This document consists of 19 pages
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ATOMIC ENERGY COMMISSION

RELEASE OF ATOMIC INFORMATION TO U.K.-CANADIAN OBSERVERS (PROPOSED TALK BY DR. OGLE)

Report to the General Manager by the Director of Military Application

THE PROBLEM

1. To consider concurring in the use of a proposed talk by Dr. Ogle to U. K.-Canadian observers at Operation REDWING.

SUMMARY

2. By letter of June 20, 1956 (Appendix "A") the Chairman, MLC, transmitted to AEC (1) copy of Department of the Navy letter dated June 19, 1956, (Annex to Appendix "A") which indicated DOD concurrence in transmissibility of the proposed briefing material and (2) the text of the proposed briefing which Dr. Ogle, Deputy Commander for Scientific Matters, JTF-7, plans to give the U.K.-Canadian observers at Operation REDWING (Appendix "B"). The DOD has determined that the breifing material is legally transmissible to the United Kingdom and Canada under Section 144b of the Atomic Energy Act of 1954 and has requested the AEC to join in the determination that no important information concerning the design or fabrication of the nuclear components of an atomic weapon would be revealed. The DOD also requested AEC concurrence in the use of the material for briefing the observers.

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3. The briefing material contains very little Restricted Data relating to design or fabrication of atomic weapons. Specifically, the only Restricted Data is the approximate expected yields shown in the table attached to Appendix "B". A footnote on the second page of the text (Appendix "B") states that Dr. Ogle will give information from this table only for the shot which the observers will see plus any other shots which at the time of briefing have been unclassified, i. e., publicly announced. To date only the LACROSSE and CHEROKEE shots have been announced. Since the talk will not present a very clear picture of Operation REDWING with only three shots mentioned the staff recommends that the entire table of shots be used with certain changes and that the above mentioned footnote be deleted. The first change would delete the column giving the date so the British would not be able to correlate each shot with their long range detection measurements or debri samples. The second change would substitute "Low KT" (less tha 100 KT), "High KT" (100-999 KT), and "Megaton" (1 MT or greater for the Approximate Expected Yield. Otherwise, by averaging th approximate expected yields the British could get a close estimate of the total yield from the REDWING series. This woul be undesirable since requirements of the intelligence cooperati program will require giving the British later total fission yield for the series. In staff discussions with DOD personnel the above changes were thought to be acceptable.

4. Since the proposed talk, with the above changes, no longer contains Restricted Data a joint determination under Section 144b is not required and the Commission need only concu with the use of the proposed material for briefing the foreign observers. See Appendix "C", the proposed reply to the Chairma MLC.

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STAFF JUDGMENTS

5. The Office of the General Counsel and the Divisions of Classification and Intelligence concur in the recommendation of this paper.

RECOMMENDATION

6. The General Manager recommends that the Atomic Energy Commission:

a. Concur in the use of the proposed briefing material (Appendix "B" as modified by para. 3 above) for briefing the U. K.-Canadian observers.

b. Note that the Chairman, MLC, will be notified of this action by a letter such as Appendix "C".

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LIST OF ENCLOSURES

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APPENDIX "A"

DEPARTMENT OF DEFENSE
MILITARY LIAISON COMMITTEE
P.O. Box 1814
Washington 25, D.C.

June 20, 1956

Dear Mr. Strauss:

Inclosed is a letter from the Chief of Naval Operations which transmits the technical material for briefing foreign observers at Operation REDWING. I understand that members of your staff have assisted in the preparation of the briefing material. The attached document, "Proposed Talk to UK-Canadian Observers to be given by Dr. William E. Ogle," contains Restricted Data which has not been previously determined to be transmissible to foreign nations in accordance with the Atomic Energy Act of 1954.

The Department of Defense, in accordance with provisions of Section 144b of the Atomic Energy Act of 1954, has determined that the transmission of information relating to design or fabrication of atomic weapons which is to be given to the foreign observers at Operation REDWING as contained in Inclosure 2 will not reveal important information concerning the design or fabrication of the nuclear components of an atomic weapon and is, therefore, transmissible under existing Agreements for Cooperation for Mutual Defense with the United Kingdom and Canada.

It is requested that the Atomic Energy Commission join with the Department of Defense in the determination that the information cited above will not reveal important information concerning the design or fabrication of nuclear components of an atomic weapon and concur in the use of the inclosed material for briefing foreign observers at Operation REDWING.

Sincerely,

/s/

Herbert B. Loper
Chairman

2 Inclosures
1. CNO Ltr for Ch, MLC
dtd 19 June 56.
2. Proposed Talk

Honorable Lewis L. Strauss
Chairman, U. S. Atomic Energy Commission

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ANNEX TO APPENDIX "A"

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
Washington 25, D. C.

June 19, 1956

From: Chief of Naval Operations

To : Chairman, Military Liaison Committee

Subj: Exchange of Restricted Data with United Kingdom and Canada (Foreign Observer Program for *REDWING*)

Ref : (a) Asst to SECDEF (Atomic Energy) Memo to CJTF-7 of 4 Apr 1956
(b) Atomic Energy Act of 1954

Encl: (1) "Proposed Talk to UK - Canadian Observers" to be given by Dr. William E. Ogle, Acting Deputy Commander for Scientific Matters, Joint Task Force SEVEN

1. Enclosure (1) is a "Proposed Talk to United Kingdom - Canadian Observers" to be given by Dr. William E. Ogle, Acting Deputy Commander for Scientific Matters, Joint Task Force SEVEN, in the Foreign Observer Program for REDWING. This talk was prepared and submitted in accordance with reference (a).

2. The talk has been reviewed by the Army, Navy and Air Force, and the Armed Forces Special Weapons Project and determined to be transmissible under the policies governing the disclosure of classified military information to foreign governments. It is therefore transmitted herewith for submission to the Atomic Energy Commission and for the joint determination of the Commission and Department of Defense that the information contained is releasable to these foreign observers in accordance with reference (b).

Courtney Shands
By direction

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APPENDIX "B"

PROPOSED TALK TO U.K. - CANADIAN OBSERVERS

To be Given by
Dr. William E. Ogle
Acting Deputy Commander for Scientific Matters
Joint Task Force-Seven

Since our last Pacific test operation two years ago, and the last U.S. continental test a year ago, we have made important design advances in our laboratories. It is now necessary to test these new concepts or to test new devices which have entered or will enter stockpile. To accomplish these purposes, Operation REDWING was scheduled over a year ago and is now being conducted.

As has been mentioned by others, the probability of having favorable weather conditions for firing a high-yield shot, that is in the megaton range, on any given day in the Pacific Proving Ground is small, perhaps one in ten. Thus, it seemed desirable to plan to fire low-yield devices while waiting on the weather for high-yield shots. Therefore, last summer the plans for REDWING were changed to include the firing of several low-yield devices.

As you have probably observed, at Eniwetok Atoll, Eniwetok Island and Parry Island are permanent installations, representing the investment of many millions of dollars and containing, at shot time, several thousand people. Those islands serve as a base for operations and cannot be jeopardized without having serious consequences. The northern islands of Eniwetok, on the other hand, have been treated as shot islands and may be altered as necessary for the operation. We also have the concept that the whole of Bikini Atoll is treated as a shot island. If we

were faced with the necessity of picking a wind pattern for a high-yield shot which would put no fall-out on distant atolls, and at the same time would not put fall-out on islands in the shot atoll, for instance Eniwetok, we would be tremendously handicapped -- therefore, in initial planning, all high-yield shots are to be fired at Bikini Atoll, where close-in fall-out will not seriously handicap the operation (assuming the Navy will furnish ships for us to live aboard) and will be of little hazard to personnel. In firing a Bikini shot, we need then only worry about long-range fall-out.

On the other hand, it is difficult and expensive to work 200 miles from our base of operations -- thus, low-yield shots, which can be fired with relative safety with respect to close-in personnel and essentially no hazard to other atolls, are fired on the northern islands at Eniwetok Atoll.

Let me now tell you some of the reasons for the scheduling and placement of shots in this particular operation. I have here a table listing the proposed shots for Operation REDWING*. There were left at the end of CASTLE, several installations in such condition that their use could be considered again. The recording stations in the Eninman region of Bikini Atoll were not seriously damaged and a fair amount of land area was left. The Yurochi region, used for barge shots at CASTLE, are still useable. While a large hole was made in the reef just west of Namu, the island, itself, still furnished a fairly large land area. On Bogon of Eniwetok Atoll, the recording structure used for Mike shot at Operation IVY was still in good shape. The recording structures on Aomon - Biijiri were built for CASTLE and were still satisfactory.

*Note: Dr. Ogle will use only those portions of table covering:
(a) Particular shots which at the time of briefing have been unclassified; i.e., Cherokee;
(b) Particular shots foreign observers will see.

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Thus, it appeared clear that the high-yield shots not requiring closely aligned or stable platforms should be barge shots off Yurochi, using the structures built for CASTLE. The Zuni shot uses instrumentation requiring land so it inherited the Eninman region. The DOD requirement for fall-out studies on the Cherokee air-drop required a fairly large land mass, so its ground zero was placed in the center of Namu Island. The Seminole was originally conceived to be a fairly high-yield shot requiring detailed instrumentation, so with some reluctance it was put on Teiteiripucchi Island in order to use the Ivy recording structure on Bogon -- later, after the rest of the program was fairly well settled, the design yield was reduced and the zero point was moved to Bogon. In order to use the same recording stations for several shots and to reduce both the experimental effort and construction effort, some of the small shots (the Yuma, Inca, Kickapoo, and Mohawk) were put on Aomon-Biijiri group as tower shots, and by ordering the shots so as to have the largest yield last, the towers could be all built before the operation began. Similarly, the other small shots, Blackfoot, Erie, LaCross, and the Osage Air Drop, were put on the only remaining piece of land except Engebi; that is, Runit Island. However, since LaCross was to be a highly instrumented shot, it had to come first, and since it was also fairly large, the towers for Erie and Blackfoot could not be built ahead of time. Engebi was not used initially, since fall-out from shots there would certainly land on the Bogon installation. However, we have the capability of putting up a tower there later in the series and making the appropriate measurements if it should prove necessary.

Now as to time. The LaCross shot had to be fired first of the Runit shots because of construction problems. The Erie,

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Seminole, Flathead, and Dakota were shot at Runit. Since we were anxious to get started, the Erie was the second shot on Runit, some three weeks after LaCross, three weeks being necessary to build a new tower and instrument it. The Seminold on Bogon was fired then as soon as possible after the Erie. As I mentioned, the Mohawk on Eberiru must be the last shot; Yuma, Inca, and Kickapoo were detonated as available.

On Bikini, the Cherokee was essentially an effects shot, concerned with fall-out and structures and, hence, had to be fired first, since the instrumentation would be adversely affected by an earlier shot. The Zuni installation on Eninman would not suffer seriously from the Cherokee but would be seriously damaged from a barge shot at Yorichi; therefore, the Zuni shot was the second shot at Bikini. From then on, the order depended essentially on the readiness of the device.

I would like now to describe for you something of the sequence of events preceding the high-yield shot you are about to see.* Until about D-day minus four days (D -4) most of the personnel at Bikini except those in the Navy Task Group, live ashore, usually in a tent close to their place of work. At that time, however, they start moving to the ships, largely to the CURTISS and AINSWORTH. The caps are gradually reduced in size, tents and other equipment being removed from various exposed islands during D -4, D -3, D -2 until on D -2 only a bare skeleton is left ashore. The equipment (tractors, trailers, etc.) that must be used again is moved to protected areas in Bikini, the rest are shipped back to Eniwetok. All personnel no longer needed at Bikini are moved to Eniwetok.

*Note: For illustrative purposes, the sequence of events preceding a high-yield shot at Bikini is set forth in this paper. If the Foreign Observers will see a low-yield shot, appropriate changes to this section would be made.

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Thus, on the morning of D -1 -- the last day before the shot -- all of the experimental equipment is supposedly ready except for the final loading of cameras, the final setting of the switches, etc. The device has been checked out and is ready for firing. All personnel except those needed for final check-outs, and their support, such as boat operators, helicopter crews, etc., are evacuated, and the big question is: "What will the weather be like?"

At about 8:00 a.m. on D -1, Colonel Bonnet, the Task Force Weather Officer, will bring to Admiral Hanlon an estimate of the weather situation based on data taken at 6:00 a.m. and before. If the situation is clearly desirable, he will "turn the shot on"; that is, declare that we will attempt to fire the next day.

If it is clearly undesirable, he will call the shot off; and if it is marginal, he will possibly wait until the mid-morning formal briefing, at which more data are available, to decide.

Obviously, this process, if the weather is unfavorable, can go for some time. During CASTLE, we waited 28 days for one shot. However, good weather usually comes around about once every week or 10 days. Of course, while weather may cancel the high-yield shot, we may be able to fire a low-yield device at Eniwetok.

When a favorable prediction is made, the shot will be "turned on" at about 8:00 a.m. Everyone concerned will be notified and the final film loading and switch checking will begin. At about 10:30 a.m. a complete briefing will be held at which the weather and fall-out patterns will again be discussed.

All known ships and air-borne aircraft will have already been advised as to the courses they should take, and a search

of the danger area for other boats or ships will have been started. There will be several more informal meetings of Admiral Hanlon and his advisors up to the time of the shot, but for the sake of brevity, I will assume that conditions remain favorable.

By about 2:30 or 3:00 p.m., all personnel and equipment should be evacuated from Bikini and the ships will be ready to leave the lagoon. The only people left are a small party in the firing station. That station is so constructed as to be completely safe from blast, water waves, and fall-out during the detonation, and is in constant communication with the command ship. The ships will probably leave the lagoon about sundown. Aircraft for effects measurements, etc., will be taking off at scheduled times prior to the shot.

Let us now assume that conditions continue satisfactory and the device is fired. Prior to the detonation a sequence timer sends out signals to all stations, opening shutters, starting cameras, etc.

After the detonation we will wait about an hour for the dust to clear away, and then send in a helicopter to survey the damage and to determine the radioactive situation in the lagoon and around the recording stations.

If the report from that survey is favorable, recovery parties can start in and the ships can re-enter the lagoon. By the end of the day, most recovery should be accomplished and work will have started to get the next shot ready.

As a final subject, I would like to tell you about some of the measurements we will make of the particular high-yield shot you will see.* Pictures will be taken which will allow a measurement of the fire-ball diameter as a function of time and,

*Note: If a fission device, see Attachment B for the conclusion of the talk.

hence, permit a determination of the yield of the device. There are photo stations on various islands in the Bikini Atoll and in addition aircraft will be at various positions above the islands. Other cameras in the same stations are used for other purposes; for instance, a fan of rockets will be photographed to study blast effects. Cannisters will be dropped by parachute from an aeroplane just before zero time and will telemeter free air blast information to receiving stations. The position of the cannisters will be determined by cameras. Some military effects studies are being made. Fall-out stations all around the atoll will measure the fall-out activity as a function of time, and will also collect the actual fall-out material as it comes down, for further study in the States. Similar stations are on rafts in the lagoon, on anchored skiffs outside the lagoon, and on manned ships further away in the fall-out pattern. The intensity and color of the device light will be measured. The characteristics of the water wave produced in the lagoon will be studied. Many different aeroplanes will be passing overhead to study the effects of blast and thermal radiation on those aircraft. The aeroplanes are accurately positioned by radar. The system on the ground and in the air is tied together by the timing station on Enyu which sends out time signals by wire and radio to all stations needing timing. Control centers on the Command Ship ESTES make sure the whole operation is proceeding properly. Thus, you can see that we have here a tremendous outdoor laboratory, but for some shots, it is none too large.

NAME	DATE	APPROX EXPECTED YIELD	METHOD OF FIRING	ZERO POINT	RESPONSIBLE LAB
YUMA*	1 June	1 - 4	200' tower	Aomon	UCRL
KICKAPOO	18 June	1 - 6	300' tower	Aomon	UCRL
INCA	8 June	5 - 15	200' tower	Rujoru	UCRL
BLACKFOOT	7 June	5 - 20	200' tower	Runit	LASL
ERIE*	27 May	5 - 25	300' tower	Runit	LASL
OSAGE	14 June	1 - 4	700' high Air Drop	Runit	LASL
LACROSSE*	5 May	35 - 60	Surface	Runit	LASL
MOHAWK	1 July	100-700	300' tower	Eberiru	UCRL
FLATHEAD	5 June	300-800	Barge	Yurochi	LASL
DAKOTA	16 June	200-1000	Barge	Yurochi	LASL
SEMINOLE	1 June	10 - 20	Surface	Bogon	LASL
HURON	15 June	100-500	Barge	Yurochi	LASL
APACHE	20 June	1 - 6 MT	Barge	Yurochi	UCRL
NAVAJO	8 June	3 - 8 MT	Barge	Yurochi	LASL
CHEROKEE*	8 May	2 - 10 MT	5000' high Air Drop	Namu	LASL
ZUNI*	15 May	1 - 4 MT	Ground	Eninman	UCRL
TEWA	7 July	2 - 8 MT	Barge	Yurochi	UCRL

*Already fired.

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ATTACHMENT "B"

As a final subject, I would like to discuss some of the measurements we will make of the low-yield shot you will see. The efficiency of a fission device may be expressed as the ratio of the actual number of nuclei undergoing fission to the total number of fissile, i.e., uranium-235 or plutonium 239, nuclei present in the weapon. If this is multiplied by the energy which would be obtained by the fission of all the fissile nuclei, the result would give the total energy yield.

Something like ten or more different methods, of varying degrees of accuracy, can be used to determine the yield of a nuclear explosion. A radiochemical procedure and a ball of fire method have been generally employed for diagnostic purposes, the others being available in special cases. One of the procedures used for a rapid, but approximate, determination of yield has the advantage of giving yield value within a few minutes of the explosion. Various other methods of yield determination do not appear to possess any special advantages in most instances, although they may be valuable in special cases. Their main interest lies in the fact that they relate the yield to certain phenomena accompanying the explosion.

In order that nuclear weapons may be used most effectively, it is necessary to study various properties of the shock wave and related phenomena. The information obtained in this manner can also be utilized for the development of defensive procedures. For these and other reasons, various measurements of shock wave phenomena are undertaken in connection with nuclear weapons tests.

One method used for observing shock arrival times was to attach blast switches to a number of cables held by balloons.

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Upon arrival of the shock, the switch closes and sends a signal to a distant receiving station by cable or radio. This procedure has been found to be rather expensive and, thus, it has been replaced by the method of rocket-trail photography.

In passing through a region occupied by a shock front, light is refracted so that objects seen through the shock wave appear to be distorted. This fact permits times of shock arrival to be determined. Just prior to the explosion, a fan-like gird of vertical smoke trails is produced from a number of rockets launched from the ground at various distances from the zero point. These trails are photographed with a motion-picture camera. The arrival of the shock front at a point between the camera and any trail is indicated by an apparent shift in the position of the trail due to refraction.

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APPENDIX "C"

DRAFT LETTER TO THE CHAIRMAN, MLC

1. This is in answer to your letter of June 20, 1956, concerning the proposed briefing of United Kingdom and Canadian official observers by Dr. Ogle, Deputy Commander for Scientific Matters, JTF-7.

2. The Commission requests certain changes be made in the table of shots attached to the proposed talk. As presently written Dr. Ogle will be able to discuss only three shots (LACROSSE, CHEROKEE, plus the shot observed) from the table. Since these will give a very incomplete picture of Operation REDWING we suggest Dr. Ogle we authorized to present the entire table but with the dates of the shots deleted and the "Approximate Expected Yield" replaced by the following:

"Low KT" (less than 100 KT)
"High KT" (100-999 KT)
"Megaton" (1 MT or greater)

If all shots are listed, giving the dates of the shots may permit accurate correlation of the shots with British debris samples and long range detection measurements. Also, if approximate yields of all shots are furnished, by averaging these a fairly accurate estimate of the total yield could be obtained. Since it may later be desirable to furnish the British the total fission yield of the REDWING series in connection with intelligence cooperation we believe it undesirable to give even approximate yields of all shots.

3. With the changes noted above the Commission concurs in the use of the proposed talk for briefing the foreign observers

at Operation REDWING. As revised we believe the briefing material does not contain any Restricted Data and that a formal joint determination under Section 144b is not required.