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NUCLEAR TESTS

Memorandum by the Prime Minister

The joint declaration issued on 30th March, at the end of my recent discussions with President Eisenhower, contemplated that arrangements would be made, between the Governments of the United States, the United Kingdom and the Soviet Union, to institute a "co-ordinated research programme" for the purpose of improving methods of detecting nuclear explosions below a seismic magnitude of 4.75. The President and I were satisfied, on the advice of British and United States experts, that a "joint programme" on a tripartite basis would be a slow and cumbersome method of procedure, and that more rapid progress was likely to be made if each of the three countries conducted separately its own part in a "co-ordinated programme". The concept is that each should notify the others in advance of the experiments which it proposes to undertake so as to ensure that the whole field is covered and that unrewarding duplication is avoided; and that there should thereafter be a full exchange of results and continuing consultation at the technical level. It was also hoped that facilities would be given for each side to send observers to inspect experiments conducted under this programme, particularly those involving nuclear explosions.

2. The United States authorities have already drawn up a programme of experiment to improve methods of detecting nuclear explosions below the proposed threshold of 4.75. They are establishing throughout the United States a chain of detection stations, including some unmanned seismic stations, which will be completed by the autumn of this year. By October they expect to be ready to conduct nuclear and conventional explosions, in different underground environments, to test the efficacy of these detection stations. In 1961 they will establish further detection stations in the United States and possibly in Canada. This will be their contribution to the "co-ordinated programme" of research.

3. We ourselves have already been making a modest contribution. Within the next six months we shall complete the series of experiments which we have been making in Cornwall to test the theory that explosions can be muffled by concealing them in deep underground cavities. We have also been developing improved systems of instrumentation, and it is desirable that this should continue at an enhanced rate. We have now to consider what further contribution we can make to the "co-ordinated programme".

4. The Atomic Energy Authority consider that we could most usefully contribute by supplementing the detection stations which are to be established in the United States. They recommend that a number of detection stations should be built in Canada. This would have three advantages. First, it would increase the value of the results to be obtained from the stations in the United States, for the coverage would be more complete. Secondly, it would not be necessary for us to make further experimental explosions of our own; our stations would be observing the explosions which the Americans have already decided to make. Thirdly, we should be engaging in a joint Anglo-American programme and should thereby be enabled to continue our close technical collaboration with the United States authorities. We should get the benefit of advice and help from the powerful team of seismologists which has already been assembled in the United States.

5. An outline of the proposed programme and its costs is given in the Annex to this memorandum.

6. It may be possible to enlist some degree of Commonwealth support for this programme. The stations would be erected in Canada; and the Canadian Government might be willing to make some contribution towards the local costs. Failing that, they might contribute the logistic support and they and other Commonwealth countries might provide (and pay for) the services of some experts. Australia, which has already played a notable part in the testing of nuclear weapons and to some extent in seismology, might be willing to send some of the scientific staff required to man the detection stations. New Zealand, which has already promised help with seismology in New Zealand and has some good seismologists, might also be ready to second some of these for a period of service in the Canadian stations.

The practical possibilities of securing this degree of Commonwealth co-operation in our part of the research programme might with advantage be explored in the course of the forthcoming Meeting of Commonwealth Prime Ministers.

7. I would myself make it clear to President Eisenhower when I see him next month that we would not embark on any actual expenditure until the Soviet Government have agreed that arrangements for a co-ordinated research programme should be made.

8. After consultation with the Chancellor of the Exchequer and the Minister for Science, I invite the Cabinet to agree in principle that we should offer to undertake, as our contribution to the "co-ordinated programme of research", a programme on the broad lines indicated in the Annex to this memorandum - at an estimated cost of about £3.25 millions over the next three years. If this proposal is accepted in principle, the immediate practical steps to be taken will be:-

- (i) To obtain the consent of the Canadian Government for the establishment of detection posts in Canada and to seek from them a contribution towards the cost and co-operation in providing technical and logistic support. For this purpose, after a preliminary approach to the Prime Minister of Canada, discussions should be opened shortly at the technical level with the Canadians and thereafter, on a tripartite basis, between the Canadians, the Americans and ourselves.

- (ii) Orders should be placed by the Atomic Energy Authority as soon as possible for the supply of seismometers and other equipment from the United States, at an estimated cost of half-a-million dollars.
- (iii) The Prime Ministers of Australia and New Zealand should be asked if they would be willing to help to man the detection stations by lending seismologists and other technical staff.
- (iv) The Atomic Energy Authority should be invited to assume technical and financial responsibility for the conduct of the programme as a whole, including the enhanced instrumentation development programme, and should seek approval for supplementary expenditure as necessary.
- (v) An inter-Departmental Committee of officials comprising, under Foreign Office Chairmanship, representatives of interested Whitehall Departments and of the Atomic Energy Authority should be appointed to advise on policy questions arising from this programme. (This Committee would discharge functions similar to those of the inter-Departmental Committee which handled policy questions arising from trials of nuclear weapons.)

H.M.

10, Downing Street, S. W. 1.

27th April, 1960

ANNEXOUTLINE OF UNITED KINGDOM CONTRIBUTION  
TO RESEARCH PROGRAMME

It is proposed that we should construct in Canada (i) the complete seismological section of a control post, as recommended by the Geneva Conference of Scientific Experts; and (ii) about a dozen posts of a much simpler type. For the main post a building of permanent construction would be required, but the simpler posts would each require only a hut and a recording van. The main post would be manned by three scientists and four technicians. Each of the simpler posts would be manned by one scientist and two technicians. All posts would require logistic support - for living accommodation, communications, etc. The main control post would be manned continuously, but the simpler posts need be manned only intermittently, mainly for periods of two months at a time while the experimental explosions were being prepared and made.

2. The capital cost of buildings and construction in Canada would be about \$1.5 millions. Equipment obtained in Canada might cost \$1 million. Instruments purchased in the United States would cost \$0.5 million.

The total cost of a three year research programme is estimated at £3.25 millions, of which less than half would be in dollars; this estimate includes £0.75 million for an enhanced instrumentation development programme.

3. The site for the main post must be carefully chosen. Stringent conditions of "seismological noise" must be met, and it may take a survey team three or four months to find a good site. The conditions for the simpler posts are not so stringent.

We should establish as quickly as possible at least two survey teams, each containing three technical men (one geologist, one seismologist and one technician), together with support, to look for good sites.

4. Most of the instruments required for the main post and for the simpler posts can be obtained commercially in the United States. Two firms are already making long runs of instruments for the United States Government, and it is probable that any orders we placed could be met within six months, simply by adding our orders to those already placed by the Americans. The total dollar costs of the instruments required will be of the order of \$0.5 million.

A considerable amount of instruments and equipment will be obtained in the United Kingdom. Some of this could be exchanged with the United States, in order that both sides can try the other's equipment. The United States and the United Kingdom might each make an offer to the Soviet Union to exchange instruments with them.