERS.

Order No. 1040 - D-1 and D-Day Radio Communications until H-Hour.

To be assumed as soon as D-1 Day is declared.

See Note 6 regarding Radio Silence.

T-Transmit.

R-Receive.

	CAMPANIA	PLYM	HAWKESBURY	ZEEERUGGE	NARVIK	TRACKER	H.1.
1. Ship/Shore	TR	-	-	-	-	-	-
2. Broadcast Bells.	R	-	-	-	-	-	-
3. Port Wave (see note 1)	R	-	TR	TR	-	-	-
4. Met. Traffic	TR	-	-	-	-	-	-
5. Civil Aeradio	TR	-	-	-	-	-	-
6. Boat Wave (see note 2)	TR	-	-	TR	TR	TR	R
7. Naval Intercom. (see note 3)	TR	TR	TR	TR	TR	TR	TR
8. Channel "B" (see note 4)	TR	Reserved exclusively for two way conversation TR between CAMPANIA and H.1. but initiated by CAMPANIA.					
9. Channel "C" (see note 5)	R	TR	-	R	R	R	T
10. Forces Commander's Wave (with F.O.C.A.F. & GULCOA).	TR	-	-	-	-	-	-
11. Radar (see note 7).	(a) Unrestricted "Y" & "S" bands. (b) 281 silence from H-1 Hour to H+5 secs.	-	Unrestricted		See Note 7.		-

14th September, 1952.

OPERATION "HURRICANE" - TRIAL ORDERS.

Order No. 1040 - D-1 and D-Day Radio Communications until H-Hour. (Contd.)

Notes.

1. PORT WAVE. Watch is to be set by any ship proceeding outside of VHF range with C.T.F.4. CAMPANIA will keep listening watch and ZEEBRUGGE is to keep constant watch from 2000IK D-1 day.
2. BOAT WAVE. Continuous from 0700IK D-1 day controlled by CAMPANIA until about 1800 when control will be relinquished to NARVIK. Motor pinnaces and harbour launches are to have their stand-by boat wave crystals with them and change to stand-by frequency on the morning of D-day (H.T.O. 1041). CAMPANIA will however give the warning signals as in H.T.O. 260 paragraph 3.
3. NAVAL INTERCOM. H.1. station is to cease transmitting when ordered by the controller at H.1. and then keep a listening watch only.
4. CHANNEL "B". This wave will be used exclusively by the Force Commander and Technical Director (or his representatives) for the passing of technical information to H.1. Only C.T.F.4. is to initiate signal messages on this wave. No tests of any description are to be carried out.
5. CHANNEL "C". TRACKER is to take control of this wave when H.1. closes down at H-Hour plus.
6. RADIO SILENCE. Should it be necessary because of interferences with Telemetry or other causes to impose a silence the words "RADIO SILENCE" with a D.T.G. will be broadcast. Silence is to be maintained from the time stated. If a separate wireless or radar silence (with frequency named) is required the words "RADAR OR WIRELESS SILENCE" will be used.
7. L.S.T.'s are to keep Radar silence from first light until H + 1 Hour on D-Day. At other times they are only to operate radar when necessary for navigation.

Additional Distribution:-

ZEEBRUGGE	1 copy.
CAMPANIA	1 copy.
NARVIK	1 copy.
TRACKER	1 copy.
PLYM	1 copy.
HAWKESEURY	2 copies.
██████████	1 copy.

(for H.1.)

14th September, 1952.

ACTION TECHNICAL SCHEDULE FOR S.P.,

D - 1 AND D DAY.

Appendix 1.

ACTION TO BE TAKEN IF SCHEDULE IS INTERRUPTED.

1. The following policy has been declared by C.S.H.E.R.
 - (a) If D - 1 Day is cancelled at any time up to and including 0030 approx. on the morning following its declaration a 24 hours postponement of H hour may be ordered, i.e. the day which would have been D day may be declared D - 1 Day.
 - (b) If cancellation has not occurred as a result of the meteorological forecast at 0030 approx. on the day following D - 1 action but a subsequent forecast results in cancellation the current day will not be declared D - 1.
2. In view of the above policy it is clear that D - 1 activities, so far as they are necessary on the day following a cancelled D - 1, may need to be carried out by staff starting from their D - 1/D quarters. For this reason and because T.2. camp must be assumed out of commission staff will be required to occupy D - 1/D quarters on the night of any cancelled D - 1, independently of the time of day at which the cancellation is announced. Exceptions to this principle arise in the case of M.R. and A.E. Divisions as regards the staff who would spend D - 1/D night on Trimouille. They will be accommodated on T.V. in the event of a cancellation.
3. A boat schedule will be issued under the heading PD - 1. This is the schedule which will operate on a day declared as D - 1 following a day on which D - 1 has been declared and cancelled.
4. This arrangement will not prevent Teams from taking such action as may be practicable on the originally declared D - 1 to restore the S.P. state on apparatus, provided the boat service referred to in para. (3) allows them to complete D - 1 action on the following day.
5. The boat movements which would be made following a cancellation before the D - 1 Boat Routine is completed cannot be specified in advance. The extent of completion of the programme and the prevailing conditions will affect the decision. If the situation arises it will be dealt with by [redacted] who will arrange:
 - (a) that occupants of boats are informed of the alteration of plan.
 - and (b) that the alterations are such that staff reach the required quarters.
6. Any modification to boat services made under para. 5. is unlikely to allow all clocks to be visited and stopped by T.C. Division. A request for helicopter assistance will be made from H.1. according to the circumstances in which the cancellation occurs. The service would be required either in the afternoon of the cancelled D - 1 Day or in the early morning of the following day. In either case the passengers would be picked up from H.1.
7. If D - 1 has been declared and cancelled and the following day is not declared as D - 1, the T.2. camp will be re-established as soon as possible, including transport as far as possible equivalent to that scheduled for S.P. On the day following the cancelled D - 1, staff will be required to re-occupy their S.P. quarters and to assess their readiness to declare S.P. again in existence.
8. The time required to re-establish T.2. camp is not yet defined. Staff who intend to re-occupy quarters at T.2. should take packed meals with them unless they have previously been informed that this is unnecessary. Information on this point will be circulated as soon as it is received.

9. Boat movements will be required if a cancellation occurs to convert a day following D - 1 from D Day to a day on which preparations for another S.P. are made. These movements will depend on the time of cancellation and no routine covering all cases will be issued in advance. The worst case would be a cancellation at 0830 approx. on D Day.

ACTION FOLLOWING CANCELLATION AT 0645 APPROX. OF 'D' DAY.

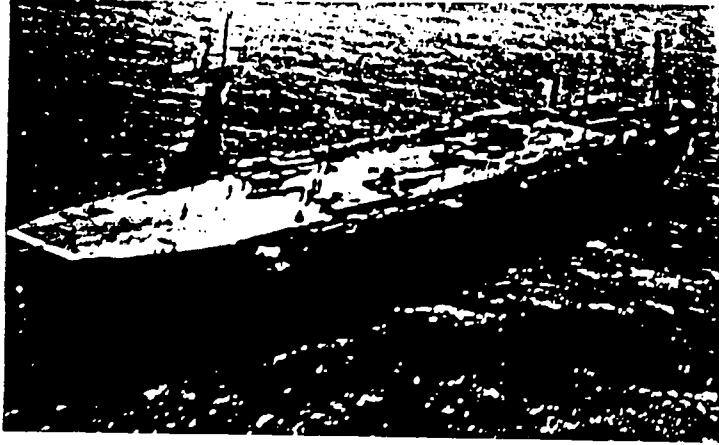
1. T.V. party stay aboard to await return of launches bringing first evacuation party.
2. Instructions given to H.S. to return the first evacuated party to T.V. (These instructions to be given directly to launches if practicable.)
3. W.O.3. team remove e.e.h., informing H.1. when process completed.
4. Helicopter despatched on request to H.1. while above action is taking place. Tour of sites then made by T.C.3. representatives to stop clocks.
5. H.S. and Narvik stop moving south but keep outside the 5 miles limit from T.V. Other ships move towards their S.P. positions but keep outside a range of 10 miles from T.V. until completion of action under 3.
6. T.2. camp and facilities ordered to be re-established.
7. When 5. completed, L.M.S. boat schedule is put in operation - delay in times according to circumstances.
8. This schedule is not intended now to allow preparations for D but for S.P. Hence staff take bedding and personal requirements with them, and where convenient after technical duties leave the craft to resume S.P.

ACTION FOLLOWING CANCELLATION AT 0845 APPROX. ON 'D' DAY.

1. No action is taken until it is announced from H.1. at 0945 approx. that the Danger Bracket has ended, as shown by signal received by T.C. Division at H.1.
2. The party evacuated last from T.V. return from H.1. to T.V. to render circuit 'safe'.
3. When 2. has been announced complete, H.S. returns the first two parties who left T.V.
4. When T.V. announces circuits are at 'safe' on T.V., a helicopter is despatched on request to H.1. Tour of sites then made by T.C. representatives to stop clocks.
5. When removal of e.e.h. has been announced, ships move north to their S.P. positions.
6. T.2. camp and facilities ordered to be re-established.
7. When 5. completed, L.M.S. Boat Schedule is put into operation. This schedule is intended:
 - (a) To allow the restoration of S.P. condition on apparatus.
 - (b) To transport personnel to their S.P. quarters.

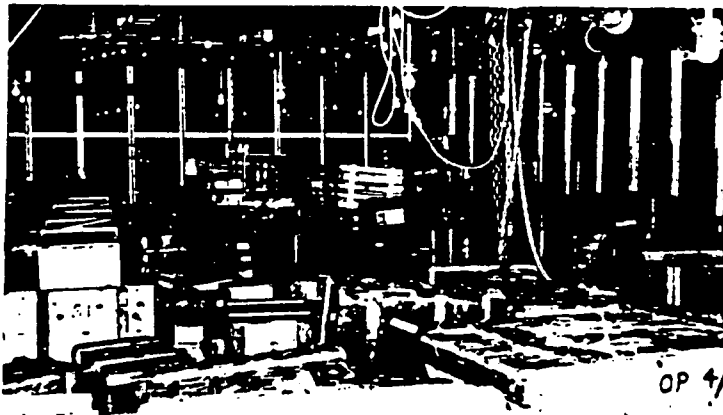
Staff changing their quarters should therefore take bedding and personal requirements with them.

APPENDIX 4



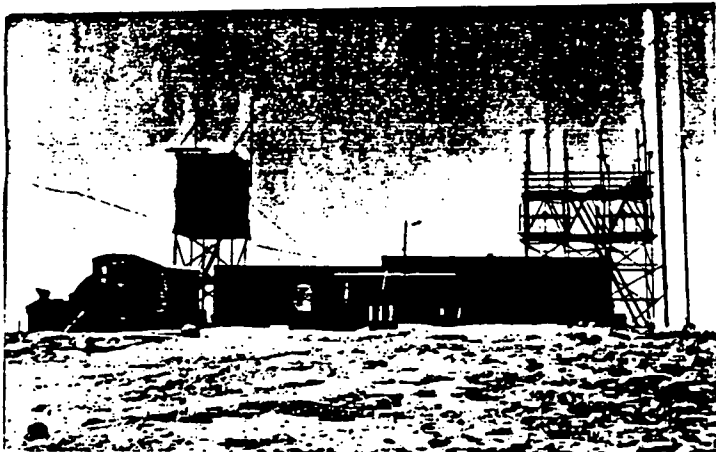
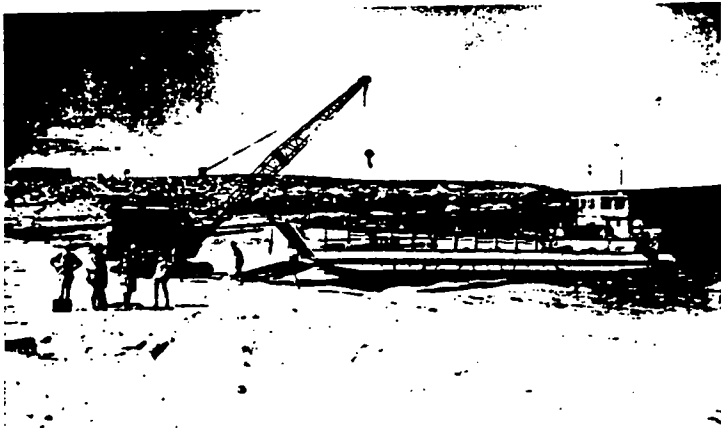
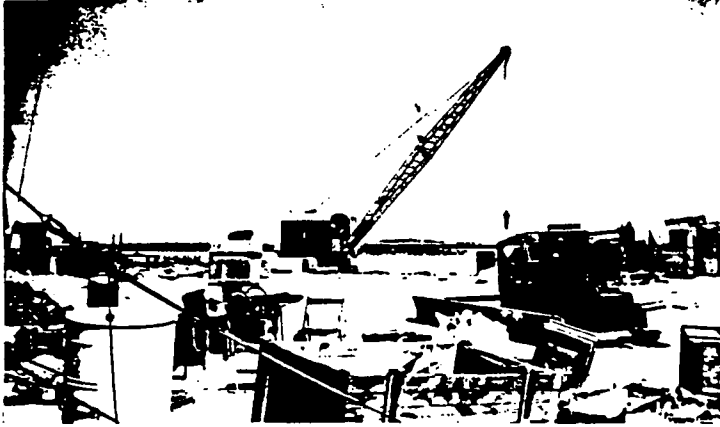
10/1/50

LA 2222

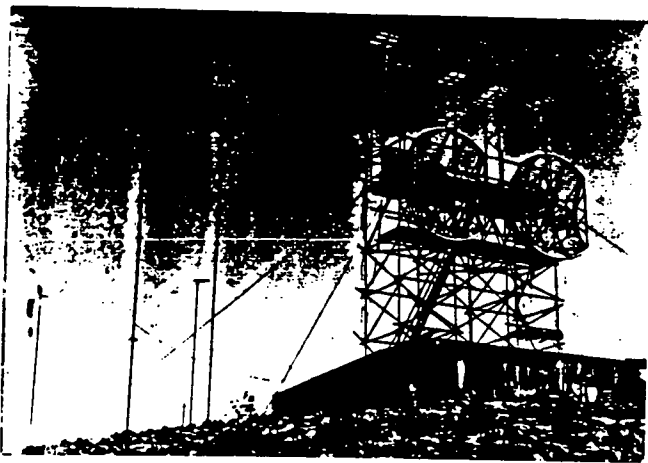


OP 4/

APPENDIX C



APPENDIX 4

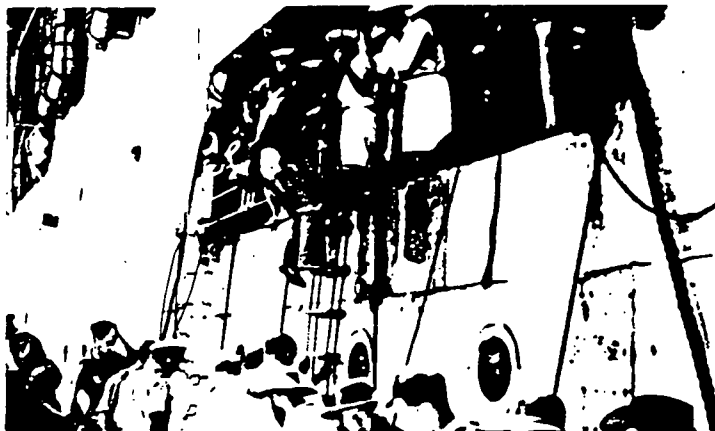
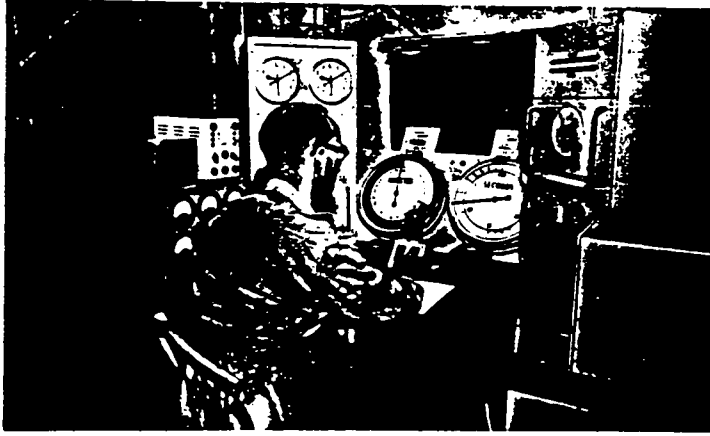


1216

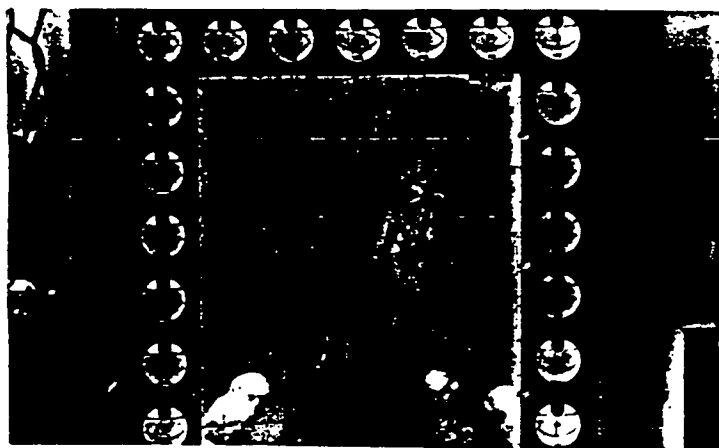
APPENDIX G



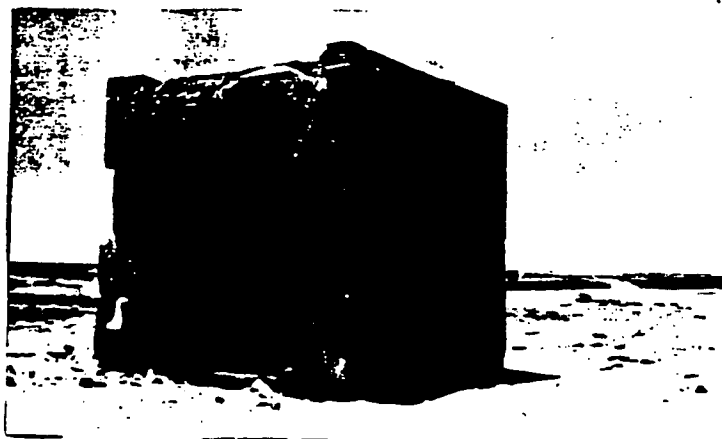
APPENDIX G



APPENDIX G



about
2000



APPENDIX G



NET

TO

BE



INCLUDED



S. IX 27



LOOSE MINUTE

12/85

D. of Ops. (B)

14. 2. 85
3

Radio - Active
Sampling
0312 I
Downgraded

L

Reference your TS3329/D.D.Ops.(B).

2. I have attended a meeting at A.W.R.E. on the afternoon of the 6th October, at which were present [redacted] and I was asked what flying participation was required by the medical authorities at the next trials. I stated that such information as we still required could be obtained on the normal sampling runs and [redacted] stated that their requirement in this matter from us was a cloud sampling at about 20 minutes after burst on each occasion and again at 6 hours after. They would prefer this to be done by manned aircraft and, in fact, have specified Canberras for this purpose.

3. Those in charge of the filter design and instrumentation of the aircraft are anxious to start work on these aircraft as soon as possible, and feel that no time should be wasted. They are therefore going to ask for at least one Canberra to be available at Farnborough for them to complete prototype designs. It is not anticipated that the flying trials will take place until the New Year. In this connection the Chairman of the meeting, [redacted] pointed out that [redacted] was their link with Air Ministry and that he would arrange all the details, but requested me to inform you of what had transpired at the meeting since [redacted] was unable to be there.

4. I told them that Ops. (Recce) 1 had requested facilities for testing of Canberras and H2S equipment and the probable inclusion of a P.R. type Canberra for use at low level almost immediately after burst, as we discussed the other day. I understand that the party will leave for testing grounds at almost any moment now, and plan to be away three weeks. I also understand that A.W.R.E. as a whole view with considerable doubt inclusion of the Jindivick and Queen Bee programme and are likely to discourage it in favour of the R.A.F. participation.

5. Also raised was the question of the early return to U.K. of an extremely hot collecting filter. It seemed possible that the only way that this might be returned to U.K. would be to return in situ on the wing tip of an aircraft. It was pointed out that this would result in the aircrafts fuel capacity being 500 gallons less since both wing tip tanks would have to be empty. However, that is a matter for further discussion. In all I gathered they are prepared to accept four Canberras, and I would suggest that two extra crews were available for the entire operation. This short summary is for your information, and [redacted] would be grateful if you could let him have confirmation that you are prepared to accept this commitment. He stated that there should be no difficulty on the air strip itself for the electronic servicing you mentioned the other day.

[redacted]

7th October, 1954.

1221

copy to [redacted] A.W.R.E. for the attention of [redacted]

W - *Reviewed* 70
Token planning
0261 II f.

Totes - Activity on Vehicles.



S.O.
ilding

A report has been received from the Commonwealth X-ray Laboratory through War Office (Science 1) showing that the Centurion Tank exposed at now carries significant quantities of activity. This must have been picked up when being driven back to Woomera.

It is considered likely that other vehicles driven out of EMU may have similar residual activities, and that vehicles using Dingo Claypan and the large Centre line may also be affected.

I do not consider that these activities are likely to present any significant hazard. However if, you consider it desirable, we could perhaps arrange for S.S.T,D's party to inspect some of the other vehicles during their coming visit to Australia.

I attach a copy of my reply to Science 1.

S.R.P.

Copies to:- S.S.M.D.
S.S.T.D.
File W6/HTB/3007.

243

Token planning.
0261 11 f.

W6/HEB/3024

86/Research/875 of 9.9.54

13th October, 1954

Totes - Centurion Tank

1. We were interested to receive your memo and the attached report by the Commonwealth X-ray and Radium Laboratory.
2. It is clear from a study of all the factors that the tank picked up this activity during its journey from B&J to Woomera. We are certain that the Tank was not exposed during the test to Radiations other than those in the initial flash together with a little wind borne dust, and that the report on the 1st November was valid. The exact route taken by the Tank is not known, but travel by the most convenient route via Dingo Claypan would mean that the Tank travelled for some 15-20 miles in the fall-out area after 1st November.
3. We agree that there is no external hazard and consider that the activity at present on the Tank does not constitute a serious internal hazard. The removal of the activity, under controlled conditions, will, however provide useful training, and in doing this a slight hazard will inevitably arise.
4. The hazard is related to the total quantity of mud on the tank and as no mention of this is made in the report we must assume there is enough to warrant precautions in handling.
5. Decontamination of the vehicle should be carried out on a sound concrete washdown, which can itself be cleaned daily. The use of high pressure fire hoses on the outside is NOT good practice because of the probability of spreading activity. A fine low
/pressure

The Under Secretary of State (Science 2)
The War Office
London, S.W.1.

Continued on page 10

100-100000-100000

pressure spray should be used in conjunction with cotton waste swabs and soft brushes together with the application of liquid detergents. It is agreed that sand blasting and live steam should not be used, indeed sand blasting could, under certain circumstances, cause an airborne hazard. The precautions to be taken by the personnel are given in the Report, these are adequate, and should be rigidly enforced. Care should be taken during decontamination work to ensure that personnel do not inhale unnecessarily dust clouds or spray, and to keep dust and spray away from exposed flesh, and in particular the eyes, mouth, nostrils and cuts and abrasions.

A thin walled Geiger counter type G. 12 will serve as a personal monitor as well as a survey probe for assessing the degree of cleaning achieved.



(If possible) also to provide a record of the work done.

DO NOT REGRAD TO

Totem planning
0261 11 f.

(6/53) 89923 M65941 Wt. 5002 Doo79 10/53 2M pads T&Co. G534. (58)

Both sides to be used

R.O.F. Form 2a.

Minutes to be numbered consecutively

Q.P. No.

Ref. to T.2. /A. 98

Subject {

Totem - Activity on Vehicles

[REDACTED]

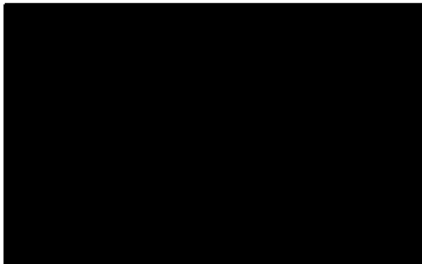
I have received a memo. from [REDACTED] on the above subject and see that you have been included on the circulation list. I have spoken on the matter to [REDACTED] and have suggested to him that ~~and~~ ought to accept [REDACTED] suggestion that the matter be raised during the forthcoming visit to Australia. [REDACTED] will be the man who will be knowledgeable on details and on the general regulations made by [REDACTED] who was in charge of the post-explosion phase. However, the general question is, I think, one for you to raise and I imagine that the right approach would be to mention it, probably to the Department of Supply, since they were the organisation in charge of the Australian side at the relevant time. This approach is merely ~~for~~ the intention of bringing the subject up and I should anticipate that the correct arrangement would be that [REDACTED] should then be put in touch with whatever organisation the Department of Supply might suggest.

[REDACTED]

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

15th October, 1954.

Tchern planning
0261 XII e.



T.1. /A.90.

14th October, 1954.



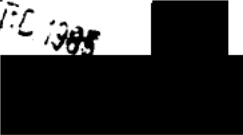
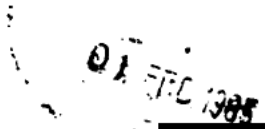
Science 1, Room 164,
War Office,
London, E.1.1.



24/10/54

Dear

Thank you for your letter of the 28th September, 1954. The situation is rather difficult because the blast curve which you proposed to publish is not correct, even for non-precursor conditions. I have referred the question to [redacted] and I give below the relevant paragraph of his reply.



"The radius time curve of the ball of fire quoted in the "Effects" book is consistent with the nominal 20 KT energy release. Applying the new American 45% figure, the blast equivalent of a nominal air burst should thus be 9 KT of T.N.T.. The quoted pressure-distance blast curves, however, imply a blast equivalent of about 17 KT of T.N.T. and are thus definitely wrong for a nominal bomb. This conclusion is quite independent of whether or not there is a precursor."

[redacted] points out that there are two possibilities. The present curves can be retained, in which case it is necessary to make it very clear that they are based on the information given in "Effects". Alternatively, you could recalculate the air blast curve on the basis of the latest U.S. information and adopt the consequent security restrictions. As you point out

/in

in your letter, this would mean using the classification Secret-
S.E. Eyes only. I think the decision here must be yours. You
are certainly entitled to have any information that we get from
the States and in fact, of course, you have it already.

Further circulation of such information for War Office
purposes must, I think, be a question dealt with by the War Office.
In your position I think I should feel inclined to adopt the lower
classification and quote the results specifically as those given
in the "Effects" with a supplement to individuals who need to know,
giving the corrections which should be applied. The supplement
could then have the appropriate security grading. However, this
one must be up to you and I think I only come into it to the
extent that I must ask you that any curve published in a Totem
report should show its origin and should not purport to give values
for blast which we know have been superseded. I think both
conditions could be met by stating the origin of the curve and
including some such phrase as "These were the values expected at
the time the "Effects" was written".

I hope you will be able to sort all this out.

All best wishes.

Yours

Copy to:-

Permanent ⁰¹⁷¹ IV
 Health & Safety Reg.

Subject : Maralinga Range Radiation Safety Regulations

1. The draft Radiation Safety Regulations for the proposed Maralinga Range are enclosed. I shall be grateful if you will let me have any comments by 31st October, 1954. Appendices II and III have not been included.
2. As the Maralinga Range is to be a permanent station, and as moreover A.W.R.E. Industrial Staff may be employed there, the Regulations have been based on those already in existence at A.W.R.E. Aldermaston.
3. The Maximum Permissible Levels and Concentrations are based on the Recommendations of the International Commission on Radiological Protection. It is expected however that authority will have to be sought for the implementation of the Lower and Higher Integrated Doses.
4. Your attention is particularly drawn to para 14 - Responsibilities.
5. The attached regulations are the "General" regulations covering all ACTIVE areas and Tasks. Instructions will be issued covering individual Tasks or Areas when, and if, required.
6. Until political approval for the Maralinga project has been given, these Regulations must be classified "SECRET". They will eventually be issued as a RESTRICTED document.

CONTRACT TO

19th October, 1954.

Distribution:-

Copy Number 1 C.S. (S)	Copy Number 13 S.P.E.
Copy Number 2 S.S.H.D.	Copy Number 14-22 S.P.T.
Copy Number 3 S.S.T.D.	(9 copies)
Copy Number 4 S.S.F.D.	Copy Number 23 S.L.W.
Copy Number 5 F.H.O.	Copy Number 24 [REDACTED]
Copy Number 6 RAF/AWRE	(S.S.F.D)
Copy Number 7 D.S.S.X.	Copy Number 25 [REDACTED]
Copy Number 8 S.H.M.	(S.S.F.D)
Copy Number 9 S.E.L.	Copy Number 26 [REDACTED]
Copy Number 10 S.C.M.	(S.E.H.)
Copy Number 11 SC/EM	Copy Number 27 [REDACTED]
Copy Number 12 [REDACTED]	(S.H.P.)
Copy Nos 31-35 SSTD.	File Copy Number 28

Spares 29 and 30

Permanent Proving Ground
Health + Safety Regs.
OIR IV

Both sides to be used

R.O.F. Form 2a.

Minutes to be numbered consecutively

Q.P. No.

Ref. to

Subject { Maralinga Range - Proposed Radiation Safety Regulations

S.S.T.D.
Building

Copy No. 1 of 6 copies

1. I enclose for your consideration 6 copies of the draft of the proposed Radiation Safety Regulations for the Maralinga Range. These will I hope eventually be issued as RESTRICTED documents with a wide distribution. Appendices II and III have not yet been written.

2. In order to save time I am circulating the drafts to the various interested parties in A.W.R.E. prior to receiving your comments

3. Paragraphs 1.3, 2.2 (1), 7.2 with Appendix IV, 10,13,14.4, 14.5 and 14.6 are particularly brought to your notice, as they refer to items on which we should obtain the approval of either other U.K. Authorities or of Australian Authorities.

4. It is hoped that you will be able to obtain the consent of the requisite Australian Authorities while you are in Australia. For this purpose, I have forwarded S.P.T. 8 additional copies of the draft.

5. The Director's approval for the Maximum Permissible Level for External Radiations (Para. 2.2 (i)) will require to be sought as was done in the cases of HURRICANE and TOTEM. On this occasion we should seek the permission to cover "YELLOW BUNTING". CS(S) is aware of this requirement and can probably quote the Totem procedure.

Building
A.W.R.E. Aldermaston,
18th October, 1954.
W6/HPB/1722(a)

- c.c. S.S.M.D. Copy No.2 of 6 copies
- C.S.(S) Copy No.3 of 6 copies
- S.P.T. Copy No.4 of 6 copies
- Copy No.5 of 6 copies
- File Copy No.6 of 6 copies

COPI

Permanent Flying Ground

Health + Safety Regs. THE WAR OFFICE,
O/T H IV LONDON, S.W.1.

CONFIDENTIAL

57/Misc/8851/GS(W)7(Plans) ~~DOWNGRADED TO~~ 18th October, 1955.

Memorandum for:-

The Secretary,
Atomic Weapons Trials Executive,
Ministry of Supply, Room 671
St. Giles Court,
St. Giles High Street,
London, W.C.2.

Radiation Safety Regulations - Maralinga

Please refer to your XI/72/09 dated 8 July 55 and our memorandum of even reference dated 3 August 55; referring to RSMR/55(2) dated 15 June 55.

1. The War Office is now prepared to agree to the exposure of Army personnel on atomic weapon trials to radiation doses in excess of 0.3 roentgen per week, and will agree that the maximum permissible levels of radiation under these considerations may be extended to the limits given at paragraphs 2.2 and 2.3 of the provisional Radiation Safety Regulations - Maralinga Range.

2. We consider, however, that the "lower integrated dose" mentioned in paragraph 2.2 should be regarded as the upper limit incurred in the normal recovery of records or any other exposure in the area around ground zero, and its application would be a matter for the officer in charge of a task (e.g. group or team leader, or senior departmental representative) and not the Health Control Officer. The imposition by the Health Control Officer of further fractional limits within this dose might well result in the loss of valuable information by the sponsoring department. We therefore suggest in paragraph 2.2(1)(b) the sentence "This dose of the operations." should be deleted.

3. We suggest that two other paragraphs be rewritten before final approval is given. These are:-

(a) Para 11.1 We suggest:-

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

- (i) take emergency action;
- (ii) report to the Medical Officer (through his officer in charge, if the accident occurs on duty)."

The above procedure would of course ensure that Health Control would be informed automatically without the need of further action by the individual.

(b) Para 15.5. We suggest:-

"The officers in command of the various Service units and groups engaged in the trial will ensure that these regulations, and any instructions of the Trials Superintendent, are brought to the notice of all personnel under their command and will ensure that they are enforced."

for Major-General,
Director of Weapons and Development.

Copies to DGAMS
DPA
DPS

26/10/54

Permanent Proving Ground
Telegrams in
0171 Vid [redacted]

13

INWARD TELEGRAM TO COMMONWEALTH RELATIONS OFFICE

[redacted]
18-2-85

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

D: Canberra 18.25 hours 25th October 1954
R: 11.35 hours 25th October 1954

CYPHER
PRIORITY

DOWNGRADED TO
UNCLASSIFIED

No. 807 [redacted]

25/1/85 MOD 2/33

My telegram No. 658.

ATOMIC TESTS

In letter of today's date [redacted] confirms that Australian Government are prepared to co-operate with United Kingdom Government in further series of trials beginning in April or May of 1956 and to make Maralinga site available for permanent testing ground. He adds that matter will be discussed immediately with Premier of South Australia "who has some views on question when reserve which forms part of area should be reclaimed".

2. He says that pressure on local resources, both service and civil, is such that it is unlikely that anything more than token contribution can be made by Australian Government towards construction and preparation of proving ground.

3. Letter ends with suggestion that United Kingdom authorities may wish to take early opportunity of sending some officers to Australia to assess resources required and to begin planning construction of proving ground and trials.

4. In discussion at time of delivery of [redacted] letter Secretary of Prime Minister's Department said that Australian Government were, of course, contributing site and would provide other assistance wherever possible but he gave clear warning that they were most unlikely to be able to make any financial contribution towards trials. Further comments on this and other points together with copy of [redacted] letter follow by air mail.

Copy to:-

- C.R.O.
- M/Supply (Shell Mex House) [redacted] to Minister of Supply
- " (First Avenue Hse. [redacted])
- " (Castlewood Hse.) [redacted]
- " " " [redacted]
- Atomic Energy Authority
- M/Defence [redacted]

1231

Allotted to Defence Dept.

ANNEX A

Prime Minister,
Canberra.

25th October, 1954.

My dear High Commissioner,

Would you please refer to your letter of the 2nd August, 1954, and previous correspondence concerning the wish of the Government of the United Kingdom to establish in Australia facilities for a number of atomic weapon trials, the first to commence in the spring of 1956.

As the proposed proving trials are expected to extend over a period of approximately ten years the Australian Government agrees with the view of the United Kingdom Government that it would seem desirable to establish a permanent proving ground and that this should be in an area more accessible than that at Emu Field. It agrees that Maralinga in South Australia is the most suitable site.

I have noted the views of your experts that under suitable meteorological conditions the Maralinga site would provide an adequate margin of safety for bursts of atomic weapons of somewhat higher power than those used in previous trials.

My Ministers and I have noted also that the power of the atomic weapons to be tested and the meteorological conditions suitable for the test would be subject to prior agreement with the Australian Government, and also that there would be no question of testing hydrogen weapons.

In view of the foregoing, my Government is prepared to co-operate with the United Kingdom Government in the further series of trials beginning in April or May of 1956 and, to this end, we agree to make the Maralinga site available for a permanent testing ground. We will immediately discuss the matter with [redacted] who has some views on the question when the reserve which forms part of the area should be reclaimed.

I am afraid that pressure on our local resources, both service and civil, is such that it is unlikely that little more than token contribution can be made by us towards the construction and preparation of the proving ground.

Perhaps the United Kingdom authorities would wish to take an early opportunity to send to Australia some Officers who could make an assessment of the resources required, and begin planning the construction of the proving ground and the 1956 trials.

Yours sincerely,

PRIME MINISTER

His Excellency Sir Stephen Holmes, K.C.M.G., M.C.,
High Commissioner for the United Kingdom,
CANBERRA A.C.T.



ANNEX B

Office of the High
Commissioner
For the United Kingdom
Canberra

25th October, 1954.

43/2

My dear [REDACTED]

With reference to our telegram No. 807 I now enclose copies of the letter of the 25th October from [REDACTED] to the High Commissioner, confirming the Australian Government's agreement to make the Maralinga site available for the construction of a permanent proving ground for atomic tests and to co-operate with the United Kingdom Government in the proposed further series of trials beginning in April or May of 1956.

In paragraph 4 of our telegram we said that [REDACTED] had given us a clear warning that the Australian Government were most unlikely to be able to make any financial contribution towards the trials but would provide other assistance wherever possible. [REDACTED] talked to me at some length about this and reverted to the question of co-ordination of defence requests on Australia. He said that the Australian Defence Vote was already overtaxed and pointed out that part of it was already allocated to other projects including Woomera in which Australia and the United Kingdom were jointly interested. He said that Australia had contributed generously towards the cost of previous trials and was continuing to offer a wide variety of services in connection with the testing of equipment. He expressed the view that any financial contribution by Australia towards the cost of the proving ground and of the future atomic tests would be marginal and might well mean the cutting of expenditure on other forms of joint operation in the field of defence. It would therefore be very helpful if, before the question of an Australian financial contribution came to be discussed, the United Kingdom authorities could make up their minds about the importance of this project in the scheme of Commonwealth defence, in relation to Woomera and any other defence "extras" which we have asked, or propose to ask, Australia to undertake. In this connection he also mentioned the newly announced project for research and development for the industrial use of atomic power, which, it is estimated, will cost over £5,000,000. I pointed out to him that the initiative in this connection seemed to have come largely from the Australian side, just as most of the benefit would eventually accrue directly to Australia. He said that, be this as it might, the Australian Government would like this project to be included amongst the items in the priority list.

In his letter [REDACTED] says that pressure on local resources, both service and civil, are such that it is unlikely that the Australians will be able to make anything more than a token contribution towards the actual construction and preparation of the permanent proving ground. [REDACTED] confirmed this. He said that there were two schools of thought in Australia on the question whether construction should be undertaken on a civilian or a service basis. He himself was inclined to think that it should be undertaken by a service force. He added, however, that Australia's own limited service engineer forces were heavily committed and that none of them could be spared for work in connection with the proving ground at the present time. He confirmed that his idea was that United Kingdom sappers or the equivalent from another service might be made available for the job.

As you will see from [REDACTED] letter, we are asked to send a planning team to Australia. I told [REDACTED] that in view of the passage of time we had ourselves come to the conclusion that the balance of advantage would now lie in a United Kingdom team visiting Australia and that the United Kingdom authorities were already making preparations to this end (C.R.O. telegram No. 880).

[REDACTED] C.M.G., C.B.E.,
Commonwealth Relations Office, London, S.W.1.

1233

I gathered also from Brown that the Australian meteorological authorities were making an urgent examination of the meteorological conditions in the area and would forward a report as soon as possible. A map of the area was also in course of preparation and would be forwarded direct to the United Kingdom authorities.

As regards overall administrative control of the construction forces in Australia, Brown said that present thinking was in favour of much the same sort of arrangements as were introduced for the construction of Emu Field.

██████████ ended our conversation on a characteristically dry note by saying that the Australians were glad that we wished to embark with them on a programme of increasing co-operation over the field of atomic energy but that they had not yet received any information whatsoever from previous tests. If what ██████████ says is true it seems to reflect a surprising state of affairs. We should be grateful if you would find out what the position is and let us know in due course.

On the question of defence priorities, mentioned above, it is essential that we should clear our minds about this before we tackle the Australians about finance, bearing in mind, as the High Commissioner said in his letter of the 10th May to Liesching, not only that the Australians themselves cannot always be expected to know the relative importance from our standpoint of all the requests coming in to them at different angles from the United Kingdom, but also that it is in our own interest to deny them too easy an excuse for claiming that they cannot get a quart out of their £A200 million pint pot.

Yours sincerely,

████████████████████

[Redacted]
Permanent Proving Grounds
0171 Id

25/10/54
Prime Minister,
Canberra.

25th October, 1954.

My dear High Commissioner,

Would you please refer to your letter of the 2nd August, 1954, and previous correspondence concerning the wish of the Government of the United Kingdom to establish in Australia facilities for a number of atomic weapon trials, the first to commence in the Spring of 1956.

As the proposed proving trials are expected to extend over a period of approximately ten years the Australian Government agrees with the view of the United Kingdom Government that it would seem desirable to establish a permanent proving ground and that this should be in an area more accessible than that at Emu Field. It agrees that Maralinga in South Australia is the most suitable site.

I have noted the views of your experts that under suitable meteorological conditions the Maralinga site would provide an adequate margin of safety for bursts of atomic weapons of somewhat higher power than those used in previous trials.

My Ministers and I have noted also that the power of the atomic weapons to be tested and the meteorological conditions suitable for the test would be subject to prior agreement with the Australian Government, and also that there would be no question of testing hydrogen weapons.

In view of the foregoing, my Government is prepared to co-operate with the United Kingdom Government in the further series of trials beginning in April or May of 1956 and, to this end, we agree to make the Maralinga site available for a permanent testing ground. We will immediately discuss the matter with Mr. Playford who has some views on the question when the reserve which forms part of the area should be reclaimed.

I am afraid that pressure on our local resources, both service and civil, is such that it is unlikely that little more than token contribution can be made by us towards the construction and preparation of the proving ground.

Perhaps the United Kingdom authorities would wish to take an early opportunity to send to Australia some officers who could make an assessment of the resources required, and begin planning the construction of the proving ground and the 1956 trials.

Yours sincerely,

PRIME MINISTER,

[Redacted]
18-2-85

DOWNGRADED TO
UNCLASSIFIED
MOD 2/20

His Excellency [Redacted] H.C.M.G., H.C.,
High Commissioner for the United Kingdom,
CANBERRA. A.C.T.

ASSISTANT DEPUTY DIRECTOR'S OFFICE,

L

Reports Supply to Australia.

0244.

DOWNGRADED TO UNCLASSIFIED

22/1/85

Ref: 502/10/54/V

28th October, 1954

21-2-85

My dear

I am writing with [redacted] blessing, once again to ask if you can accelerate the decision on the policy of the supply of A.W.R.E. reports to the Australian Government, since the absence of a policy is causing acute embarrassment at this end and we have reason to believe, considerable irritation at the other.

For over a month now I have had to sit on a request from the R.A.A.F. for copies of one of our Secret reports, of whose existence they probably became aware at TOTEM. While I feel sure that such a report will fall into the category of those which should be given to Australia, I do not feel able to comply with the request from the R.A.A.F. until (a) U.K. policy is decided and (b) some of our HURRICANE and TOTEM reports (on "effects") have been voluntarily sent to the Australian Government. Today I have received a hastener from Australia House pressing for a decision whether the report in question is or is not available, and in the former case when it will be sent. It is difficult to keep on stalling and the effect on Australian Departments must be that we are trying to get Atomic range facilities and yet give away as little information as we decently can.

Could this unfortunate state of affairs be ended by you perhaps, after verbal acquiescence of your Official Committee Member, giving us interim authority to send to the Australian Government a selection of our "effects" reports within the following category:-

(1).....

[redacted]
Ministry of Defence,
Storey's Gate,
London, S.W.1.

Atom planning
0261 XII e.
DOWNGRADED TO
36/Research 1047

FROM: [REDACTED]

THE WAR OFFICE,
LONDON, S.W.1.

28 October, 1954

Dec [REDACTED]

[REDACTED]
22/1/54

[REDACTED]
24/1/54

Thank you for your T1/A.90 dated 14th October, 1954. I will agree that this problem is a difficult one. I originally disagreed with [REDACTED] because I had plotted out the American information and found that below 9 psi the blast distance curves from "Effects of Atomic Weapons" and the Tripartite Conference proceedings, were in quite good agreement. I attach a copy of these curves to show you what I mean.

[REDACTED] statement that the E.A.W. curves imply a blast equivalent of about 17 Ki of TNT and hence, using the 45% figure, an RC yield of 38 Ki was disturbing, and, as you know, [REDACTED] of the Ministry of Defence and I visited [REDACTED] on Monday, 25th October to discuss the whole problem. It is clear from our discussion that the E.A.W. curves are wrong, but it was also clear that the curves in the TCP don't agree with the TCP 45% figure and distances scaled from charges of pentolite, nor does either curve agree with figures obtained from blast pressure for damage given in "Capabilities of Atomic Weapons" and iso-damage curves for military equipment given in the TUP.

Thus is confusion worse confounded! If we accept that the E.A.W. Curves are wrong, we have at the moment, no correct curves to replace them. An easy way out would be not to include pressure-distance curves at all, but I am convinced that this would then defeat the main object of the reports, which is to present damage to military equipment in terms of distances from the ground zero of a weapon with which the Army is now familiar. I consider, therefore, that it would be correct to retain the blast curves from E.A.W. which are, in any case, the curves quoted in all publications issued on a fairly wide distribution to the Army, and to label these clearly with their origin. Any attempt at further correction would so increase the security grading of the reports that their circulation would be limited, and their value correspondingly so.

I suggest that "Figure 1" should have some title such as "Based on Figures 3.72 (Blast) and 6.36 (Heat) in "The Effects of Atomic Weapons" - U.S. Combat Force Press 1950" such as I have indicated on the figure attached, and suitable amendments be made in the text of the report. I can discuss these directly with [REDACTED] if you agree.

The question of issuing a highly classified supplement to these reports will have to remain in abeyance until it has been decided what are the most reliable figures to be substituted not only for those in E.A.W. and C.A.W., but also for those in the TCP. Presumably [REDACTED] will produce these in due course!

Yours sincerely

[REDACTED]

[REDACTED]
United Kingdom Atomic Energy Authority,
Atomic Weapons Establishment,
Aldermaston,
Berks.

Copies to: [REDACTED] BSC RN) A.W.R.E. Aldermaston.

[REDACTED] RN (Retd),
A.W.R.E.,
Fort Halstead, Kent

Totem planning.
0261 XIIIe.

22/1/55

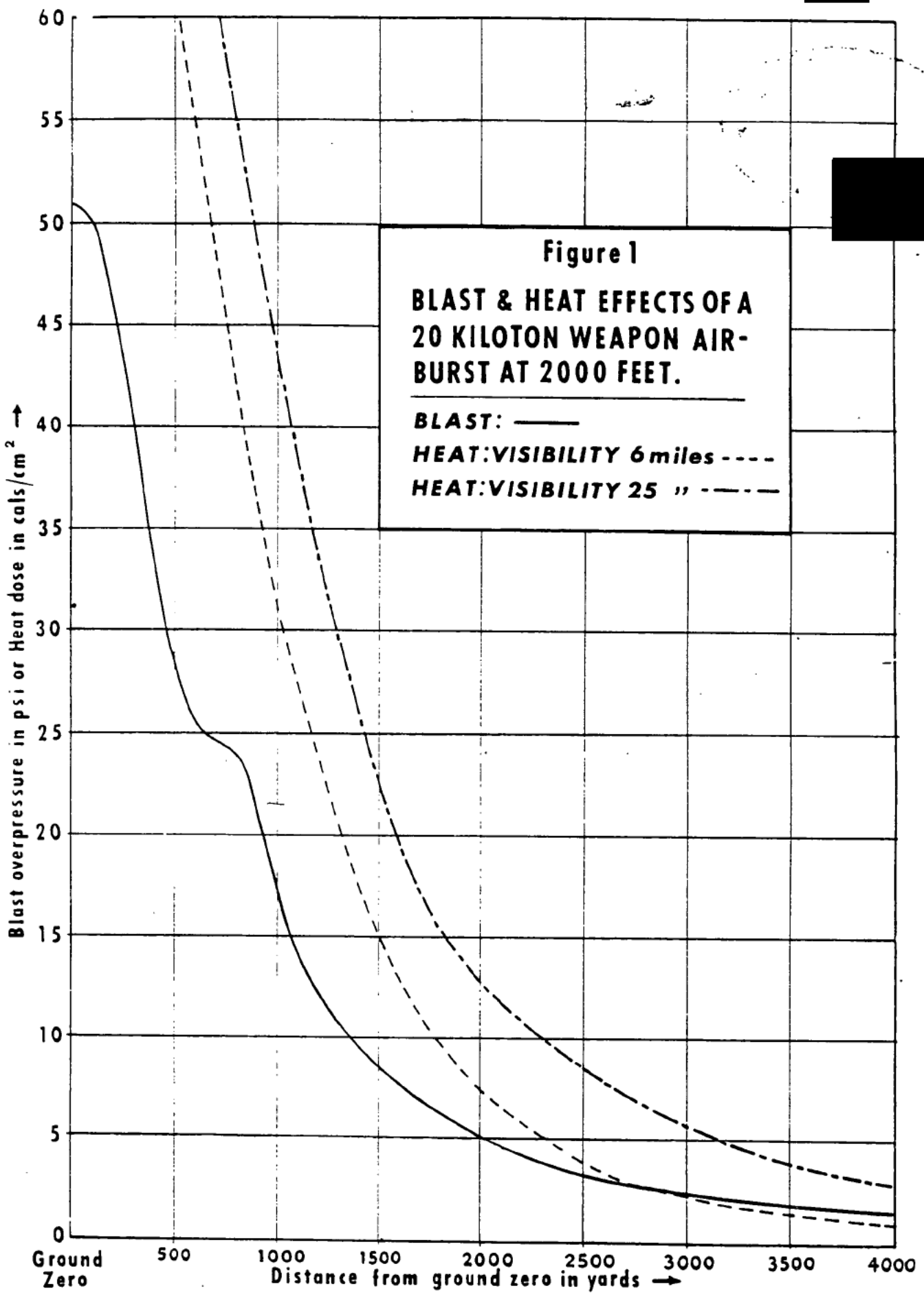


Figure 1
BLAST & HEAT EFFECTS OF A 20 KILOTON WEAPON AIR-BURST AT 2000 FEET.
BLAST: —
HEAT: VISIBILITY 6 miles ----
HEAT: VISIBILITY 25 " -.-

ASSISTANT DEPUTY DIRECTOR'S OFFICE,

Reports Supply to Australia.
0244.

Ref: 502/10/51/V

28th October, 1954

DOWNGRADED TO

My dear [REDACTED]

I am writing with [REDACTED] blessing, once again to ask if you can accelerate the decision on the policy of the supply of A.W.R.E. reports to the Australian Government, since the absence of a policy is causing acute embarrassment at this end and we have reason to believe, considerable irritation at the other.

For over a month now I have had to sit on a request from the R.A.A.F. for copies of one of our Secret reports, of whose existence they probably became aware at TOTEM. While I feel sure that such a report will fall into the category of those which should be given to Australia, I do not feel able to comply with the request from the R.A.A.F. until (a) U.K. policy is decided and (b) some of our HURRICANE and TOTEM reports (on "effects") have been voluntarily sent to the Australian Government. Today I have received a hastener from Australia House pressing for a decision whether the report in question is or is not available, and in the former case when it will be sent. It is difficult to keep on stalling and the effect on Australian Departments must be that we are trying to get Atomic range facilities and yet give away as little information as we decently can.

Could this unfortunate state of affairs be ended by you perhaps, after verbal acquiescence of your Official Committee Member, giving us interim authority to send to the Australian Government a selection of our "effects" reports within the following category:-

[REDACTED] K.B.E., C.B.,
Ministry of Defence,
Storey's Gate,
London, S.W.1.

(1).....

Reports Supply to Australia. *02/11/54*



MINISTRY OF DEFENCE,
STOREY'S GATE,

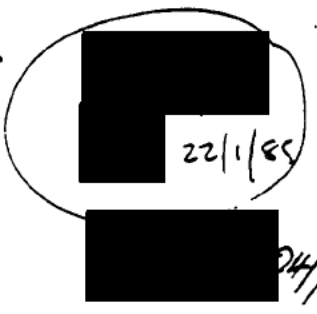
FB/233/54

S.W.1

3rd November, 1954.

Te. Whitehall 7000

My dear



I share your anxiety to hasten the decision on the supply of A.W.R.E. reports to the Australian Government.

DOWNGRADED TO

A general paper on this business is being taken by the Atomic Energy (Official) Committee in the next day or two and I have arranged that if a general decision is not reached then, I will act myself on your particular case.

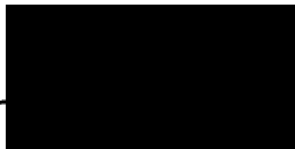
On the general procedure it is, I think, extremely important for the maintenance of the proper security arrangements in Australia that any documents we do send should go to the Prime Minister's Department, who should be responsible for looking after their safeguarding and distribution in Australia. We have therefore proposed in the paper to the A.E.(O) Committee that any documents for Australia should be sent by the Ministry of Defence through the Commonwealth Relations Office to the Prime Minister's Department.

With regard to Canada, with which we are also dealing in the same paper, we propose to follow the precedent with certain earlier atomic documents and send them to Solandt, as Chairman of the Research and Development Board and as a member of the Canadian Chiefs

/of

[Redacted] D.S.O., (Retd.),

U.K. Atomic Energy Authority,
A.W.R.E.,
Aldermaston.



E.R.

DOWNGRADED TO

MINISTRY OF DEFENCE,

Storey's Gate,

Ref: 407/053/54

Reports Supply to Australia - S.W.1.
0244

10th November, 1954.

Dear

As I told you over the telephone on Monday the A.E.O. have now adopted an agreed policy for the transmission of reports to Canada and Australia. The relevant extracts from the paper are:-

"4. (a) Australia may be given all purely British data on weapons effects including weapon trial data which does not reveal the design or functioning of the weapon; this data may include the actual yield of the weapon for any trial held within Australian territory but must not include any references to American information obtained under the Tripartite Agreement or subsequent agreements under the new U.S. Atomic Energy Act.

(b) Canada may be given all British reports on weapon effects including weapon trials data which does not reveal the design or functioning of the weapon; this data may include the actual yield of the weapon for any trial in which Canadian participation occurs. Any such British reports which contain American information must be clearly marked.

5. Documents for Australia should be passed by the Ministry of Defence through the Commonwealth Relations Office to the Prime Minister's Department in Australia and further distribution should be the responsibility of that department. For the time being documents for Canada should be passed by the Ministry of Defence to the London representatives of the Chairman of the Research and Development Board, who is also a member of the Canadian Chiefs of Staff Committee."

[redacted] has asked me to get from you as soon as possible a first batch of reports for Australia. Our intention is to deal with Australia first in this respect leaving Canada until we have sent Australia something to digest.

Yours sincerely

I hope this gives you the information you asked me for on the telephone today

[redacted]
Vice Director,
A.W.R.E.,
ALDERMASTON,
Berks.

C.B., D.S.O.,

1241 *experts*

C10
[redacted]

D.D/AURE

ASSISTANT DEPUTY DIRECTOR'S OFFICE,

Reports Supply to Australia.
0244.

[Redacted] 22/1/85

[Redacted] 24/1/85

Ref: 521/11/54/ADD

17th November, 1954

DOWNGRADED TO UNCLASSIFIED

Dear [Redacted]

Since writing to [Redacted] about what I feel should be said to the Australians, I have received the following suggestions from [Redacted] (who has been in charge of the preparation of the 'HURRICANE' reports) of what should also be included. I think his points are good ones and suggest they be worked into your draft if there is time:-

[Redacted] [Redacted]

"The Director's report on "Scientific Data obtained at Operation Hurricane" was prepared from all available information in the Atomic Weapons Research Establishment and has been issued by the Ministry of Defence. The report, as issued, constitutes Report T.1 and T.1a of our Hurricane series. It summarises all the information on the Effects of Atomic Weapons in so far as they might be of interest to Civil, Military and Naval personnel.

The basic individual reports and records from which the Director's Report was prepared were left in manuscript form until recently. It was then decided to reproduce them, in a limited number of copies, mainly for internal use in the Establishment. They constitute a record of instrumentation, successful or otherwise, and of many details which might be of value in another expedition, but which would often have little value to outside bodies.

/Most.....

[Redacted]
Ministry of Defence,
Storey's Gate,
London, S.W.1.

TS 3306

RE
DOWNGRADED TO
UNCLASSIFIED

02 11 2005

P

1203 9656

ops 8332A

2/4916

2/136

E.R.

[REDACTED]

DD Ops (2)
DD Ops (8) to keep.

A.C.A.S. (Ops.)

B3 114

Operation Totem

As requested in your minute Ops.7330. dated 4th October in reply to our loose minute of 27th September, I am enclosing for your retention the following reports:-

- No. T.48/54 - Analysis of Water and Petrol Samples irradiated during the Totem T1 Explosion.
- No. T.52/54 - Gamma Radiation Measurements in Field Trials.
- No. T.53/54 - Penetration of Concrete Slabs by Gamma Radiation
- No. T.54/54 - Totem Administration.

29th October 1954.

[REDACTED]
S.A. (D)

[REDACTED]

Downgraded to

5-3-45
[Redacted]

[Redacted]

Buff. 1. x(3-)/P5

Memorandum for the Chief of Staff

Reference:

- (1) [Redacted]
- (2) [Redacted]
- (3) [Redacted]
- (4) [Redacted]
- (5) [Redacted]

Secret:

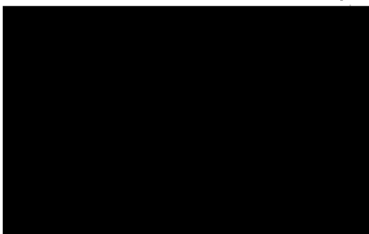
- (1) [Redacted]
- (2) [Redacted]
- (3) [Redacted]
- (4) [Redacted]
- (5) [Redacted]

Confidential:

- (a) [Redacted]
- (b) [Redacted]
- (c) [Redacted]
- (d) [Redacted]

Room 204,
First General Headquarters,
High Wycombe, Bucks.
2.11.56.

[Redacted]



11/10/63
B4

Attachment (54)/PL

Attachment (54) - Report on the Buffalo

The following report was prepared by the National Committee on Atomic Energy (NCAE) in response to the request of the Atomic Energy Commission for a study of the problems of trials in connection with the development of a reactor. The study was conducted by the NCAE in cooperation with the Atomic Energy Commission and the Department of Energy. The report is being submitted to the Atomic Energy Commission for its information and guidance.

The following are the main findings of the study:

- (1) The study has shown that the development of a reactor is a complex task which requires the cooperation of many different agencies and organizations.
- (2) The study has shown that the development of a reactor is a long and costly process which requires a large amount of resources.
- (3) The study has shown that the development of a reactor is a high-risk activity which requires a high degree of technical competence and experience.
- (4) The study has shown that the development of a reactor is a task which requires a high degree of coordination and communication between all concerned parties.
- (5) The study has shown that the development of a reactor is a task which requires a high degree of flexibility and adaptability to changing circumstances.
- (6) The study has shown that the development of a reactor is a task which requires a high degree of perseverance and determination.
- (7) The study has shown that the development of a reactor is a task which requires a high degree of leadership and vision.
- (8) The study has shown that the development of a reactor is a task which requires a high degree of teamwork and collaboration.
- (9) The study has shown that the development of a reactor is a task which requires a high degree of innovation and creativity.
- (10) The study has shown that the development of a reactor is a task which requires a high degree of responsibility and accountability.

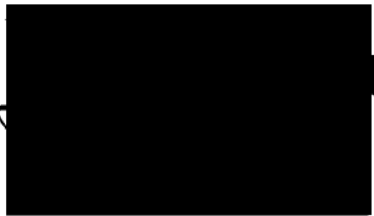
The following are the recommendations of the study:

- (1) The Atomic Energy Commission should continue to support the development of a reactor.
- (2) The Atomic Energy Commission should continue to provide the necessary resources for the development of a reactor.
- (3) The Atomic Energy Commission should continue to provide the necessary technical assistance for the development of a reactor.
- (4) The Atomic Energy Commission should continue to provide the necessary leadership and vision for the development of a reactor.
- (5) The Atomic Energy Commission should continue to provide the necessary teamwork and collaboration for the development of a reactor.
- (6) The Atomic Energy Commission should continue to provide the necessary innovation and creativity for the development of a reactor.
- (7) The Atomic Energy Commission should continue to provide the necessary responsibility and accountability for the development of a reactor.

The study has shown that the development of a reactor is a complex task which requires the cooperation of many different agencies and organizations. The study has also shown that the development of a reactor is a long and costly process which requires a large amount of resources. The study has also shown that the development of a reactor is a high-risk activity which requires a high degree of technical competence and experience. The study has also shown that the development of a reactor is a task which requires a high degree of coordination and communication between all concerned parties. The study has also shown that the development of a reactor is a task which requires a high degree of flexibility and adaptability to changing circumstances. The study has also shown that the development of a reactor is a task which requires a high degree of perseverance and determination. The study has also shown that the development of a reactor is a task which requires a high degree of leadership and vision. The study has also shown that the development of a reactor is a task which requires a high degree of teamwork and collaboration. The study has also shown that the development of a reactor is a task which requires a high degree of innovation and creativity. The study has also shown that the development of a reactor is a task which requires a high degree of responsibility and accountability.

NOTE: The study has shown that the development of a reactor is a complex task which requires the cooperation of many different agencies and organizations. The study has also shown that the development of a reactor is a long and costly process which requires a large amount of resources. The study has also shown that the development of a reactor is a high-risk activity which requires a high degree of technical competence and experience. The study has also shown that the development of a reactor is a task which requires a high degree of coordination and communication between all concerned parties. The study has also shown that the development of a reactor is a task which requires a high degree of flexibility and adaptability to changing circumstances. The study has also shown that the development of a reactor is a task which requires a high degree of perseverance and determination. The study has also shown that the development of a reactor is a task which requires a high degree of leadership and vision. The study has also shown that the development of a reactor is a task which requires a high degree of teamwork and collaboration. The study has also shown that the development of a reactor is a task which requires a high degree of innovation and creativity. The study has also shown that the development of a reactor is a task which requires a high degree of responsibility and accountability.

Page 10
Page 11
Page 12
Page 13





12,000

E10

Supp 12x(26)/53

Principles of division of responsibility among U.K. Departments

1. [Redacted] will be responsible for the execution of the general policy laid down by the Ministry of Defence, and will be responsible for the planning of the operations, and for the procurement, maintenance and repair of the aircraft operated by the Royal Air Force.

2. [Redacted] will be responsible for the general administration of the Executive's policy.

3. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

4. [Redacted] will be responsible for providing the necessary technical and financial resources for the operation of the Executive's policy.

5. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

6. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

7. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

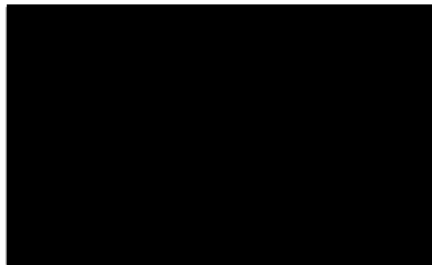
8. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

9. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

10. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.

11. [Redacted] will be responsible for the provision of the necessary technical and financial resources for the operation of the Executive's policy.





2/10/11

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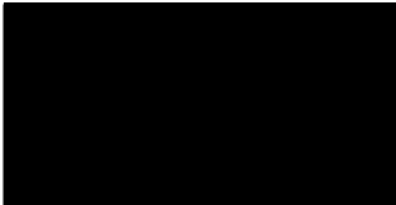
Dufflex(5)EC

General instructions for operations in Buffalo

It is requested that you direct the Director of the
Weapons Division (Mr. William Penney) should direct the
operation in the area of the policy laid down by this Executive and
to the effect of the operation and execution of the operation
with the assistance, subject to the concurrence of the Australian
Government, of the United States and the United Kingdom as indicated
in the report.

It is requested that Mr. E. P. P. Penney, Mr. Penney's Senior
Subsidiary in the Division, should be in charge of detailed planning
on Mr. Penney's behalf. Mr. P. Penney will communicate directly with
individual members of the Executive in the subject of tasks allocated
to their respective divisions.

Room 125,
First Avenue,
New York, N.Y.
2/11/54.



Downgraded to X1/rel II

E12

285
[Redacted]

[Redacted]

Diffalex (S) P.1

Review of Present Situation

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

A. C.R.O. Telegram No. 5/4 dated 29.7.1954

Previous Ground

It should be noted if you would not approach Australian Prime Minister on this line but that any immediately following telegram. In a separate communication you should explain that we are looking for a way to increase cooperation with Australia in the field of atomic energy in accordance with discussions held last year. We are keeping this matter fully under review.

1. Previous world political situation

(a) It should be noted that the Australian Government would be prepared to make a contribution to the cost of the project, since a joint venture would avoid difficulties and expenses which would otherwise be incurred from a purely Australian 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 a more full information now on the form of financial structure of the project as things stand today, this would be due to difficulties with United States to develop a attitude towards exchange of atomic weapon information and facilities as 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.

2. It should be noted that reference is made to [Redacted] points of detail [Redacted] in enclosure to [Redacted] letter of 7th July to [Redacted] (REF. 5-56/15) should be passed to Prime Minister's Department.

B. C.R.O. Telegram No. 5/4 dated 29.7.1954

1. Reply to [Redacted] telegram.

Following [Redacted] approach:-

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

(b)

[Redacted]

- (b) It should be made clear that if Australian Government would not be willing to holding of further series of open trials in Australia in April or May 1956 and would not extend their cooperation.
- (c) Since the possibility of holding open trials is likely to continue for long period, it should like to consider in consultation with Australian Government whether it is desirable in interest of efficiency and economy to set up a proving ground of permanent nature, with all existing facilities.
- (d) The choice of site will have to be between Bru Field and another suitable site. Our experts consider that under suitable meteorological conditions Maralinga could provide a site for safety for bursts of atomic weapons of much higher power than those used in previous trials.
- (e) The proposal to hold open trials of atomic weapons to be tested under meteorological conditions suitable for the tests will be subject to prior agreement with the Australian Government. It should be quite clear that there will be no question of testing hydrogen bombs.
- (f) One of the main difficulties to be tackled by Australian Government, in the first position to assess local meteorological conditions, and to work out the most economic solution.
- (g) It will, of course, be for the benefit of Australia for such help in providing services. It is clear that provision of support facilities can be undertaken as a joint project. It fully appreciate any other calls upon Australian resources and the apportionment of costs could be a matter for negotiation taking due account of other commitments.
- (h) We should like to have Australian views on this proposal as soon as possible with view to reaching agreement in principle between the two Governments including apportionment of responsibilities and costs.
- (i) Subject to such agreement, we would hope that detailed planning for the construction of the proving ground and the conduct of the 1956 trials could start without delay.
- (j) As far as United Kingdom is concerned it has been decided that administrative responsibility for the project should rest with the Ministry of Supply. The Ministry of Supply will refer technical questions as necessary to the United Kingdom Department of Atomic Energy.
- (k) You may, if necessary, inform the Australians that the rumour in [redacted] letter C.743/2 of 1st March that proving ground might be located in Canada is unfounded. We do not regard Canada as suitable site owing to climatic conditions in uninhabited areas.

8451

1219



C. Canberra Telegram No. 563 dated 4.8.1954

Your Telegram No. 433.

PROVING GROUND

In your telegram yesterday I referred to my letter to him... I think to him as personally... and could welcome the prospect of... on the United Kingdom and Australia... discretion given in sub-paragraph (k) of your... and so forth any suggestion that... had been thinking...

Mr. Clark's reply alluded to the newspaper story mentioned in... 556. I told him that I had no knowledge of any... should be shared with the... at all to think that there was...

D. Canberra Telegram No. 468 dated 2.9.1954

Your Telegram No. 409.

ATOMIC TESTS

Prime Minister's Department have given us interim answer to... enough to set the matter of... proposed... nature and extent... officials and... until Cabinet have... will meet on... will be undue delay.

2. In regard to the... provided in 1(C) of... July to Tory, Cabinet decided... United Kingdom and that we are... United Kingdom team to... Australia instead.

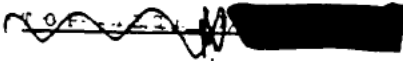
3. We have been told on... basis that Government have also... in principle to co-operate in initiator tests on understanding... United Kingdom Department of Atomic Energy... full liability for expenses involved. More also full... until details have been considered and... reported on by officials.

E. C.E.O. Telegram No. 980 dated 30.9.1954

Your No. 458, paragraph 2.

ATOMIC TESTS

In view of... and need to make best of that... would lie in United Kingdom team... to this end. Paragraph 1(c) of... to Clark's letter of 7th July to Tory... cancelled.



/F.

UNCLASSIFIED



Page 4

P. Canberra Times 24.10.1954

1954

REPLY

In the light of the... Australian Government... 1954 and... ground... South... forms

4. ... civil... construction

5. ... utilities... construction

6. In the... Australian Government... contribution

Room 225,
First Floor,
High Court, Adelaide
S.A. 5001



1251

1520

UNCLASSIFIED

It is now noted that, in addition to radio active hazards there are still considerable security risks at Monte Bello and that the Admiralty considers that access to the areas shown must be carefully controlled. The Australian Naval authorities have advised that there has been no physical security in the Monte Bello area for the last eighteen months and that they are unable to police the area now. It is desired to bring this to your notice so that the United Kingdom authorities might be fully aware of the position should they wish to consider what arrangements might appropriately be made by them on security aspects.

The prohibited area at Monte Bello as declared by the Defence (Special Undertakings) Act 1950 covers a radius of 45 miles from the centre at Flag Island, and you will be aware from previous correspondence of the action contemplated to reduce the size of the area. However certain legal aspects have not yet been finalised and the area remains as originally declared under the abovementioned Act. The present area is unnecessarily large and is administratively inconvenient. As an illustration of this, special authorisation and the issue of permits was necessary in connection with a visit for petroleum exploration purposes by two geologists to Barrow Island which, although within the present prohibited area is outside the radio active and security areas shown in the present report. Also the retention of a large prohibited area is causing unnecessary interference with fishing.

In the light of the report the Australian Naval authorities have suggested that the area should now be reduced to a radius of 10 miles from the centre of Flag Island instead of 45 miles as at present. Our approach to this matter is that the area which is to remain prohibited should be the minimum necessary to provide for United Kingdom requirements and for adequate protection against radio activity, and it is for consideration whether the new area should have a radius of 10 miles from Flag Island or a lesser radius.

It would be appreciated if the United Kingdom views on the minimum size of the area to achieve the above-mentioned objectives, could be made available as soon as possible. It would also be appreciated if, as suggested in the report, the United Kingdom authorities would arrange for the position at the Monte Bello Islands to be kept under review at regular intervals and for periodical reports to be made available to the Australian authorities.

Yours faithfully,


Secretary.

The Official Secretary,
Office of the High Commissioner
for the United Kingdom,
CANBERRA.

UNCLASSIFIED

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Yours faithfully,


Secretary.

The Official Secretary,
Office of the High Commissioner
for the United Kingdom,
CANBERRA.

Downgraded to

Buffalex (S) Ad.

25-2-85

Minutes of a Meeting of the Atomic Weapons Trials
Executive held in Room 224, First Avenue House,
High Holborn, W.C.1. on THURSDAY, 11th NOVEMBER, 1954

PRESENT:

Lt. Gen. Sir Frederick Morgan
Ministry of Supply (Chairman)

- | | |
|--------------------------------|---------------------------------------|
| [REDACTED] | [REDACTED] |
| Admiralty. | War Office |
| [REDACTED] | [REDACTED] |
| Air Ministry. | Lord President's Atomic Energy Office |
| [REDACTED] | [REDACTED] |
| Air Ministry. | Ministry of Defence. |
| [REDACTED] | [REDACTED] |
| Commonwealth Relations Office. | H.M. Treasury. |
| [REDACTED] | [REDACTED] |
| Ministry of Transport. | Ministry of Supply. |
| [REDACTED] (retd.) | [REDACTED] |
| Atomic Energy Authority. | Ministry of Supply. |
| [REDACTED] | [REDACTED] (retd.) |
| Atomic Energy Authority | Ministry of Supply (Secretary) |
| [REDACTED] | [REDACTED] |
| Atomic Energy Authority. | Ministry of Supply. |

1. TERMS OF REFERENCE AND REPRESENTATION

The Chairman informed the Executive that Ministerial approval had been given for a further series of atomic weapons trials in 1956, and for the opening of negotiations with the Australian Government on the construction in Australia of a permanent proving ground for atomic weapons. These were separate projects, administratively and financially:-

- (a) the proving ground project (code name quoted in separate minute) was the responsibility of the Ministry of Supply. The security grading of the project is TOP SECRET.
- (b) the 1956 trials (code name quoted in separate minute) were the responsibility of the Executive, which had been set up by the Official Committee on Atomic Energy. The security grading of the trials project is TOP SECRET/GUARD.

The Chairman also outlined the possible nature of the 1956 trials.

[REDACTED]

/It

It was agreed that questions requiring Ministerial decision, and those at official level which might be outside the competence of the Executive, would be referred to the Official Committee on Atomic Energy. If decisions concerning scientific policy or effort are required, the questions will be referred to the Atomic Energy sub-committee of the Defence Research Policy Committee.

2. REVIEW OF PRESENT SITUATION (BUFFALEX (54)P.1)

To complete the outline given in the paper, the Chairman said that the Australian Prime Minister's reply had now been received, together with a covering letter from the U.K. High Commissioner. The Australian Government had agreed to both projects, but had been unable to hold out any offer either of financial co-operation or of provision of construction effort for the proving ground. U.K. Ministers were now being asked to authorise the construction of the ground, and to approve the visit of a British reconnaissance party to Australia in the near future.

On the Chairman's invitation, [redacted] outlined the present state of A.M.R.E.'s plans. The proving ground had been planned in some detail and drawings were well advanced. They also had well in hand the arrangements for measurements which A.M.R.E. themselves required from the 1956 trials. In so far as tests of equipments, etc., are to be included for other parties, A.M.R.E. would like them to be integrated in one coherent plan, and would welcome further discussions to that end. This will avoid a most undesirable feature of a previous trial, when requirements were put forward up to the last minute.

3. COMMAND ARRANGEMENTS FOR OPERATION (BUFFALEX (54)P.2)

The Executive agreed the proposals set out in Buffalex (54)P.2.

The Executive will be kept informed of the progress of actions carried out under the powers delegated in paragraph 2.

4. DIVISION OF RESPONSIBILITY BETWEEN U.K. DEPARTMENTS (BUFFALEX (54)P.3)

The Executive agreed the proposals set out in Buffalex (54)P.3 with the following amendments:-

para.4 (Atomic Energy Authority); final sentence should now read:

'They will also be responsible for arranging for the transport of all stores in consultation as necessary with the Ministry of Transport.'

para.5 (Ministry of Supply); first sentence should read:

'The Ministry of Supply will be responsible for co-ordinating the administrative arrangements required in connection with overseas service of all scientific, technical and other personnel save those of the Authority.'

para.6 (Air Ministry); second sentence; amend 'transport services in Australia' to 'air services in Australia.'

5. DIVISION OF COSTS

The Executive noted that except for the air drop (for which the Air Ministry will accept responsibility), it was not yet certain how many explosions there would be, or of what type. It was therefore agreed that (apart from the air drop) weapons should be provided by the Ministry of Supply or the Atomic Energy Authority as appropriate, and the administrative costs under (C) of the paper divided on the best available basis to be decided later. Recovery of the cost of tests of equipments, structures, etc., under (C), was agreed.

6. SECURITY POLICY (BUFFALEX (54)/P.5)

The Executive noted that the main security task would lie with the Australian security service.

The classifications proposed in Buffalex (54)/P.5 were agreed with the following amendments:-

'GUARD' classification is to be added to items (a), (b), (c), (d), (e), (f), (h) and (i).

Item (c) was amended to read: 'The specific nature and purpose of each weapon trial.'

Item (f) was amended to read: 'The yield of experimental weapons tested.'

7. PUBLICITY AND QUESTIONS FOR MINISTERS

- (a) Publicity. The desirability of an early announcement to the Press was stressed by [REDACTED] and [REDACTED]. The Official Committee on Atomic Energy is being asked to approve a visit to Australia of a U.K. team in the very near future. Some members of this team might be recognised by the Press. An announcement of discussions with Australia should therefore be made before the party leaves. The terms of such an announcement would have to be agreed with the Australian Government.

The Executive concurred with these views, and invited the Commonwealth Relations Office to test Australian reactions to a proposed announcement of negotiations on the construction of an atomic weapons proving ground.

- (b) Ministerial Responsibility for Parliamentary Questions.

The Executive agreed that the most suitable Minister for answering questions in connection with the proving ground and most questions concerning the actual trials was the Minister of Supply, although some of the latter might be appropriate to the Lord President.

[REDACTED] /It

It was noted that arrangements for replying to questions in the House of Commons on atomic energy matters which are the responsibility of the Lord President have been laid down in a recent minute from the Prime Minister. The Prime Minister will reply on major policy questions; the Minister of Works will reply on more detailed and domestic matters, e.g. questions on the administration of A.E.C. personnel, etc.

It seems, therefore, that it is not necessary to obtain further directions on this matter at present.

8. CANADIAN PARTICIPATION

The Chairman announced that at the time of the Totem trials, the Canadian Chiefs of Staff were informed that they would be invited to take part in tests of equipment, etc. associated with future atomic weapon trials.

The Official Committee on Atomic Energy has agreed that Canadian representatives should be asked to meetings of the Executive at which matters of particular concern to them are to be discussed. Care will have to be taken not to pass restricted information to them.

In semi-official contacts, the Canadian Joint Staff (D.R.E. member) has given an indication of the lines on which the Canadians would like to participate. The work they would wish to carry out would involve the use of their Radiation Detection Unit.

If the Canadians are to use uniformed personnel the matter must be cleared with the Australians before the Canadians are approached officially. The Commonwealth Relations Office confirmed that action to this end is being taken.

9. TESTS BY OTHER GOVERNMENT DEPARTMENTS

[REDACTED] announced that requests for tests to be associated with Buffalo have been received from:

- The Admiralty
- The War Office
- The Air Ministry
- The Ministry of Supply
- The Ministry of Defence (Technical Research Unit)
- The Home Office (for civil Departments)
- Medical Research Council/Agricultural Research Council.

It was agreed that these requests will have to be co-ordinated as a whole and examined with the Australians where necessary. The final programme will be reported to the Executive, which will refer to the Defence Research Policy Committee, as necessary, for guidance on allocation of the facilities available for these tests.

/10.

10. COMMUNICATIONS

The Executive discussed communications required and agreed the following arrangements:-

- (a) Official U.K./Australian communications on trials policy will be sent to the U.K. High Commissioner, Canberra, via the Commonwealth Relations Office. Distribution of copies will be agreed by the Commonwealth Relations Office in agreement with the Secretary of the Executive.
- (b) U.K./Austrian communications on routine and technical matters will be sent to Mr. Black (U.K.M.C.S.S.), Melbourne, via the Secretary of the Executive, who will use the direct M.O.S./Melbourne telephone link, keeping the Commonwealth Relations Office informed and circulating copies of messages as required.
- (c) Sample specifications for the 1956 trials. These will be provided by the Secretariat.

11. METEOROLOGICAL SERVICES

The Chairman outlined the requirements and the facilities likely to be available for meeting them. After discussion, the Executive agreed:-

- (a) that the Australians should be invited to provide the basic meteorological services and forecasting for the Director of the trials;
- (b) that advice to the Director on the interpretation of this data in its relation to specific trials problems, e.g. fall out, should be given by the suitably qualified scientist now at A.T.R.E., but that the Australians should also be invited to collaborate in this task.

12. OTHER BUSINESS

(Security). The representatives of all Departments present were asked to ensure that papers and information relating to the Executive's programme will be handled only by staff who have been positively vetted, and to advise the Under Secretary of Security, Ministry of Supply, that this precaution is being taken.

Note: [redacted] address and telephone number are: Room 251 First Avenue House, High Holborn, W.C.1, - Chancery 6888, Ext. 927.

Enquiries on papers, minutes, etc., should be addressed to [redacted] Room 225 First Avenue House, High Holborn, W.C.1, - Chancery 6888, Ext. 1048.

Room 225,
First Avenue House,
17.11.54.
DB/35/01.

From: - [redacted]

Buffalo ? TS/1

[redacted]

[redacted]

50/1/54

copy [redacted]

Aircraft for Trials
0038

DOWNGRADDED TO

Ref:- RAF/AWRE/S.1270

12th November, 1954.

Dear

I promised to send you the known flying commitments for the trials in 1956. There will be four explosions, approximately a week or 10 days apart and for each of these the following flying tasks will be required.

Task A Cloud Flight at H + 20 Minutes. One high speed aircraft (Canberra) for air sampling and radiation measurements. A photographic aircraft tracking the above and photographing its entry into the cloud. This latter aircraft will also be used for other air photographic and cloud radar measurements.

Task B Cloud Flight at approx. H + 6 hours. One high speed aircraft for air sampling, particle size sampling and radiation measurements. This aircraft will also be used for tests on cabin filtration and surface finishes.

Task C Fall-out Pattern Surveys D-Day to D + 3 Day. Two medium transport aircraft for aerial surveys over the ground fall-out patterns out to approximately 400 miles. For use on days D + 1, D + 2, D + 3. It is possible that the R.A.A.F. will be able to undertake this commitment as they did for the last tests, but if not I understand from D.D.Ops B that the R.A.F. are willing to undertake the task.

[redacted]

D.F.C.,

Air Ministry,
D.D.Ops (Recce)
Whitehall Gardens,
London S.W.1.

[redacted]

/2

[REDACTED]

2. It is almost certain that the radiation dose which will be received by the aircrew involved in obtaining the H + 20 minute sample (Task 'A') will probably be so high that the crew will not be able to be exposed to further radiation during the trials series; such a crew would, however, be available to fly on photographic missions. There will be a small hazard involved in the H + 6 hour flight, but the crews concerned will probably be able to carry out a subsequent H + 20 minute flight or carry out a complete series of H + 6 hour flights.

3. I think the above will give you enough to start thinking about the size of the requirement and I will then come up and discuss it with you next week.

[REDACTED]

[REDACTED]

CONSTRUCTION OF A PERMANENT ATOMIC WEAPONS
PROVING GROUND IN AUSTRALIA

Report by M.O.S. Team

52
RECEIVED
11/11/55

INTRODUCTION

1. At the meeting on 16th November (A.E.(O)(54) 16th Meeting) the Official Committee agreed that the Ministry of Supply should send a team to Australia to make a detailed technical assessment of the resources required for the construction of a permanent atomic weapons proving ground and to examine with the Australians, without commitment, the possible methods of providing these resources. Questions of policy and finance were specifically reserved for further consideration in the light of the report to be made by this fact-finding mission.

2. At the request of the U.K. Atomic Energy Authority the team was also asked to complete the arrangements for holding a series of initiator trials in Australia in the early part of 1955.

3. The M.O.S. team which consisted of:

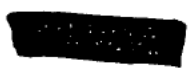
- [Redacted] Under Secretary, M.O.S.
- [Redacted] O.B.E. R.N. Director of Atomic Weapons, Trials, (Retd.) M.O.S.
- [Redacted] Senior Superintendent, Trials Division, A.W.R.E.
- [Redacted] Superintendent Trials Planning A.W.R.E.
- [Redacted] Trials Planning, A.W.R.E.
- [Redacted] War Office

left London on 24th November and arrived in Australia on 28th November. After preliminary talks in Canberra and in Melbourne, the whole team, accompanied by representatives of the Department of Supply and of the S. Australian Department of Mines, paid a four-day visit to the proposed site at Maralinga in the S. Australian desert, during which the whole area was reconnoitred. On return to Melbourne, further discussions were held with the Department of Supply, the Department of Works, the P.M.Gs Department, the Meteorological Branch of the Department of the Interior, the Commonwealth Railways, and, finally, with the Australian Prime Minister's Department and the Australian Treasury. The U.K. High Commissioner in Canberra was kept fully informed of these discussions and the Deputy High Commissioner and the U.K. Treasury representative in Australia attended the final meetings in Melbourne.

4. From the outset, the Australian representatives emphasised that the Australian Government would be unable to make any financial contribution towards the cost of the proving ground and of the next series of major trials in 1956. In reply, it was made clear to the Australians that the M.O.S. team was not authorised to negotiate any arrangement for the division of financial responsibility. The discussions were, therefore, agreed to be without prejudice to the negotiations which would subsequently have to take place on finance, but the Australians lost no opportunity of implying throughout the discussions that the U.K. would have to bear all the cost of establishing the permanent proving ground at Maralinga.

DESCRIPTION OF SITE

5. The Maralinga site is situated about 40 miles north of WATSON, a small railway stop on the Nullabor plain about 400 miles west of PORT AUGUSTA on the Trans-Continental Railway. To the north and east, the site is bounded by the existing Prohibited Area of the Woomera Rocket Range. Part of the Maralinga site is at present scheduled as an Aboriginal Reserve, though it is uninhabited and has been for many years. [Redacted] the Premier of S. Australia, has agreed to revoke this Reserve and the Federal Government



14 JAN 1955

ANNEX B

53

POINTS TO BE COVERED IN MEMORANDUM OF UNDERSTANDING BETWEEN U.K. AND AUSTRALIAN GOVERNMENTS

1. Arrangements for tenure of site

- (a) Provision should be made for the U.K. to have rights to use the site for weapon tests for a period of years.
- (b) It was suggested that the initial period should be 10 years with a provision for extension subject to agreement between the two Governments.

2. Compensation

- (a) The U.K. should agree to accept liability for any damage to persons or property in Australia as a result of the weapon trials, and should also undertake responsibility for any necessary corrective measures, e.g. decontamination.
- (b) It was suggested to the Australians that in their own interests they should build up teams experienced in the detection and treatment of radioactive hazards since these hazards would also arise from the civilian uses of atomic energy. The U.K. would be willing to train Australian personnel in these matters.
- (c) It was also suggested that the Australians should undertake a nation wide survey of background radiation before further weapon trials and before any civilian user of atomic energy was begun. Help in training and in the provision of the necessary instruments was offered.

3. Safety arrangements

- (a) The Australians propose to set up an Australian Safety Committee, consisting of 4/5 leading scientists who could assure the Australian Government that the extent of any contamination would be limited and that the tests would not cause damage to life and property. This Committee should be given by the U.K. sufficient information about the nature and scope of the tests to enable it to fulfil its function.
- (b) The Australians explained that this referred to a continuation of the arrangements made for TOTEM when [redacted] and [redacted] were given certain information by [redacted] to enable them to satisfy themselves on the general safety position.

4. Australian access to site

- (a) The Australians would require access for Commonwealth Officers to the site.
- (b) It was agreed that such access would be under suitable security safeguards and only for purposes approved by the U.K.

5. Effects data

- (a) The Australians would require information about the effects of the trials.
- (b) It was pointed out to the Australians that this had already been agreed and was being put into practice.

54

6. Information about planning and construction of range.

The Australians wish to be kept fully informed of progress in the construction of the range and to be consulted about any use of Australian labour or materials.

7. Safety arrangements at Maralinga

The U.K. should be responsible for all practical measures for ensuring the safety of the Maralinga area and of any persons who may enter it. The Australian Security Service would act as the agents of the U.K. in implementing these arrangements.

8. Publicity

There should be arrangements for mutual agreement about any publicity about Maralinga or the trials.

9. Establishment of a Joint Administrative Committee

(a) The Australians propose to set up a Committee consisting of representatives of the P.M.'s Department, Treasury, Defence, Supply and Security Service to deal with all policy matters connected with Maralinga and the trials. There would probably need to be a Working Sub-Committee to deal with day-to-day problems. It was hoped that the U.K. would also be represented on this Committee by U.K.M.O.S.S.(A).

(b) Even if the Australian contribution to the Maralinga project is initially very limited, there would clearly be an advantage in having a focal point in Australia to which all matters affecting Australia could be referred for consideration. In effect, this Committee would be the Australian counterpart of the Trials Executive that has been established in the U.K.

10. Tests of Australian equipment

The Australians would wish to have the right to submit equipment for test during the trials. The amount of equipment and the nature of the tests would be agreed with the U.K.

11. Australian observers at trials

The Australians would wish to send observers to witness trials as agreed with the U.K.



22.11.54 Permanent Proviso Ground
Telegrams in [redacted]
017 Vid

Inward Telegram to Commonwealth Relations Office

FROM [redacted] HIGH COMMISSIONER IN AUSTRALIA

18-2-85

D. Canberra 18.30 hours, 19th November, 1954.
R. 10.27 hours, 19th November, 1954.

CYPHER
IMMEDIATE

No. 874 [redacted]

Your telegrams No.1017 and No.1047.

ATOMIC TESTS

12
DOWNGRADED TO
UNCLASSIFIED
MOD 2/32

Australian authorities say they would welcome party between dates proposed and that Department of Supply will arrange all required facilities.

2. It is assumed that whole party will wish to visit Maralinga. For local reasons most convenient time for this would be during week beginning 28th November. After discussion with Australians I therefore suggest that [redacted] and [redacted] should fly to Canberra on afternoon of Sunday 28th November and leave here for Melbourne evening of 29th. It seems to us that this time in Canberra would be sufficient for necessary calls on myself and on Prime Minister's Department and Treasury at beginning of visit and that question of further visit to Canberra could be left until later. Visit to site would then be arranged during remainder of same week. Accommodation will be booked provisionally on this basis both here and in Melbourne.

3. As regards publicity, Australians say they are in some doubt about mentioning future testing programme because clearance has not yet been received from Playford with regard to reserve which forms part of testing area. It is not thought that Playford will, in the event, raise any difficulty about the reserve but Commonwealth authorities are anxious not to tread on his toes. Department of Supply have accordingly suggested announcement in very general terms as follows to be made by respective Ministers of Supply on a date to be agreed. Begin:

Ministry of Supply announced today that small party of United Kingdom officials led by [redacted] Under Secretary, Ministry of Supply, would visit Australia in near future for consultations with Australian authorities about ~~matters of common interest.~~ Ends.

possibility of holding further atomic weapon trials in Australia
We have represented that announcement on these lines would be more likely to promote than to forestall Press speculation but we are sending it forward as it stands to save time. You will no doubt telegraph quickly if you wish us to make further representations about this. In any event please let us know proposed date of release.

/Copy to:

Copy to:

C.R.O.

M/Supply (Shell Mex)
" (Castlewood
House)
" (First Avenue
House)

Atomic Energy Authority

M/Defence
Ld. President's Office
(A.E.)

ALLOTTED TO DEFENCE DEPT.

Permanent Provisions
Ground. Telegrams

In ^{9174 210}
Inward Telegram to Commonwealth Relations Office

File

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

D. Canberra, 18.40 hrs. 29th Nov., 1954
R. 11.00 hrs. 29th Nov., 1954

18-2-85

SEEN BY D.AWRE

CYPHER
PRIORITY

No. 899

2/1/55

DOWNGRADED TO
UNCLASSIFIED

MOD 2/31

My immediately preceding telegram.

ATOMIC TESTS

Following is text of proposed announcement. Begin.

Minister for Supply announced that one possible site for further A-tests in Australia was an area in a remote uninhabited part of South Australia north of the trans-continental railway line. Whilst in Australia the United Kingdom party led by [redacted] will inspect this as well as other possible sites. Ends.

Copy to:-

C.R.O.

M/Supply
(Shell Mex House)

(Castlewood House)
Atomic Energy Authority

M/Defence
Lord President's Office
(Atomic Energy)
War Office

Engineer-in-Chief

ALLOTTED TO DEFENCE DEPT.

COPY

DEPARTMENT OF SUPPLY

UNCLASSIFIED

To: Head of Staff
U.K.M.O.S.S.(A)

30th November, 1954

EMU SITE

Consideration is being given to the possibility of removing the guards at present stationed at the Emu site. It appears that from the point of view of safety this can be done without serious risk. However, we are advised by [REDACTED] (Scientific Adviser to the Department of Air) that it would be possible to obtain scientific information of a classified nature if an agent visited the site and removed samples of contaminated soil.

In view of the above we desire to obtain U.K. concurrence in the proposed removal of guards from the site. Would you, therefore, please refer this question to [REDACTED] during his current visit.

[REDACTED]
(Controller)
Research, Trials & Services

UNCLASSIFIED

1267

COLLETT

LAYOUT OF TEMPORARY KITTENS

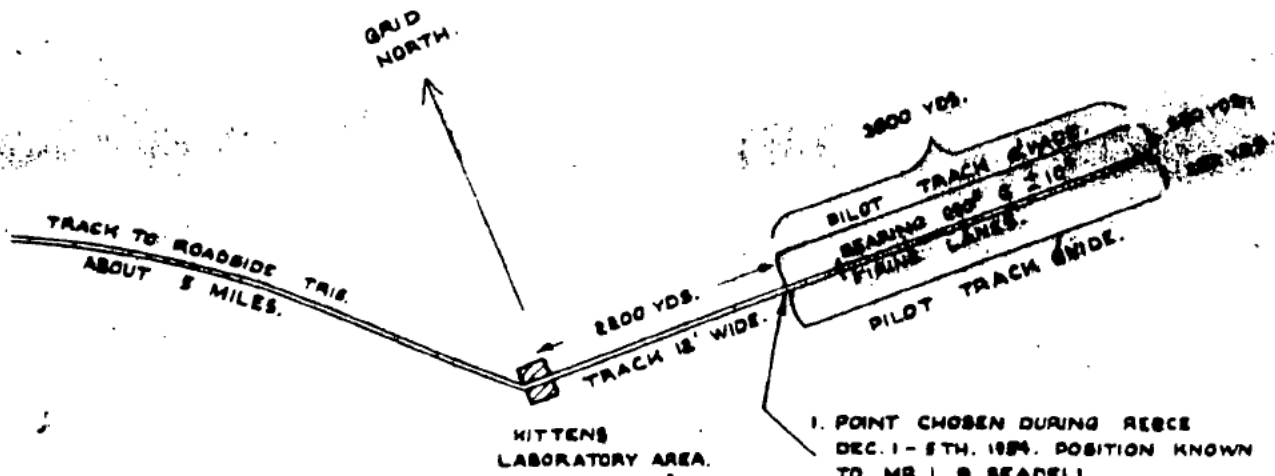
AREA, DEC. 1954



NOTE: - THE ROADS KITTENS LAB AREA TO ROADSIDE TRIG. AND THENCE TO CAMP SHOULD BE GRADED AND FOLLOW THE LINE OF PROPOSED PERMANENT ROAD. THE REMAINING TRACKS SHOULD BE DOZED TO GIVE REASONABLE RIDING SURFACE.

xy/4/ci

Downgraded to



1. POINT CHOSEN DURING RESCE DEC. 1-5TH. 1954. POSITION KNOWN TO MR. L. B. SEACELL.
2. PILOT TRACKS SHOULD BE 12 FT. WIDE IF TIME PERMITS.

5/3/55



T.K.I.

Reports Supply to Australia.
0244

Wt. 15223/0034 3M Pads 8/52 A.W.&Co. 51-41222

Both sides to be used

R.O.F. F

Minutes to be numbered consecutively

Q.P. No.

Ref. to H.HQ. 51/14

Subject

DOWNGRADED TO

ADDAWRE

You sent me a copy of [redacted] letter of November 30th in which he mentions that all Hurricane and Totem reports going to Australia are being marked GUARD by the Ministry of Defence.

Twenty five of the reports already sent to the Ministry of Defence for onward transmission were not marked GUARD when they left us and of course the same reports have been sent elsewhere.

M.O.D's. action will, I think, lead to complications unless we follow suit. Do you wish me to GUARD every copy of said reports including those already distributed, and to adopt the same procedure when we forward other batches to M.O.D. for Australia?

I suggest it might have been more correct if M.O.D. had marked the reports "FOR AUSTRALIAN EYES ONLY" and explained the reason for it.

[redacted]
Chief Information Officer.

Building [redacted]
A.W.R.E.
Aldermaston
9th December, 1954.

Downgrades to

UNIT RECEIVED

5783135
[Redacted]

[Redacted]

[Redacted]

[Redacted] 28/1/85

31/1/85

15th December, 1984

Ref: 24/12/84

Dear [Redacted]

Will you please let me have a note saying that it is you
are going to test in the Northcote Pitfalls Trials. I have
the sheet with the drawing of various initiators and the
quantities of Volodim, but no doubt some changes have been
made since this sheet was prepared, and I would like to know
the latest position.

Yours sincerely,

[Redacted]

[Redacted]

D. A. S. R.,
Building 12.2

[Redacted]

0242 1a

1270

70/12/1954

51215

INWARD TELEGRAM TO COMMONWEALTH RELATIONS OFFICE

16

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

D: Canberra 19.30 hours, 23rd December, 1954
R: 14.00 hours, 23rd December, 1954

Downgraded to:

CYPHER

No. 951

Your telegram No. 1066. / 9A

INITIATOR TESTS

As arranged during [redacted] talks, Prime Minister's Department have confirmed in writing that Australian Government agree to tests at Maralinga in May 1955 and that Department of Supply and Works will meet requirements set out in [redacted] paper dated 10th December. Australians understand these involve services of not more than 20 Australian personnel for approximately three months.

2. Letter notes that full cost of trials and any subsequent safety arrangements will be borne by United Kingdom.

3. It adds that Australian Government will wish to have opportunity of checking safety aspects and records understanding with Wilson that he will have technical details sent to them through us immediately.

4. Copy of letter follows by bag.

Copy to:-

- C.R.O.
- M/Supply (Shell Mex)
- " (First Avenue House)
- " (Castlewood House)
- Atomic Energy Authority
- M/Defence
- Lord President's Office
- (A.E.)
- War Office

[redacted]
Engineer-in-Chief

ALLOTTED TO DEFENCE DEPT.

[redacted]

[redacted]



to see
with

A.W.R.E.

L
S.C.I

29/1/55

INWARD TELEGRAM TO COMMONWEALTH RELATIONS OFFICE

FROM: U.K. HIGH COMMISSIONER IN AUSTRALIA

D: Canberra 19.30 hours, 23rd December, 1954
R: 14.00 hours, 23rd December, 1954

CYPHER

No. 951

18.2.55

DOWNLOADED TO
UNCLASSIFIED
MOD 6/14

Your telegram No. 1056.

INITIATOR STATES

As arranged during [redacted] talks, Prime Minister's Department have confirmed in writing that Australian Government agree to tests at Maralinga in May 1955 and that Departments of Supply and Works will meet requirements set out in [redacted] paper dated 10th December. Australians understand these involve services of not more than 20 Australian personnel for approximately three months.

2. Letter notes that full cost of trials and any subsequent safety arrangements will be borne by United Kingdom.

3. It adds that Australian Government will wish to have opportunity of checking safety aspects and records understanding with Wilson that he will have technical details sent to them through us immediately.

4. Copy of letter follows by bag.

Copy to:-

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- " (First Avenue House)
- " (Castlewood House)
- Atomic Energy Authority
- M/Defence
- Lord President's Office
- (A.E.)
- War Office



Engineer-in-Chief

ALLOTTED TO DEFENCE DEPT.

File 0242 (1a) Kittens trials: correspondence & papers. 1953-54

1272

R.C.



2/14/54

L12A

5/12/54

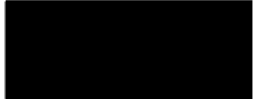


Prime Minister's Department,
Canberra.

23rd December, 1954.

M.165

Downgraded to



Dear Sir,

'Initiator' Tests

I refer to your letter of 19th August last reference J.802/1, and to discussions which have taken place with the United Kingdom mission, led by [redacted] concerning the "initiator" tests which it is proposed to be carried out in 1955. The detailed requirements for these trials were set out in a paper dated 10th December which was made available by [redacted]

I have to confirm that Australia agrees to the tests being carried out at Maralinga in May, 1955, and that our Departments of Supply and Works will provide the requirements set out in [redacted] paper. We understand that these requirements will involve the services of not more than twenty Australian personnel for a period of approximately three months.

Our understanding is that the full costs of these trials, and of any subsequent safety arrangements that may be necessary, will be borne by the United Kingdom. Arrangements will be made for separate accounts of expenditure to be kept and forwarded to the United Kingdom Ministry of Supply Staff (Australia) for payment.

We will, of course, wish to have the opportunity of checking all safety aspects of the tests. Our understanding is that [redacted] will arrange for complete technical details to be furnished to you for transmission to me immediately on his return to the United Kingdom.

Yours faithfully,



for [redacted]
Secretary

The Official Secretary,
Office of the High Commissioner
for the United Kingdom,
Canberra.

DOWNGRADED TO
CONFIDENTIAL

[Redacted]

[Redacted]

28/1/55

[Redacted]

31/1/55

COPY

OFFICE OF THE HIGH COMMISSIONER
FOR THE UNITED KINGDOM,

CANBERRA.

J.802/1

[Redacted]

24th December, 1954.

Dear [Redacted]

I now enclose a copy of the letter of the 23rd December from the Prime Minister's Department about the "initiator" tests which was summarised in our telegram No. 951.

Foxcroft has since asked me to explain that the figure of 20 personnel mentioned in paragraph 2 of the letter is not intended to cover the construction party.

He has also informed me that the further letter about the conditions on which the Maralinga site is being made available by the Australian Government will not reach us until after the New Year. The reason for this is that it will have to be cleared with Australian Ministers who will be inaccessible until then.

Yours sincerely,

[Redacted]

C.M.G., C.S.K.,

Commonwealth Relations Office,
London, S.W.1.

[Redacted]

002-1

Downgrades to

Reference.

K.B.E., F.R.S.,

The Director,
Building

28/1/85

Based on

3/1/85 Kittens 1955

Little change has been made in the firing programme since the last discussion with you. At that time the design of the grooving of the beryllium for your turbulent type delayed initiator was uncertain. We now have a design which I have tried to indicate by a sketch on the enclosed sheet.

The firing programme is as shown in the following table :-

Total number of firings - 12 : Maximum quantity of polonium - 1015 curies

<u>Iter</u>	<u>Description</u>	<u>No. of rounds</u>		<u>Curies/round</u>
		<u>Minimum</u>	<u>Maximum</u>	
1	Calibration	1	1	15
2	Half-scale Service Urchin (1% II b)	2	3	50
3	Invert jet	1	5	100
4	Boomerang	2	6	100
5	Turbulent Type	1	5	100
6	Thermal Diffusion type	1	5	100

The number shown as the minimum for each item will be made and taken out to Australia initially. These will account for 8 of the 12 firings intended. The programme for the remaining 4 firings will be decided after the results of the earlier firings are known and a signal will be sent back to this country asking for the appropriate items to be polonium filled and despatched to Australia. Variants of the various types will be available and ready for filling.

[Redacted]

[Redacted]

J.S.S.R.

Building [Redacted]
A.W.F.E.,
Aldermaston, Berks.

29th December, 1954.

E R

At their first meeting on 11th November, 1954, (Buifalex(54)/M. Item 3), the Atomic Weapons Trials Executive for Operation "Buffalo" approved the following Command set-up:-

(a) The Director of the Weapons Group of the U.K.A.E.A.

[redacted] should direct the operation in

accordance with the policy laid down by the Executive and

[redacted] should carry out the planning and execution of the operation

with the assistance, subject to the concurrence of the

Australian Government, of a joint U.K./Australian staff, the

Canadians being associated as necessary.

(b) [redacted] Senior Superintendent,

Trials Division, should be in charge of detailed planning on

[redacted] behalf.

2. Planning has proceeded in accordance with this directive and certain tasks necessary for the operation have been laid down by [redacted] on behalf of [redacted].

(a) to be carried out by the U.K.A.E.A.;

(b) to be carried out by an Australian Service force.

Plans have also been made to include in the operation Service personnel from the United Kingdom, Australian and Canadian Forces integrated into trials teams, target response teams, radiological detection units, etc.

3. The Maralinga range is being built by the Ministry of Supply using a civil contractor whose task substantially should finish by end-July, 1956. The Australians are providing a Service task force not only to carry out certain civil engineering work required for Operation "Buffalo" but also to run the range, i.e., to operate and maintain machinery and plant on the range, to provide domestic and stores support, etc. By agreement with the United Kingdom the Australians have appointed a Commandant, Maralinga - Colonel R.E. Dewar of the Australian Regular Army. He will be responsible in the first place for assisting with the setting up of the range and subsequently for running the range from Watson Station forward and for meeting [redacted] technical requirements. His task will include discipline, security and

/safety

E.K.

safety, although [redacted] will be responsible for safety during the actual trials. Insofar as United Kingdom scientific personnel are concerned, the Commandant, Maralinga, will, of course, work through the Scientific Superintendent. The Maralinga airstrip situated within the area under the control of the Commandant, Maralinga, will necessarily be under the operational control of the R.A.F., the R.A.A.F. providing flying control. The main base of the R.A.F. will be at Edinburgh Field, Salisbury.

4. In all, the Service personnel indicated in paragraphs 2 and 3 will amount to some 1,000 officers and men, broken down as follows:-

(a) R.A.F./R.A.A.F.	750
(50 only permanently at Maralinga)	
(b) Australian Task Force	190
(c) Other Australian Service personnel	10
(d) Canadian Service personnel	37
(e) United Kingdom Service personnel	<u>25</u>
TOTAL	<u>1,012</u>

Moreover, in the area for a short period may be 250 officers and N.C.Os for indoctrination (188 United Kingdom, 62 Australian).

5. The size of the Service force concerned with Operation "Buffalo" now amounts therefore at its maximum to over 1,250 officers and men, a force very considerably in excess of that visualised when the Command set-up indicated in paragraph 1 was discussed last November. In particular this is so with the R.A.F. element with whom, in addition to R.A.A.F. personnel, may be integrated an R.C.A.F. detachment for transport and aerial survey duties. The Service force contains representatives of all three Services from each of the United Kingdom, Australia and Canada.

6. [redacted] has no power of military command under Queen's Regulations in any Service. It seems essential therefore to provide a senior military officer to command all forces, to interpret where necessary the wishes of [redacted] into orders for the Service elements and to co-ordinate the efforts of all these elements.

E.R.

7. The appointment of a Task Force Commander in the sense that the Admiralty have appointed an Operational Commander for "Mosaic" would, at this stage, cause confusion and would add an unnecessary link. Planning for "Buffalo" is well advanced and administrative and store arrangements are in hand. Discussions have been held by [REDACTED] with the Commandant, Maralinga, with the Royal Australian Engineer Officer responsible to the Commandant for civil engineering work and with Department of Supply representatives. The R.A.F. task has been laid down and the R.A.F. plan is in course of preparation by the Air Ministry. Arrangements for the target response trials have been made.

8. The senior R.A.F. officer, commanding the Air Forces in Operation "Buffalo", will be a junior Air Commodore, while the Commandant, Maralinga, is a Colonel. It does not appear that, in addition to his other duties, either of these can act as the senior military officer. There is therefore a requirement for the appointment of an officer senior to the two officers mentioned to be the senior officer of the combined Services for the operation in Australia and under whom will come all units from whatever Service they belong. This officer's instructions should lay on him the responsibility for seeing that the various Service elements carry out their duties in accordance with the plans for Operation "Buffalo" which have been drawn up to meet the requirements of [REDACTED] and agreed by all concerned.

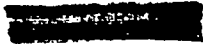
9. It will be necessary to obtain the concurrence to the appointment of this officer from both the Australian and Canadian Governments and also to obtain their agreement to place under him the forces they are providing for the operation.

*It stresses that
a might be
vantage in
wing an Australian*

10. In view of the scale of the R.A.F. effort, it is proposed that the Air Ministry should be asked to nominate forthwith an officer for this post of Service Commander and Military Adviser to [REDACTED] and that he should take up his duties at a very early date. Any additional staff required by him should be kept to a very bare minimum and he should in the main use the senior R.A.F. officer and the Commandant, Maralinga, to assist him.

UNCLASSIFIED

14 JAN 1965



DEPARTMENT OF SUPPLY

RESEARCH & DEVELOPMENT BRANCH

REPORT RD/3

A report on alternative sites for Weapon Tests in Australia, including estimates for the preparation of a special test site at Maralinga, compared with estimates for the consolidation of the existing site at Emu

POSTAL ADDRESS: DEPARTMENT OF SUPPLY,
RESEARCH & DEVELOPMENT BRANCH
339 SWANSTON STREET
MELBOURNE

1279

59
MINISTRY OF DEFENCE
MEMPH/AGD (L)
LONDON S.W.1

The estimates contained in this report were prepared in response to a request from the High Commissioner for the United Kingdom.

The report mentions briefly the aerial and surface reconnaissances which led to the location of the Maralinga site and its recommendation as suitable for developments for atomic trials. [REDACTED] inspected this site in 1953 and confirmed the opinion of the reconnaissance party.

The facilities which might be required for a permanent atomic test site were discussed with Captain Cooper and Colonel Stewart during the week ending 20th November, 1953, and the estimates of cost contained herein are for the provision of the facilities listed in the schedule drawn up at that time.

The estimates indicate that if a permanent atomic test site is to be developed, there is a considerable overall saving if the Emu site is not employed for this purpose and the new site of Maralinga developed.

These estimates are prepared on the basis that 16 months will be available for construction. If there is any substantial reduction in the time available, the cost will be increased by the need for a larger construction force overtime payments, etc.

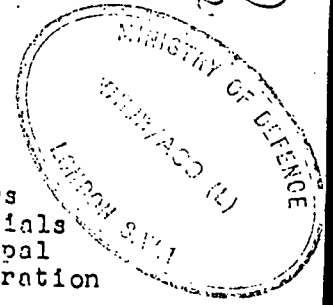
[REDACTED]

CHIEF SCIENTIST.

14 JAN 1954

UNCLASSIFIED

A REPORT ON ALTERNATIVE S OR
WEAPON TESTS IN SOUTH AUSTRALIA A



1. INTRODUCTION:

This report discusses the factors affecting the choice of a permanent site for trials of atomic weapons in Australia. The two principal sites discussed are Maralinga and Emu. Consideration is given to other possible alternatives.

(a) MARALINGA

This name has been given to a relatively level and clear area approximately 16 miles from E. to W. and at least 12 miles from N. to S. It is the area in which is located Tiotkens Well. It is eminently suitable as a trials area, and in fact it is difficult to envisage that a site could be found which is superior from the point of view of conducting trials. Its southern edge is approximately 32 miles north of the Transcontinental Railway between Ooldea and Watson. Maralinga camp would be located on a ridge south west of the trials area and Maralinga airfield further to the south at the edge of the Nullabor Plain. The estimated cost of construction of the Maralinga area is £1,900,000.

(b) EMU

This is the site used for the "TOTEM" trials located close to the centre line of the main range of the Long Range Weapons Establishment, Woomera. The estimated cost to improve this site to the same standard as relates to (a) above is £3,600,000. The relative location of these two sites is shown on Plan No. MARA.1, Appendix 2. This plan also shows the location of the Long Range Weapons Range with its rangehead at Woomera.

2. GEOLOGY OF AREA:

A geological map is attached in Appendix I. Emu is located in the desert sand hill country whereas Maralinga is located adjacent to the Nullabor Plain. This Plain is a flat limestone area bounded on the northern edge by sand hills. Maralinga is described by one geologist as an isolated area north of the Nullabor Plain but of similar geological origin.

3. CHOICE OF TEST SITE:

The Emu site was chosen for the 1953 tests. At that time, having regard to the lack of knowledge of prevailing winds and of health hazard problems, a site was required that was 100 miles from any centres of habitation. It was thought that for security reasons, easy access by road was not desirable. In choosing a site for future atomic tests the requirements differ somewhat from the requirements for the 1953 tests.

3.../

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- (a) It is now considered that the distance to habitation in a down-wind direction from the test site should be not less than 100 miles, but in other directions this distance may be reduced to 30 miles. *
- (b) It is desired as a secondary object of the trials to study the effect on military and civil installations. This necessitates the cartage of a large tonnage of materials to the site by road or rail. Air freighting of these materials would be impracticable.
- (c) A land line for communication purposes is most desirable.

4. PRELIMINARY RECONNAISSANCE:

It was realised that any effort to improve the living and working conditions at Emu and to provide the road and telephonic communication might be a very expensive undertaking, and it was considered that by taking advantage of the decreased minimum safety distances an alternative site might be found which could be developed more cheaply.

With this object a preliminary reconnaissance was made of a large area of South Australia. This comprised an aerial survey followed by a land expedition and resulted in two possible sites being chosen. Maralinga the more easterly of these two sites was finally chosen as the more suitable.

Other factors being equal, the most favourable location would be a site located as far east as possible and at a minimum safety distance from the Transcontinental Railway. The eastern boundary of the Maralinga test site is 100 miles west of the western boundary of Commonwealth Hill Station and the southern boundary is 32 miles north of the Transcontinental Railway.

Clearly no site nearer to the East or to the railway can be accepted for safety reasons, and a site further to the west would have to offer advantages considerably above Maralinga. All communications would be from the East and moving the site 100 miles further west would add £30,000 to the capital cost of telephone and teleprinter circuits and would increase the average rail freight by approximately £3 per ton, and air fares by £3 for each person. In addition, time lost in travelling would be appreciably increased.

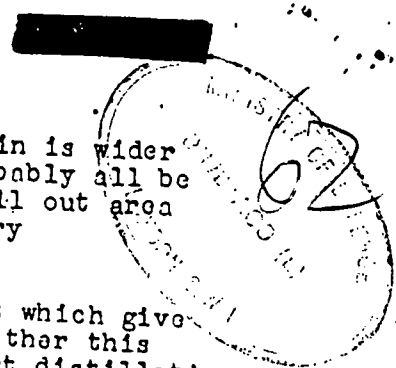
5. POSSIBILITY OF A TEST SITE ON THE NULLARBOR PLAIN

Although Maralinga did appear to be the best location, consideration was given to the other possible sites for the trials area. No area south of the railway meets the minimum distances necessary for safety, thus the possible areas are those lying 30 to 50 miles north of the Transcontinental Railway. The only area which appears to warrant close examination is located 180 to 200 miles west of Maralinga.

* Letter J743/2 of 30th October, 1953 from the Office of the High Commissioner for the United Kingdom, Canberra.

14 JAN 1950

UNCLASSIFIED



At this point the Nullabor Plain is wider and the airfield camp and test area could probably all be located on the Nullabor, but even here the fall out area and possibly the air drop site would be in very inaccessible sand hill country.

At this location bores do exist which give fairly large quantities of potable water. Whether this water would be suitable for general use without distillation is not known.

An approximate estimate of the extra capital and operational charges which would arise from using this site instead of Maralinga for 10 trial periods is as follows.:

Estimated cost of additional 180 miles of land line	£60,000
Additional cost of freight	118,000
Additional cost of passenger transport	<u>22,000</u>
	<u>£200,000</u>

Against this there would be a saving of approximately £50,000 in road construction as the supply route would be located entirely on the Nullabor Plain. If the water supply for Maralinga can be supplied from local bores the water supply for the two sites would cost approximately the same amount. If the boring at Maralinga is unsuccessful and it is necessary to pipe water to Maralinga from bores further west, the cost of the Maralinga scheme would be increased. But even with the most pessimistic view that this pipe line may need to be 185 miles long, the added cost of the pipeline, which would only need to be 24" internal diameter as commonly used by pastoralists, would not exceed £100,000.

Thus even in these circumstances, the Maralinga scheme appears the more favourable proposal by at least £50,000.

There are also other disadvantages in this more westerly site which cannot be assessed financially. Living conditions on the Nullabor Plain are almost unbearable due to lack of trees and prevalence of dust storms. The site would be further from Woomera, which would obviously be the base for any emergency work which cannot be undertaken on the site.

A site on the Nullabor Plain could be approached from any direction whereas the stretch of sand hills which must be crossed before the Maralinga test area is reached makes unauthorised access to the area extremely difficult. This sand hill barrier as far as is known may be crossed readily only two routes, each of which could be easily guarded.

* Since this was written saline water has been reached at a depth of 145 feet at Tietkins' Well in the Maralinga area.

6. COMPARISON OF MARALINGA AND EMU SITES:

The estimates attached indicate that even with only dry weather access to Emu a saving of £990,000 is achieved by developing Maralinga as a permanent test site in lieu of Emu. Maralinga also has a number of advantages which cannot be assessed financially.

- (a) Whilst Maralinga is still in a hot arid area the climatic conditions are more favourable than Emu. Temperatures well over 100 were recorded at Emu during the 1953 tests, even in October. The rainfall at Maralinga is substantially higher than Emu and coastal breezes tend to relieve night temperatures.
- (b) Maralinga is located only 80 miles from the sea coast and as most of this distance is over the Nullabor Plain across which vehicles may travel at good speeds without any road construction, week-end relaxation on the coast can be provided at low cost. No such facility is possible for Emu.
- (c) Water at Emu was supplied from a number of bores which have a limited draw-off. It might be possible to augment this at a fairly high cost by a long pipe line from the foothills north of the area, but this is not certain. If those water sources failed, Emu would have to be evacuated. As indicated later, Maralinga could, if other sources failed, be supplied by water carried by rail to Watson or by a pipe line from bores in the Eucla artesian basin.

7. ABORIGINAL RESERVE:

As shown in Plan No. MARA. 2 an aboriginal reserve exists at Ooldea. The Maralinga test site encroaches slightly on the N.W. corner of this reserve. The access road, airfield and camp would be located outside the reserve. This reserve at the present time is abandoned. The question of the revision of its boundary, should this be considered necessary, is not expected to present any difficulties and can be dealt with when a firm decision is made to proceed with the Maralinga site.

8. LAYOUT OF FACILITIES PROPOSED AT MARALINGA

Plan MARA.2, Appendix 3 illustrates the layout proposed at Maralinga.

This comprises -

- (a) Rail siding near Watson on the Transcontinental Railway with unloading facilities and with living accommodation for 10 persons.
- (b) An airfield for transport and light bomber aircraft but not heavy bombers, located on the northern edge of the Nullabor Plain approximately 12 miles from Watson comprising a sealed runway 5000' x 150' with cleared over-runs to 8000' and hardstanding area 600' x 150'. Provision is made for control tower, meteorological and radio facilities, fuel stores, etc.
- (c) Main road from rail siding to airfield thence to camp area and Technical area.

