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NAA: A1838, 720/10/10 PART 2

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Number of pages: 293

IAEA [International Atomic Energy Agency] - Peaceful nuclear explosion in Australia - Operation  
"Plowshare"

DEPARTMENT OF EXTERNAL AFFAIRS

File No. 720/10/10 PT. 2

SUBJECT: IAEA : PEACEFUL NUCLEAR EXPLOSION IN AUSTRALIA - OPERATION "PLOWSHARE"

RECORDED

**SECRET**

88/32825

RELATED PAPERS		FORMER PAPERS <b>PT. I</b>
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**CAUTION**  
This file contains Cabinet Documents

SECRET

720/10/10-2  
File No. ....



# KEY PAPERS ON FILE

(e.g. Cabinet papers, Policy matters, &c.)

FOLIO No.	SOURCE	DATE	DETAILS

**DEPARTMENT OF FOREIGN AFFAIRS AND TRADE**  
**CANBERRA, A.C.T. 2600**



TREATY BANNING NUCLEAR WEAPON TESTS IN THE  
ATMOSPHERE, IN OUTER SPACE AND UNDER WATER.

The governments of the United States of America, the United Kingdom of Great Britain and Northern Ireland, and the Union of Soviet Socialist Republics, hereinafter referred to as the "original parties",

Proclaiming as their principal aim the speediest possible achievement of an agreement on general and complete disarmament under strict international control in accordance with the objectives of the United Nations which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons,

Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radio-active substances,

Have agreed as follows:

ARTICLE I.

1. Each of the parties to this treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon test explosion, or any other explosion, at any place under its jurisdiction or control:

(a) In the atmosphere, beyond its limits, including outer space, or underwater, including territorial waters or high seas; or

(b) In any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted. It is understood in this connection that the provisions of this subparagraph are without prejudice to the conclusion of a treaty resulting in the permanent banning of all nuclear test explosions, including all such explosions underground, the conclusion of which, as the parties have stated in the preamble to this treaty, they seek to achieve.

2. Each of the parties to this treaty undertakes furthermore, to refrain from causing, encouraging, or in any way participating in, the carrying out of any nuclear weapon test explosion, or any other nuclear explosion, anywhere which would take place in any of the environments described, or have the effect referred to, in paragraph 1 of this article.

ARTICLE II.

1. Any party may propose amendments to this treaty. The text of any proposed amendment shall be submitted to the depositary Governments which shall circulate it to all parties to this treaty. Thereafter, if requested to do so by one-third or more of the parties, the depositary



governments shall convene a conference, to which they shall invite all the parties, to consider such amendment.

2. Any amendment to this treaty must be approved by a majority of the votes of all the parties to this treaty, including the votes of all of the original parties. The amendment shall enter into force for all parties upon the deposit of instruments of ratification by a majority of all the parties, including the instruments of ratification of all the original parties.

ARTICLE III.

1. This treaty shall be open to all states for signature. Any state which does not sign this treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This treaty shall be subject to ratification by signatory states. Instruments of ratification and instruments of accession shall be deposited with the governments of the original parties - the United States of America, the United Kingdom of Great Britain and Northern Ireland, and the Union of Soviet Socialist Republics - which are hereby designated the depositary governments.

3. This treaty shall enter into force after its ratification by all the original parties and the deposit of their instruments of ratification.

4. For states whose instruments of ratification or accession are deposited subsequent to the entry into force of this treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The depositary governments shall promptly inform all signatory and acceding states of the date of each signature, the date of deposit of each instrument of ratification of and accession to this treaty, the date of its entry into force, and the date of receipt of any requests for conferences or other notices.

6. This treaty shall be registered by the depositary governments pursuant to Article 102 of the Charter of the United Nations.

ARTICLE IV.

This treaty shall be of unlimited duration. Each party shall in exercising its national sovereignty have the right to withdraw from the treaty if it decides that extraordinary events, related to the subject matter of this treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other parties to the treaty three months in advance.

ARTICLE V.

This treaty, of which the English and Russian texts are equally authentic, shall be deposited in the archives of the depositary governments.



Duly certified copies of this treaty shall be transmitted by the depositary governments to the governments of the signatory and acceding states.

In witness whereof the undersigned, duly authorized, have signed this treaty.

Done in triplicate at the city of Moscow, the fifth day of August, one thousand nine hundred and sixty-three.

# DOCUMENT REMOVAL ADVICE

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Department of Foreign Affairs and Trade

File Number ..... 720/10/10 .....

Part Number ..... 2 .....

**FILE  
CLOSED**

This part opened on ..... 19, 10, 62 .....

This part closed on ..... 22, 10, 73 .....

Subsequent correspondence on Part/File Number ..... N.F.P. ....



FOREIGN AFFAIRS

FILE No.

~~919/15~~

DATE

22/10/73

SUBJECT

PNE - AAEC Comments on Ploughshare

FOR

~~Mr. Brown~~

CP

~~Mr. Mansfield~~

5

Please find attached a copy of teletype message containing AAEC reply to Mr Blakeney's query on PNE'A.

Mr Kevin was not aware at the time of his conversation this morning that the Secretary had already seen the reply.

D. Thell

DR.

(F) 120/10/10.



DEPARTMENT OF FOREIGN AFFAIRS

INWARD TELETYPE MESSAGE

Oct 19 11 33 '73

MMEP

FOREIGN AA62041

ATOMCOM AA20273

*MR. Blakeney*

TO FOREIGN CANBERRA NO. AEC 690

PLEASE PASS THE FOLLOWING CABLE TO: A FOREIGN CANBERRA  
BEGINS

UNCLASSIFIED P R I O R I T Y

TO: FOREIGN CANBERRA

FROM: ATOMCOM SYDNEY

FOR: MR F J BLAKENEY C.B.E.

AAEC REFERENCE 690

FOLLOWING IS TEXT OF LETTER SENT TO YOU THIS MORNING

"DEAR SIR,

I REFER TO YOUR TELEX 938 ON 4TH OCTOBER, 1973 SEEKING  
THE COMMISSION'S COMMENTS ON THE PRESENT STATUS OF THE  
FLOWSHARE PROGRAMM WE HAVE RECEIVED THE LITERATURE AND SEE  
LITTLE REASON TO DEPART FROM THE ASSESSMENT IN THE ENCLOSED  
REVIEW PAPER "CURRENT STATUS OF CIVIL ENGINEERING AND MINERAL  
RESOURCES DEVELOPMENT APPLICATIONS OF PEACEFUL NUCLEAR  
EXPLOSIONS" DELIVERED BY OUR DR. A.R.W. WILSON TO THE FOURTH  
GENEVA CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY IN  
SEPTEMBER 1971. BUT THE FOLLOWING WILL SERVE TO UPDATE THE  
INFORMATION CONTAINED IN THE ABOVE PAPER.

*Caplan*

*You asked about this  
recently it is more in  
the E.P. than defence field  
and AEC is our main  
source of latest thinking.*

*Disarmament Section will  
keep a continuing eye on  
from nuclear strategy, peaceful  
explosion etc. kind of mind.  
But E.P. wd. probably  
have coverage.*

*See  
line*

*RB  
AK - to E.P. & DEFENCE } 19/10*

THE OTHER MAJOR USER OF NUCLEAR EXPLOSIVES FOR PEACEFUL PURPOSES IS THE SOVIET UNION WHICH IS BELIEVED TO HAVE CONDUCTED SOME 16 MAJOR PROJECTS SINCE DR WILSON'S SURVEY, A MUCH HIGHER LEVEL OF ACTIVITY THAN IN THE U.S.A. DETAILS OF THIS RUSSIAN WORK ARE UNAVAILABLE BUT IT IS KNOWN THAT EARLIER USES INCLUDING DAMMING OF GORGES, ~~XXX~~ EXCAVATING CHANNELS FOR RIVERS, AND STIMULATION OF OIL WELL FLOW. THIS IS ALL CONSISTENT WITH THE VIEW THAT THE RUSSIANS REGARD NUCLEAR EXPLOSIVES AS A USEFUL CIVIL ENGINEERING TOOL, DESPITE THE RESTRICTIONS ON USE IMPOSED BY THE LIMITED NUCLEAR TEST BAN TREATY OF 1963.

FINALLY THERE HAVE RECENTLY BEEN RENEWED REPORTS OF A PROPOSAL TO CONSTRUCT A SEA LEVEL CANAL ACROSS THE ISTHMUS OF KRA IN THAILAND USING NUCLEAR EXPLOSIVES. SUCH A CANAL WOULD PROVIDE AN ALTERNATIVE SHIPPING ROUTE BETWEEN THE INDIAN OCEAN AND THE SOUTH CHINA SEA AND WOULD OBLIATE MUCH OF THE USE NOW MADE OF THE STRAITS OF MALACCA AND THE SUNDA STRAIT. IT IS REPORTED THAT A GROUP OF EXPERTS FROM THE UNITED STATES, EUROPE AND JAPAN MEETING IN TOKYO IN JULY, 1973 REACTED FAVOURABLY TO THE PROJECT. JAPANESE INTEREST ~~SEEM~~ SEEMS TO BE BASED ON THE REDUCTION IN SHIPPING TIMES FOR OIL TANKERX TANKERS FROM THE MIDDLE EAST TO JAPAN. THE COMMISSION HAS ASKED THE COUNSELLOR (ATOMIC ENERGY) IN TOKYO TO ENDEAVOUR TO OBTAIN A REPORT ON THE OUTCOME OF THE ABOVE MEETING.

IN SUMMARY, THE COMMISSION VIEWS THE DAMPENING EFFECTS OF INCREASED ENVIRONMENTAL CONVERN ASSOCIATED WITH THE PEACEFUL USES OF NUCLEAR EXPLOSIVES AS BEING MORE THAN OFFSET BY INCREASED RESOURCES PRESSURES, PARTICULARLY IN RESPECT OF NATURAL GAS AND MINERAL ORES. SOVIET INTERESTS CONTINUES UNABATED.

WE TRUST THE ABOVE COMMENTS WILL BE OF SOME ASSISTANCE.

FROM : F.L. BETT  
FOR CHAIRMAN AUSTRALIAN ATOMIC ENERGY COMMISSION  
MESSAGE SENT 19.10.73  
11.30  
⊕  
FOREIGN AA62041  
ATOMCOM AA20273



OPPOSED STRONGLY BY THE ENVIRONMENTALISTS WHO FOR SEVERAL YEARS SUCCEEDED IN HAVING SUBSTANTIAL CURBS PLACED ON IT. RECENTLY HOWEVER THE EMERGENCE OF THE ENERGY CRISIS IN THE U.S.A. HAS PRODUCED RENEWED SUPPORT FOR THE FLOWSHARE PROGRAM FROM THOSE WHO SEE IT AS A MEANS OF ~~XXXXXXXXXX~~ ALLEVIATING THE U.S. BALANCE OF PAYMENTS PROBLEMS (AS WELL AS FUEL RESERVES) BY ENABLING ACCESS TO VERY LARGE AMOUNTS OF NATURAL GAS CONTAINED IN IMPERVIOUS ROCK FORMATIONS. CONVENTIONAL FRACTURING TECHNIQUES CANNOT SUCCESSFULLY STIMULATE FLOW FROM THESE DEPOSITS BECAUSE OF THEIR DEPTH AND FORM, BUT TESTS, TWO OF WHICH WERE DESCRIBED IN DR WILSON'S PAPER AND ANOTHER, ~~XXXXXXXXXX~~ ("RIO BLANCE") WHICH WAS DONE SINCE AND IS STILL BEING EVALUATED, HAVE DEMONSTRATED THAT NUCLEAR EXPLOSIVES HAVE A GOOD CHANCE OF ENABLING THE ECONOMICAL RECOVERY OF SOME 300 TRILLION CUBLEEE CUBIC FEET OF SAFELY USABLE GAS FROM THESE IMPERVIOUS ROCK FORMATIONS OVER TWICE THE CURRENT PROVEN RESERVES OF NATURAL GAS IN THE U.S.A.

THE MAJORITY OF FLOWSHARE ACTIVITY IS IN THE GAS STIMULATION FIELD AND INTEREST IN GOVERNMENT AND INDUSTRY IS KEEN. LEGISLATION IS UNDER CONSIDERATION TO AUTHORISE THE USAEC TO PROVIDE NUCLEAR EXPLOSIVE DEVICES FOR COMMERCIAL PURPOSES.

EVEN SO THE OPERATING BUDGET FOR PROJECT FLOWSHARE WAS CUT FROM ITS 1972-73 LEVEL OF \$US 6.9 M TO \$US 3.8 M FOR 1973-74, NO FUNDS HAVING BEEN ALLOCATED SO FAR TO THE NEXT GAS STIMULATION PROJECT "WAGONWHEEL", DESIGNED TO TEST THE EFFECT OF SEQUENTIAL FIRING IN VERTICAL ARRAYS, A TECHNIQUE EXPECTED TO IMPROVE THE ECONOMICS OF NUCLEAR GAS STIMULATION. WE UNDERSTAND THAT THIS CUT ~~REFLECTS~~ REFLECTS NOT SO MUCH A REDUCTION OF OFFICIAL INTEREST IN FLOWSHARE AS A DECISION WITHIN THE USAEC, ~~THE~~ IN THE LIGHT OF SOME RESTRICTION ON ITS FUNDS AND WITH THE WISH TO ATTRACT FURTHER PUBLIC SUPPORT FOR THE PROGRAM, TO PROCEED AT A STEADY PACE WITH FLOWSHARE WHILE INCREASING EFFORT IN SOME OTHER FIELDS, EG., THE FAST REACTOR PROGRAM. HOWEVER, THE FLOWSHARE PROGRAM SUBSEQUENTLY RECEIVED AN ALLOCATION OF \$US 0.8 M FOR EXTRA SUPPORTING STUDIES OF CONVENTIONAL FRACTURING TECHNIQUES.

THE OTHER SIGNIFICANT FIELD OF FLOWSHARE INTEREST IS IN THE RECOVERY OF LOW GRADE COPPER ORES BY IN SITU LEACHING FOLLOWING NUCLEAR FRACTURING OF THE ORE BODY. THE TECHNIQUE WAS DESCRIBED BY DR WILSON AND CONVENTIONAL INTEREST IN IT ~~REFLECTS~~ REFLECTS THE STEADY DEPLETION OF ECONOMIC GRADES OF COPPER ORE IN THE U.S.A. AGAIN INDUSTRY IS PARTICIPATING WITH THE GOVERNMENT IN THE TESTS.

## FOREIGN AFFAIRS

A. B. Gatt  
**SECRET**

FILE No.....

DATE...17th March 1972.....

SUBJECT Atomic Energy

FOR File.....

Copies:Acting Secretary  
Mr. Blakeney

Dr. A.R.W. Wilson of the AABC, who is acting for Timbs in the latter's absence overseas, called this morning to discuss outstanding aspects of the Australia/Japan/IAEA trilateral agreement. He mentioned some other matters in confidence for our information only.

- (a) Last week Mr. Swartz proposed to Cabinet that Sir Philip Baxter's term be extended from April to the end of this year. Cabinet rejected this and decided that there should be no extension.
- (b) At his Minister's direction, Wilson is working on a re-draft of the Atomic Energy legislation, in particular to revise Section 9(iv) which vests in the Executive Commissioner (Timbs) authority for the direction of the Commission between meetings of the Commission. This provision had been obsolete ever since the Commission had come to have a full-time Chairman. Wilson said he wondered whether Cabinet would consider the amendment of the Atomic Energy legislation as of sufficient importance to be fitted into this year's legislative programme.
- (c) As a matter he wanted handled very carefully, Wilson mentioned that Hamersley Ltd., had approached him last week about a proposal for a nuclear explosion to construct a port at Legendre Island, Dampier. Hamersley wanted a lead as to how the Government would react to this idea. He was astounded to discover that Hamersley had already initiated significant exploratory work with Geonuclear Nobel of Switzerland and the Kaiser (U.S.) Group.

...2/

Ⓢ 720/3/1.  
720/10/10

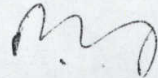
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8/22/3

**SECRET**



He was proposing to see Mr. Bott today to discuss possible arrangements for the discussion among Departments of this highly sensitive issue with major NPT implications. Wilson said that the matter would not be mentioned to the Chairman or any other AEC Commissioner until Boswell took over. He will keep in touch on the matter.



(P. J. Flood)  
Assistant Secretary  
Economic Policy Branch

SECRET



*in file*  
137  
*File  
re*

INWARD CABLEGRAM

PG.

I.4234.

FROM.

DATED. 23RD JANUARY, 1967.  
1807 LT

AUSTRALIAN HIGH COMMISSION,  
LONDON.

REC'D. 24TH JANUARY, 1967.  
0522 LT

828. CONFIDENTIAL.

ADDRESSED CANBERRA 828 REPEATED WASHINGTON 16 AUSTUNAT NEW YORK 3  
SAVINGRAM OTTAWA STOCKHOLM.

SEISMIC DETECTION - YOUR TELEGRAM 436

STREET (ATOMIC ENERGY AND DISARMAMENT DEPARTMENT, FOREIGN OFFICE) SAID TODAY THAT BRITISH HAD NOT YET HAD ANY APPROACH FROM THE SWEDES AND HAS NOT FORMED ANY VIEW ON DESIRABILITY OF ATTENDING A SECOND MEETING ON SEISMIC DATA EXCHANGE.

HE UNDERSTOOD AMERICANS WERE ALSO UNDECIDED ON THE QUESTION NOW THAT AN INVITATION BY SWEDEN SEEMED POSSIBLE, THEY WOULD HAVE TO GIVE IT MORE THOUGHT.

2. STREET DOUBTED WHETHER THE U.S.S.R. WOULD WISH TO ATTEND THE MEETING.

AT THE END OF THE LAST SESSION OF THE E.N.D.C, ROSSCHIN HAD ADOPTED A HARD LINE ON SEISMIC DETECTION AND UNDERGROUND TESTS, WHICH HAD BEEN REPEATED BY GROMYKO IN HIS RECENT MEETING WITH THE FOREIGN SECRETARY.

IF THE SOVIET UNION REFUSED TO ATTEND, STREET THOUGHT THAT THE SWEDES WOULD PROBABLY NOT WISH TO INVITE THE AMERICANS.

HOWEVER THEY MIGHT STILL WANT BRITAIN TO ATTEND IN THE ABSENCE OF THE U.S. AND THE U.S.S.R. AND STREET THOUGHT THAT IN THOSE CIRCUMSTANCES IT MIGHT BE USEFUL FOR BRITAIN TO ATTEND.

3. STREET DID NOT THINK THAT THE AMERICAN 'DECOUPLING' EXPERIMENT SHOULD AFFECT THE QUESTION EITHER WAY.

2/.....

CHECKED  
*[Signature]*

MADE IN AUSTRALIA  
B U R N  
B O N D

SECRET



DEPARTMENT OF EXTERNAL AFFAIRS  
INWARD CABLEGRAM

PG.

- 2 -

I.4234.

IT WAS ALREADY KNOWN THAT SEISMIC METHODS COULD NOT PICK UP EXPLOSIONS OF THE MAGNITUDE OF 4 OR LESS, AND FURTHER EXCHANGES OF INFORMATION ON THE QUESTION OF SEISMIC DETECTION COULD BE USEFUL IN EDUCATING IN THE LIMITATIONS OF THE SEISMIC METHOD THOSE WHO MIGHT OTHERWISE PRESS FOR A COMPREHENSIVE TEST BAN TREATY WITHOUT INSPECTION.

4. WE WILL ADVISE ON DEVELOPMENTS IN THE BRITISH POSITION.

MIN. & DEPT E.A. (919/8/7)  
MIN. & DEPT DEFENCE  
P.M.'S

24TH JANUARY, 1967.

SEC DEP SEC FAS(1) DL FAS(2) UN@ PACAM EA AMSP  
FAS(3) AS(JIC) INT ICR PIO MR W.D. FORSYTH E ER

GENEVA NEW YORK(UN) TOKYO WASHINGTON

CONFIDENTIAL



## INWARD CABLEGRAM

LL:

I.3976

FROM:

DATED: 20TH JANUARY, 1967  
1825 LTAUSTRALIAN EMBASSY,  
WASHINGTON.REC'D: 21ST JANUARY, 1967  
1533 LT

271

CONFIDENTIAL

ADDRESSED CANBERRA 271, REPEATED LONDON 14

SEISMIC DETECTION.

WE SAW KRANICH (POLITICAL AFFAIRS DIVISION CHIEF, U.S. ARMS CONTROL AND DISARMAMENT AGENCY) TODAY ABOUT THE MATTERS RAISED IN YOUR CABLE NO.155.

2. KRANICH SAID THAT IT WAS ON RECORD THAT THE U.S. HAD SUPPORTED THE NUCLEAR DETECTION CLUB.

THE U.S. WOULD ATTEND A SECOND SEISMIC DATA EXCHANGE CONFERENCE, IF THE U.S.S.R. DID LIKEWISE.

IT WOULD NOT ATTEND IF THE U.S.S.R. DID NOT ATTEND.

THE U.S. DID NOT ANTICIPATE THAT THE SOVIET UNION WOULD ACCEPT A SWEDISH INVITATION TO ATTEND.

THE U.S. UNDERSTOOD THAT THE SWEDES WERE EXPLORING PRIVATELY AND INFORMALLY THE LIKELY SOVIET REACTION TO AN INVITATION.

3. AS THE SOVIET UNION HAD ALWAYS REJECTED AMERICAN INVITATIONS FOR SEISMOLOGISTS FROM THEIR TWO COUNTRIES TO GET TOGETHER AND REVIEW NUCLEAR DETECTION METHODS, IT WAS HIGHLY UNLIKELY THAT THE SOVIET UNION WOULD PARTICIPATE IN A FORUM (I.E. THE PROPOSED SWEDISH CONFERENCE) WHERE DISCUSSION MIGHT TURN IN THIS DIRECTION.

THE U.S. HOPED THAT SOME DAY THE U.S.S.R. WOULD CHANGE ITS POSITION AND BE WILLING TO PARTICIPATE., BUT THIS SEEMED HIGHLY IMPROBABLE AT PRESENT.

4. THE SWEDES HAD ORIGINALLY HOPED TO HAVE A NUCLEAR DETECTION CLUB THAT WOULD COMPRISE NON-NUCLEAR COUNTRIES AND NOT BE ORIENTED TOWARDS EITHER THE U.S.S.R. OR U.S.A., BUT IT WOULD BE FINE BY THEM IF BOTH THE U.S.S.R. AND U.S.A. PARTICIPATED.

5. KRANICH THOUGHT THAT, IF THE U.S.S.R. WERE TO PARTICIPATE IN THE SECOND CONFERENCE, IT WOULD DO SO IN ORDER TO DEMONSTRATE THAT ON-SITE INSPECTION WAS UNNECESSARY.

IF THE U.S. THEN PARTICIPATED, IT WOULD DO SO TO SHOW THAT ON-SITE INSPECTION WAS NECESSARY.

6. THE U.S. HAD TOLD THE U.K. THAT IT APPEARED LIKELY IN THE CIRCUMSTANCES THAT NEITHER THE U.S. NOR THE U.S.S.R. WOULD ATTEND THE SECOND CONFERENCE.

...2/...

CONFIDENTIAL

CONFIDENTIAL



DEPARTMENT OF EXTERNAL AFFAIRS  
INWARD CABLEGRAM

LL.

...2/...

I.3976

THE U.K. SHOULD REVIEW THE SITUATION CAREFULLY IF IT WERE TENDERED AN INVITATION.

ON THE ONE HAND, U.K. ATTENDANCE WOULD GIVE THE CONFERENCE A WESTERN ORIENTATION THAT MIGHT MAKE IT MORE DIFFICULT FOR THE U.S.S.R. TO PARTICIPATE IN FUTURE.

ON THE OTHER HAND, U.K. ATTENDANCE WOULD PROVIDE SOME TECHNOLOGICAL EXPERTISE THAT THE NUCLEAR DETECTION CLUB WOULD NOT OTHERWISE HAVE.

BUT THE U.S. WAS NOT TELLING THE U.K. WHAT IT OUGHT TO DO. THIS WAS UP TO THE U.K.

7. THE U.S. WISHED TO ENCOURAGE NATIONS THAT WERE NON-NUCLEAR TO PARTICIPATE IN THE SWEDISH CLUB.

KRANICH DID NOT THINK THAT ATTENDANCE BY A NON-NUCLEAR COUNTRY SUCH AS AUSTRALIA WOULD BE INTERPRETED BY THE U.S.S.R. IN THE SAME WAY AS U.K. ATTENDANCE.

8. PLEASE SEE FOLLOWING CABLE ON 'DECOUPLING' AND SEISMIC DETECTION.

---

MIN. & DEPT E.A.(919/8/7)  
MIN. & DEPT DEFENCE  
MIN I/C A.A.E.C.  
A.A.E.C.  
P.M'S

21ST JANUARY, 1967

SEC DS FAS(1) DL FAS(2) UN@ PACAM AMSP FAS(3) AS(JIC)  
INT C&P ICR PIO L&T E ER@ MR FORSYTH

DUBLIN LONDON NEW DEHLI NEW YORK(UN) OTTAWA STOCKHOLM TOKYO

CONFIDENTIAL

CONFIDENTIAL



## INWARD CABLEGRAM

LES

1.31975

FROM:

DATED: 20TH JANUARY, 1967  
1810 LTAUSTRALIAN EMBASSY,  
WASHINGTON. 1REC'D: 21ST JANUARY, 1967  
1500 LT270 SECRET. 1

ADDRESSED CANBERRA 270, REPEATED LONDON 13, BONN MISC. 52

NON-PROLIFERATION. 1

OUR CABLE 169. 1

KRANICH (A.C.U.A.) 1 TOLD US TODAY THAT A.C.U.A. WAS AGREEABLE TO MAKING DRAFTS ON NON-PROLIFERATION AVAILABLE TO US, BUT THAT THE APPROVAL OF SECRETARY OF STATE WOULD HAVE TO BE SOUGHT ON WHETHER THEY COULD BE GIVEN TO SELECT ALLIES OUTSIDE OF N.A.T.O. 1

APPARENTLY, NOT ALL N.A.T.O. COUNTRIES HAVE YET BEEN INFORMED OF THE DRAFTS. 1

2. 1 WE ASKED KRANICH HOW U.S. DISCUSSIONS WITH THE WEST GERMANS WERE PROCEEDING. 1

KRANICH SAID THAT IT WAS DIFFICULT TO ANSWER. 1

THE U.S. HAD PROVIDED THE GERMANS WITH SOME INTERPRETATIONS OF THE DRAFT ELEMENTS. 1

THUS FAR, THE GERMANS HAD REALLY ONLY ASKED QUESTIONS. 1

BUT THERE WERE ENOUGH EMANATIONS FROM BONN TO SHOW THAT THE F.R.G. WAS EXAMINING THE MATTER CONSTRUCTIVELY AND RECEPTIVELY. 1 ITS ATTITUDE WAS NOT RESISTANT. 1

3. 1 WE TRIED TO DRAW KRANICH OUT BY ASKING HOW "A FULLY-FEDERATED EUROPE" WOULD BE DEFINED IN THE CONTEXT OF THE "EUROPEAN OPTION". 1 WOULD IT INCLUDE EAST EUROPE?

KRANICH SAID THAT HE DID NOT THINK THAT THE "EUROPEAN OPTION" ENVISAGED INCLUSION OF EAST EUROPE AS A CONDITION. 1

WESTERN EUROPE WOULD NOT HAVE TO BE COMPLETELY FEDERATED IN EVERY DETAIL - BUT FOREIGN POLICIES AND SECURITY POLICIES WOULD NEED TO BE ON A UNIFIED BASIS. 1

4. 1 WE ARE KEEPING IN TOUCH WITH KRANICH ON THE QUESTION OF THE DRAFTS. 1

MIN. AND DEPT E.A. 1  
MIN. AND DEPT DEFENCE  
P.M.'S

21ST JANUARY, 1967

SEC DS FAS(1) DL FAS(2) UN(ACTION) PACAM EA AMSP LA  
FAS(3) AS(JIC) INT C AND P ICR PIO L AND T MR W. D. FORSYTH  
ER

BONN GENEVA LONDON NEW DELHI TOKYO



DEPARTMENT OF EXTERNAL AFFAIRS  
INWARD CABLEGRAM

LLJ

I.3980

FROM:

DATED: 20TH JANUARY, 1967  
1830 LT

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 21ST JANUARY, 1967  
1635 LT

269 CONFIDENTIAL

REPEATED LONDON 12

SEISMIC DETECTION - DECOUPLING.

KRANICH (A.C.D.A.) COMMENTED TO US TODAY ON DECOUPLING - I.E. THE EXPLOSION OF A NUCLEAR WEAPON DEEP BELOW GROUND LEVEL IN A HOLE, WHERE THE AIR ACTED AS A CUSHION TO REDUCE THE SEISMIC READING.

2. DECOUPLING HAD RECENTLY RECEIVED A LOT OF PUBLICITY, BUT THERE WAS NOTHING NEW ABOUT IT.

SCIENTISTS HAD KNOWN FOR A LONG TIME THAT SEISMIC MEASUREMENTS COULD BE APPRECIABLY AFFECTED BY THE CIRCUMSTANCES IN WHICH UNDERGROUND EXPLOSIONS TOOK PLACE.

THUS, AN EXPLOSION IN HARD ROCK WOULD GIVE A MATERIALLY DIFFERENT READING TO ONE IN SOFT ALLUVIAL SOIL.

3. THE U.S. RECOGNISED THAT THERE COULD BE UNDERGROUND TESTS OF SUCH LOW MAGNITUDE THAT THEY COULD NOT BE IDENTIFIED ON A SEISMIC SCALE AS MAN-MADE OR NOT.

HENCE, THERE WAS STILL A NEED FOR ON-SITE INSPECTION.

4. THERE WAS ALSO SOME QUESTION AS TO WHETHER MEDIUM-SIZED NUCLEAR EXPLOSIONS, IF CONDUCTED IN LARGE HOLES, WOULD BE INDISTINGUISHABLE ON A SEISMIC SCALE FROM NATURAL PHENOMENA.

THIS CONSIDERATION REINFORCED THE NEED FOR ON-SITE INSPECTION.

5. AS A QUALIFICATION TO PARA 4 ABOVE, IT SHOULD BE ADDED THAT SUCH MEDIUM-SIZE EXPLOSIONS COULD NOT BE MUFFLED IN ANY NATURAL CAVERNS.

THEY WOULD HAVE TO TAKE PLACE IN HOLES PREVIOUSLY MADE BY NUCLEAR EXPLOSIVES.

THERE WAS ONLY A SLIGHT POSSIBILITY THAT NON-NUCLEAR EXPLOSIONS COULD MAKE HOLES LARGE ENOUGH FOR THESE PURPOSES.

6. COUNTRIES THAT ALREADY HAD SOPHISTICATED NUCLEAR WEAPONRY COULD CARRY OUT MILITARILY SIGNIFICANT TESTS BELOW A THRESHOLD OF IDENTIFICATION (AS SUSPICIOUS EVENTS) BY SEISMIC MEANS.

IT SEEMED THAT EVENTS THAT GAVE A READING ABOVE A CERTAIN LEVEL ON THE SEISMIC SCALE COULD PROBABLY BE IDENTIFIED AS SUSPICIOUS.

MIN. & DEPT E.A. (919/8/7)  
MIN. & DEPT DEFENCE  
MIN. I/C A.A.E.C.  
A.A.E.C.  
P.M.'S

21ST JANUARY, 1967

CONFIDENTIAL



DEPARTMENT OF EXTERNAL AFFAIRS

INWARD CABLEGRAM

LL.

I.3890

SEC DS FAS(1) DL FAS(2) UN@ PACAM AMSP FAS(3) AS(JIC)  
INT C&P ICR PIO L&T E ER@ MR FORSYTH

GENEVA LONDON NEW DEHLI NEW YORK (UN) OTTAWA STOCKHOLM  
TOKYO

CONFIDENTIAL

CONFIDENTIAL



*Walter*  
*pe*  
FOLIO No.  
133

OUTWARD CABLEGRAM

LH

6.02953

TO:

SENT: 19TH JANUARY 1967  
2037

AUSTRALIAN EMBASSY,  
WASHINGTON.....155

AUSTRALIAN HIGH COMMISSION,  
LONDON.....436

REPEATED:

AUSTRALIAN MISSION TO UNITED  
NATIONS,  
NEW YORK.....135 (FOR INFORMATION)

AUSTRALIAN HIGH COMMISSION,  
OTTAWA.....128 (FOR INFORMATION)

AUSTRALIAN EMBASSY,  
STOCKHOLM.....118 (FOR INFORMATION)

CONFIDENTIAL.

SEISMIC DETECTION.

SWEDISH AMBASSADOR HAS APPROACHED US REGARDING SECOND SEISMIC DATA EXCHANGE CONFERENCE WHICH SWEDEN PROPOSES SHOULD TAKE PLACE, WITH INCREASED PARTICIPATION, POSSIBLY IN MAY.

SWEDEN HAS SUGGESTED THAT REPRESENTATIVES OF THE EIGHT ORIGINAL COUNTRIES AT THE STOCKHOLM MEETING MIGHT MEET TO DISCUSS ARRANGEMENTS FOR A SECOND CONFERENCE IN GENEVA WHERE ENDC RECONVENES NEXT MONTH.

IT IS APPARENTLY HOPED THAT UK, USA AND USSR MIGHT ATTEND CONFERENCE ALTHOUGH SWEDES DO NOT APPEAR TO REGARD THIS AS ESSENTIAL.

2. SECRETARY HAS TOLD SWEDISH AMBASSADOR AS PRELIMINARY REACTION (REPORT BY BAG) THAT:

- (A) WE CANNOT SEE THAT THERE ARE ANY MATTERS WHICH WOULD JUSTIFY ANOTHER EARLY MEETING:
- (B) IF THE THREE PRINCIPAL NUCLEAR POWERS WERE PRESENT THIS WOULD BE A NEW FACTOR AND
- (C) MERE ATTENDANCE OF MORE COUNTRIES THAN BEFORE WAS NOT IN ITSELF AN ARGUMENT FOR ANOTHER CONFERENCE.

3. WE HAVE UNDERTAKEN TO CONVEY FURTHER VIEWS TO SWEDEN EARLY IN FEBRUARY.

BEFORE DOING SO WE WOULD APPRECIATE US/UK VIEWS ON WHETHER THEY WOULD WISH TO ATTEND A NEW CONFERENCE, WHETHER THEY THINK THE USSR WOULD DO SO (WE HAVE SOME DOUBTS ON THIS POINT) AND WHAT WOULD BE THEIR REACTION IF THE SOVIET UNION DID NOT WISH TO.

.....1/2

CONFIDENTIAL



DEPARTMENT OF EXTERNAL AFFAIRS  
OUTWARD CABLEGRAM

LH

- 2 -

0.02953

WE WOULD ALSO BE GLAD TO KNOW WHETHER THE RESULTS OF RECENT AMERICAN 'DECOUPLING' EXPERIMENT IS SEEN AS CONFIRMING THE UNWISDOM OF GIVING ANY ENCOURAGEMENT TO THE IDEA THAT THE EXCHANGE OF SEISMIC DATA COULD BE A SUBSTITUTE FOR INSPECTION.

MIN. AND DEPT E.A. (19/8/7)  
MIN. AND DEPT DEFENCE  
P.M'S.

20TH JANUARY 1967

SEC DEP SEC FAS(1) DL FAS(2) UN ACTION PACAM EA AMSP  
FAS(3) AS(JIC) INT ICR PIO E ER MR FORSYTH  
NEW DELHI TOKYO GENEVA

SECRET

SECRET



*file appropriate*

**AEC**



*Decker*

**UNITED STATES  
ATOMIC ENERGY COMMISSION**  
WASHINGTON, D.C. 20545

JOINT DEPARTMENT OF DEFENSE-AEC RELEASE

No. J-231  
Tel. 973-3335 or  
973-3446

*PLOWSHARE*  
*Johnston* FOR IMMEDIATE RELEASE  
(Friday, October 7, 1966)

720/10/10  
FOLIO No.  
132

*Registration*  
*pl file 7/19/15/1 (?)*

FEASIBILITY OF CONSTRUCTING CAVITY  
FOR NUCLEAR DECOUPLING TEST TO BE STUDIED

*R.R.*

The Nevada Operations Office of the Atomic Energy Commission is seeking proposals from qualified industrial engineering and construction concerns to study the engineering feasibility of preparing a cavity in a salt dome suitable for a nuclear decoupling experiment and to develop plans for possible future cavity excavation if considered feasible.

Project Payette would be a five-kiloton to ten-kiloton nuclear detonation at the center of a cavity, which would have a diameter of about 350 feet at a depth of 2,700 feet. A decision to implement Project Payette will depend on the results of this engineering study and on other factors under consideration by the Advanced Research Projects Agency and Atomic Energy Commission. The project would be a joint Department of Defense-Atomic Energy Commission experiment in the U. S. program to improve means for detecting, locating and identifying underground nuclear detonations.

The seismic information which would be gained from the experiment would be of value to the Advanced Research Projects Agency of the Department of Defense, which is charged with conducting the program for improving techniques in underground test detection. The AEC's Lawrence Radiation Laboratory, Livermore, California, would have charge of the technical program.

Firms submitting proposals on feasibility of constructing the large cavity will be advised that either conventional mining or solution mining (washing) methods may be proposed.

① *Dr. Johnson*

→ ② *UN Mr. E. J. ...*

⑤ *K. J. ...*

*you may be interested to note this*  
*Registry - pl file*  
*"under" "PLOWSHARE" ...*

720/10/10

*R. Burns 28/10*  
*720/10/10*



The feasibility study is expected to begin about December 1, 1966, and will be completed in about 24 weeks.

The five-kiloton Salmon nuclear detonation was conducted at the Tatum Dome site near Hattiesburg, Mississippi, on October 22, 1964, as a tamped experiment. In a tamped configuration, the nuclear device is closely surrounded by the salt mass. Experiments with small charges of high explosives have shown that decoupled explosions, where the detonation takes place at the center of a spherical cavity of the correct size, can decrease the energy transmitted into the surrounding earth mass.

A second nuclear detonation experiment, Project Sterling, has been scheduled for the Tatum Dome late this year. It calls for detonation of the equivalent of 350 tons of high explosives in the cavity created by the Salmon experiment, and will be decoupled to a major degree.

Project Payette, if approved and conducted, would extend decoupling knowledge and would be useful for comparing with information gained from Salmon and Sterling. It would be expected to result in much less earth shock in nearby areas than resulted from Project Salmon.

#

(NOTE TO EDITORS AND CORRESPONDENTS: This information is being issued simultaneously in Las Vegas, Nevada, and Hattiesburg, Mississippi.)

10/7/66



CONFIDENTIAL

720/10/10

→ E.A.

FILE No. 131

R/A Operation Plowshare file Dalrymple

912/15

OPERATION PLOWSHARE

PROPOSED HARBOUR EXCAVATION BY NUCLEAR MEANS IN W.A.

Summary of main points at Inter-Departmental Meeting on 6th October, 1965, in Department of Interior Conference Room.

Present

Chairman	Mr. McCay	Dept. of National Development
	Mr. Boughton	" " " "
	Mr. Munro	Prime Minister's Department
	Mr. Griffith	" " "
	Mr. Timbs	A.A.E.C.
	Dr. Wilson	"
	Mr. Garrett	Treasury
	Mr. Capelhorn	Defence
	Mr. Doig	External Affairs
	Mr. Evans	" "

Mr. McCay (National Development) opened the meeting by explaining that the Prime Minister's Department had reservations about the necessity at this stage of a further letter to the Premier of Western Australia from the Prime Minister concerning the W.A. proposal on a nuclear excavated harbour near Onslow.

Mr. Munro (Prime Minister's) said that the Prime Minister had already written to the Premier indicating that "careful consideration" of his proposal would be required. He had also asked the Minister of National Development to set such a study in train with no commitment on the part of the Commonwealth. Various aspects such as the safety, cost and Nuclear Test Ban Treaty aspects would have to be considered. Mr. Munro thought we needed more information from the W.A. Government on the proposed project and its background but that this did not warrant a further letter from the Prime Minister. The Prime Minister's Department had already sent, at External Affairs request, an informal letter to the Premier's Department in Western Australia setting out some of the problems posed by the Nuclear Test Ban Treaty. The Prime Minister's Department felt that an inter-Departmental meeting was necessary to discuss the problems involved, and to decide on what to do next.

Mr. Timbs (A.A.E.C.) noted that the Premier of Western Australia had written to the Prime Minister on 21st May, 1964, and urged the necessity to get the Commonwealth's study under way. It was now 6th October and nothing had been done. The A.A.E.C. had a number of technical questions it would wish to ask the Western Australians and he imagined that other Departments would also have queries, e.g. Treasury, on

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the question of financing.

Mr. Timbs emphasised the A.A.E.C.'s view that timing was of critical importance. If a speedy decision were made in favour of the project it was likely that the U.S. would accept substantial involvement and, if an explosion could be carried out within the next 3 years, the U.S.A.E.C. would, he said, be prepared to substitute the W.A. project for other parts of the Plowshare programme. If we left a decision too long the U.S.A.E.C. had indicated that such a substitution would not be possible and Australia would probably then have to finance the whole project. Mr. Timbs remarked several times during the meeting his firm belief that the Western Australian letter was "written" by the B.H.P.

Mr. Garrett (Treasury) said that Treasury had an open mind, and that there was no reason why a feasibility study should not go ahead, provided that this involved no financial commitment to the Commonwealth.

Mr. Doig (External Affairs) said that External Affairs would not wish to frustrate any feasible proposals which would be of economic benefit to Australia, but was concerned that in this instance the provisions of the Nuclear Test Ban Treaty should be fully taken into account. We needed more technical information on the proposal and we needed to pin down the United States more specifically on its attitude towards harbour explosions, which would be, after all, a breach of the Test Ban Treaty. Our latest information was that the future of harbour excavations by nuclear means was uncertain.

Mr. Timbs said that harbour excavation would be a breach of the Test Ban Treaty and that the United States was aware of this. They were however preparing some experiments of their own in breach of the Treaty. The U.S.A.E.C. were confident they could get around the Treaty, and perhaps within a year or so an accommodation would have been reached with the U.S.S.R. in effect permitting explosions for such purposes as harbours.

Mr. Timbs added that the U.S. Administration was in favour of Palmer and Baker doing a design study, and there had been much U.S. interest in the W.A. proposal. He said however, that any attempt at actual excavation at this time would not be possible. He understood also that the B.H.P. had not been able to obtain any guarantee (he inferred from U.S. sources) that a harbour explosion would eventually be possible. It was possible that, as had happened with a proposed harbour excavation some time ago in Alaska, that once examined, the project would have to be scrapped e.g. on safety grounds.

Mr. Evans (External Affairs) said that there must be some doubt as to whether the U.S.S.R. would in fact agree to any accommodation under the Test Ban Treaty, and that we might not want to be, in effect, pushed into making some of the running for the United States on the question of harbour explosions. It might be preferable for the United States to see if it can work out something first of all with the U.S.S.R. We might not by any decision which might be taken, appear to be making a commitment to seek a way around the Treaty. It seemed a little odd that substantial U.S. aid would be received if a favourable decision were made soon, but otherwise not.

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Dr. Wilson (A.A.E.C.) suggested that if Australia were interested, this would be evidence of a desire to use peaceful nuclear explosions for harbour purposes.

Mr. Timbs discussing the question of who would carry out research on an Australian operation said that the A.A.E.C. would plan to do this and it would be necessary to head off Palmer and Baker. Australian engineers and scientists needed the benefit of the application of nuclear techniques. The U.S. Government would require to be assured by its own experts before any explosion could take place. The use of U.S. engineers was probable as we would not have sufficient of our own who were well versed with the subject.

There was some discussion over whether an approach should be made to Cabinet at this stage without further reference to the Western Australian authorities. Mr. Garrett wondered whether Cabinet should be asked to pronounce now as the Test Ban Treaty aspects, assuming that the technical aspects were favourable. Mr. Timbs felt that detailed information on the technical side should also be included in the first submission.

It was agreed that a letter should be written by the Prime Minister's Department to the Premier's Department in Western Australia seeking a meeting of Commonwealth officers with the Western Australian Government to discuss background and technical details. Officials from the A.A.E.C. and the Department of National Development might visit W.A. for the purpose. Mr. Munro said that he would have to clear this suggestion with his Department and possibly with the Prime Minister. Mr. McCay said also that his own Minister would have to be informed. Mr. McCay noted that among the questions requiring an answer were: does any and if so which company want a port in W.A.; where does it want it; why is a nuclear explosion necessary; what is the full background of Western Australian talks with the U.S.A.E.C., State Department, Palmer and Baker and the B.H.P. and the Cleveland companies.

Dr. Wilson, reverting to technical aspects, said that the proposed explosion or explosions must be of a cratering kind. The A.A.E.C. would like to know, inter alia, what the advantages of a nuclear explosion are supposed to be in this particular case. It might be that the overall cost by nuclear means, while more attractive, might not as had been canvassed be several times cheaper. He understood that the proposed site included solid rock approaches which it might be very difficult, if possible at all, to remove by conventional means.

Mr. Timbs said that the Western Australian Government would have an incentive to develop a deeper draught port for the export of iron ore, if it meant that ships of 100,000 tons could load compared with only 40,000-60,000 ton ships at present.

Mr. Munro commented that when Dr. Palfrey of the U.S.A.E.C. visited Australia recently as had referred to underwater explosions as being "dirty" and that fall-out problems could exist.

There was some discussion of the financial problems which might be involved in considering the project. Treasury had reservations about Commonwealth involvement and precedents if the project was to be in effect, for the benefit of one company. The submission to Cabinet should include cost estimates and how the project was to be financed. It was

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pointed out that the United States appeared to envisage any feasibility study an actual project agreement being on a Federal to Commonwealth Government basis. A feasibility study might take 2 years. It was agreed that following the discussions on technical and other matters with the Western Australian authorities a submission to Cabinet would be prepared by the Department of National Development in consultation with the A.A.E.C. and that this would be circulated for comment or another meeting called to discuss it.

Mr. Munro referred to his need to keep the National Radiation Advisory Council informed of any details on radioactivity as it was their function to advise the Government on such matters.

Summary of Decisions

- (1) That a letter should be sent to the Premier's Department in Western Australia proposing discussions with a few officials to obtain more background details and technical information on the proposed scheme.
- (2) That subsequently the Department of National Development have the carriage, with the advice of the A.A.E.C., of a Cabinet Submission covering all aspects of the proposal, and that this should be submitted for discussion or comment to other interested Departments.

Report prepared by D.W. Evans



W/pt 28/5

pointed out that the United States appeared to envisage any feasibility study on actual project agreement being on a Federal to Commonwealth Government basis. A feasibility study might take 2 years. It was agreed that following the discussions on technical and other matters with the Western Australian authorities a submission to Cabinet would be prepared by the Department of National Development in consultation with the A.A.E.C. and that this would be circulated for comment or another meeting called to discuss it.

Mr. Murray referred to his need to keep the National Radiation Advisory Council informed of any details on radioactivity as it was their function to advise the Government on such matters.

Summary of Decisions

- (1) That a letter should be sent to the Premier's Department in Western Australia proposing discussions with a few officials to obtain more background details and technical information on the proposed scheme.
- (2) That subsequently the Department of National Development have the carriage, with the advice of the A.A.E.C., of a Cabinet submission covering all aspects of the proposal, and that this should be submitted for discussion or comment to other interested Departments.

Report prepared by D.W. Evans



919/13/4

720/10/10

31st March, 1965

POSSIBLE PARLIAMENTARY QUESTIONAUSTRALIAN ATOMIC ENERGY COMMISSIONS'REPORT ON OPERATION PLOWSHAREFOR THE MINISTER

.... Attached is a copy of telegram 1086 from Washington containing the text of a United States Official press statement, scheduled for release there, concerning a report by three Australian scientists on Project Plowshare - the United States programme to explore peaceful uses for nuclear explosives. Though this is primarily a matter for the Minister for National Development, you could be asked a question in Parliament on this matter, particularly on the relation between Project Plowshare and the Nuclear Test Ban Treaty.

2. The visit of the Australian scientists arose out of an invitation by the Chairman of the United States Atomic Energy Commission (U.S.A.E.C.) to discuss the possibility of a mutual United States - Australian experimental programme of nuclear excavation. Ministers approved that a team led by Dr. Wilson of the

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Australian  
*al*



Atomic Energy Commission (A.A.E.C.) should visit the United States of America to seek a first-hand appreciation of the scientific, engineering and safety aspects of nuclear explosives without any suggestion at that stage that Australia's interest would be extended further. The U.S.A.E.C. subsequently sought and received permission to publish the report of the Wilson team, which they regarded as the best and most comprehensive independent report on the subject, in their technical series.

3. We have told the A.A.E.C. that if any press release is made in Sydney we would like to see an additional paragraph inserted to the effect that the Australian report also stated that any special limitations which may result from the Nuclear Test Ban Treaty had not been considered in the report in evaluating the practicability of nuclear explosives for peaceful purposes. We understand that it is not proposed to release a statement in Sydney although the A.A.E.C. promised to put our point to the Minister for National Development in the event that he is asked a question concerning the United States press release.



4. If asked a question on this aspect, you might wish to consider a reply along the lines that the partial Nuclear Test Ban Treaty, as it at present stands, imposes limitations on the explosion of any nuclear device, and that Australia's international obligations under the Treaty would be an important element in the consideration of any proposal for a nuclear explosion for peaceful purposes.

(Patrick Shaw)  
Acting Secretary



INWARD CABLEGRAM

MB.

I. 12853.

FROM:

DATED: 29TH MARCH, 1965.  
1850.

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 30TH MARCH, 1965.  
1100.

1086. RESTRICTED. PRIORITY.

FOR TIMBS A.A.E.C. FROM BETT

THE FOLLOWING IS THE TEXT OF A PRESS RELEASE SCHEDULED FOR  
RELEASE IN WASHINGTON AT 3.30 PM MARCH 30, WASHINGTON TIME, I.E  
6.30 AM MARCH 31, SYDNEY TIME.  
YOU MAY WISH TO RELEASE IT IN SYDNEY AT THIS TIME.

AUSTRALIA PRESENTS U.S. WITH PLOWSHARE REPORT EVALUATING  
NUCLEAR APPLICATIONS.

THE AUSTRALIAN AMBASSADOR TO THE UNITED STATES, MR. J.K.  
WALLER TODAY SENT TO DR. GLENN T. SEABORG CHAIRMAN OF THE US  
ATOMIC ENERGY COMMISSION A REPORT BY THREE AUSTRALIAN SCIENTISTS  
EVALUATING PROJECT PLOWSHARE WITH REGARD TO ITS POSSIBLE APPLICATION  
IN AUSTRALIA.

PROJECT PLOWSHARE IS THE USAEC'S PROGRAM TO EXPLORE PEACEFUL  
USES FOR NUCLEAR EXPLOSIVES AND THE AUSTRALIAN REPORT CONCLUDES  
THAT THE TECHNOLOGY DEVELOPED IN THE US PLOWSHARE PROGRAM "COULD  
ASSUME A SIGNIFICANT, IF LIMITED, ROLE IN THE CONSTRUCTION OF  
MAJOR WORKS AND THE EXPLOITATION OF MINERAL RESOURCES IN AUSTRALIA."

THE THREE SCIENTISTS WHO COMPLIED THE AUSTRALIAN REPORT  
ARE : DR. A.R.W. WILSON, HEAD OF THE TECHNICAL POLICY SECTION,  
AUSTRALIAN AEC., MR E.B. PENDER, SENIOR EXECUTIVE ENGINEER.,  
CIVIL ENGINEERING, SNOWY MOUNTAIN HYDROELECTRIC AUTHORITY AND DR.  
E.K. CARTER, SUPERVISING GEOLOGIST, MISCELLANEOUS INVESTIGATIONS,  
GEOLOGICAL BRANCH, BUREAU OF MINERAL RESOURCES.

THEY VISITED THE UNITED STATES TO STUDY PROJECT PLOWSHARE  
AT THE INVITATION OF THE U.S.A.E.C.

COMMENTING ON THE PROJECT THE REPORT STATES THAT "NUCLEAR-  
EXPLOSION PHENOMENA CONSTITUTE A FIELD OF GREAT SCIENTIFIC INTEREST  
AND IT IS IN THE BEST INTERESTS OF THE TECHNOLOGY THAT THE  
SUBJECT BE STUDIED IN SCIENTIFIC DEPTH.

THE PROGRAM HAS MADE GOOD PROGRESS IN PROVIDING THE TYPE OF  
INFORMATION NEEDED TO MAKE NUCLEAR EXPLOSIONS FOR ENGINEERING  
PURPOSES PRACTICABLE IN TERMS OF SAFETY, CONFIDENCE IN RESULTS  
THAT WILL BE OBTAINED, AND ECONOMY."

THE REPORT FORECASTS THAT PROGRESS TOWARD THE DEVELOPMENT OF  
AN EFFECTIVE NUCLEAR TECHNOLOGY "IS LIKELY TO BE MADE SLOWLY  
BUT STEADILY OVER THE NEXT FEW YEARS."

THE SUCCESSFUL APPLICATION OF NUCLEAR EXPLOSION TECHNIQUES  
"COULD MAKE AN IMPORTANT CONTRIBUTION TO THE DEVELOPMENT OF  
PRODUCTIVITY AND THE EXPLOITATION OF NATURAL RESOURCES."

RESTRICTED - CONFIDENTIAL



INWARD CABLEGRAM

MB.

- 2 -

I. 12853.

DISCUSSING THE POSSIBLE APPLICATION TO AUSTRALIA, THE REPORT STATES THAT THE SUBSTANTIAL BASIC COSTS ASSOCIATED WITH NUCLEAR OPERATIONS WILL INEVITABLY RESTRICT NUCLEAR EXCAVATION AND ROCK-BREAKING TECHNIQUES TO LARGE SCALE WORKS.

IT WOULD APPEAR THAT THESE TECHNIQUES "MAY IN DUE COURSE, COMPETE WITH CONVENTIONAL TECHNIQUES" FOR THE EXCAVATION AND ROCKBREAKING COMPONENTS OF PROJECTS TOWARD THE UPPER END OF THE SIZE RANGE OF CURRENT AUSTRALIAN LARGE SCALE DEVELOPMENT WORKS.

"AS A LARGE DRY CONTINENT WITH LITTLE TOPOGRAPHIC RELIEF AND A POORLY INDENTED COAST LINE, AUSTRALIA IS VITALLY CONCERNED WITH PROBLEMS OF WATER CONSERVATION, INTERNAL COMMUNICATIONS AND SHIPPING ACCESS.

THUS, THE SUCCESSFUL DEVELOPMENT OF NUCLEAR ENGINEERING AND MINING TECHNIQUES COULD BE OF ASSISTANCE IN THE COUNTRY'S DEVELOPMENT PARTICULARLY AS THE ECONOMIC EXPLOITATION OF ITS MINERAL RESOURCES IN AN IMPORTANT FACTOR IN ITS ECONOMY."

THE U.S. ATOMIC ENERGY COMMISSION HAS THE PERMISSION OF THE AUSTRALIAN GOVERNMENT TO REPRODUCE THE REPORT AND MAKE IT AVAILABLE THROUGH US GOVERNMENT CHANNELS.

-----  
MIN. I/C A.A.E.C.  
A.A.E.C. (T/T)  
MIN. & DEPT E.A.  
NATIONAL DEVELOPMENT  
P.M.'s DEPT  
P.M.'s

30TH MARCH, 1965.

SEC FAS(1, 2, 3, 4) PACAM AMSP EAMEC E PIO ICR ER

RECEIVED  
DEPT. OF EXTERNAL AFFAIRS  
30 MARCH 1965



919/13/4 ✓  
720/10/10

FLOWSHARE PROGRAMME: PROPOSAL TO DEVELOP A HARBOUR AT GERALDTON WITH NUCLEAR EXPLOSIVES

THE MINISTER

(for information)

....

The attached minute from the Australian Atomic Energy Commission indicates that a Minister in the Western Australian Government, Mr. Wylde, has invited an American firm of civil engineers to visit Australia to advise on the practicability of developing a harbour near Geraldton, W.A., with nuclear explosives. Mr. Palmer, the President, and Mr. Reece, the Managing Director of the U.S. firm of Palmer and Baker, are <sup>with their</sup> expected to arrive in Sydney on 20th March on their way to Western Australia.

2. In April, 1964, the Deputy Premier of Western Australia, Mr. Court, while in the United States, had discussions with Palmer and Baker concerning this question. Following press speculation the Minister for National Development issued a statement to the effect that he knew nothing about the proposals except what had appeared in the press and that "if and when the Western Australian Government approached the Commonwealth in the matter, it will be time for us to consider it". Cabinet later decided that it should take no initiative in the matter but should await an approach, if any, from the Western Australian Government.

3. Should the proposals be proceeded with, there are a number of aspects of External Affairs interest. The Russians in the past have shown some suspicion of Operation Flowshare (the U.S. programme to develop nuclear explosives for peaceful purposes) which they at one time asserted was designed to enable the United States to circumvent the provisions of any future comprehensive test ban by allowing it to test nuclear devices for military purposes under the guise of peaceful applications. While the Russians appear not to have repeated these charges recently and (according to the United States Atomic Energy Commission) have privately shown some understanding of the aims of the Flowshare programme, the political implications of a proposal to carry out in Australia the first demonstration of a peaceful nuclear explosion would require further study.

4. An even more important consideration is that it is probable that a nuclear explosion at Geraldton would not comply with the provisions of the Nuclear Test Ban Treaty. The Treaty prohibits nuclear explosions which cause radio-active debris to be present outside the territorial limits of the

*Mr. Thomson*  
*For information*  
*MS 244*

*Mr. Deig*  
*Mr. Wylde*  
*2313 -*



State under whose jurisdiction and control such explosion is conducted. It seems doubtful whether it would be possible to prevent some fall-out products from being deposited in the atmosphere, or being carried by sea currents, outside Australia's territorial limits. The U.S.A.E.C. has itself recognised that the Test Ban Treaty as it stands imposes limitations on the possible applications of Flowshare.

5. It is presumed that any parliamentary question on this matter, unless placed in the context of Australia's obligations under the Test Ban Treaty, would be dealt with by the Minister for National Development. If any question is asked concerning the proposal in relation to Australia's international obligations under that Treaty, you might consider replying that this aspect would require careful consideration by the Government if and when an approach is made by the Western Australian Government.

(M. R. Booker)  
First Assistant Secretary

UNITED NATIONS BRANCH  
M. J. McKeown:SW.



# EXTERNAL AFFAIRS

FILE NO. 127

FILE NO. 720/10/10

DATE 16th March 1965

SUBJECT


Operation Blowdown - Geraldton

FOR

~~Mr. Borochin~~

The attached minute from the A.E.C. indicated that the West Australian Government is again showing an interest in Blowdown-type works under explosions for the purpose of developing a harbour near Geraldton.

When this matter was raised last year, Cabinet decided that "it should take no initiative in this matter but should await an approach, if any, from the Western Australian Government." I would imagine that this will again be the Commonwealth's position. There is no indication from the attached minute that ~~any approach~~ to the West Australian Government has yet made any approach to the Commonwealth.

  
16/3



EXTERNAL AFFAIRS



FOLIO No.  
126

720/10/10

File No.

10 MAR 1965

NOM. INDEX

SUB. INDEX

*With the Compliments* *PS*

*of the*

*Australian Atomic Energy  
Commission*

M.C. TIMBS

*45 Beach Street, Coogee, N.S.W., Australia*

BOX 41, POST OFFICE, COOGEE, N.S.W.



MINUTE PAPER

720/10/10

**CONFIDENTIAL**

SUBJECT:

NORTH-WEST COAST OF AUSTRALIA - LARGE-SCALE EXPLOSIONS

## File Minute:

On Saturday, 6th March, 1965, I received a telephone call from Mr. F.L. Bett, Atomic Energy Attache in Washington.

2. Mr. Bett said that he had been contacted by Mr. Reece, the Managing Director of Palmer and Baker, a firm of civil engineers who are experts in the use of large-scale explosions - including nuclear explosions - for excavations etc.

3. Mr. Bett said that following the elections in Western Australia, Mr. Wylde, a Minister in the Western Australian Government, had written to Palmer and Baker and invited them to undertake an inspection of the north-west coast of Western Australia with the idea, if practicable, of advising the Western Australian authorities on the feasibility of a Plowshare-type explosion for the purposes of developing a large harbour north of Geraldton.

4. Mr. Reece said that he had consulted the U.S.A.E.C. which had shown a substantial interest. He has not contacted the State Department. He had been assured by the U.S.A.E.C. that difficulties associated with Plowshare experiments (residual radioactivity) were considerably less now than they were 12 months ago. New techniques had been developed which would reduce the radioactivity hazard to minimal proportions.

5. Mr. Reece said that assuming a suitable target could be selected, and assuming the necessary approvals were given, the investigation could proceed to the point where the nuclear explosions could be carried out in three years from the date of the original approval.

6. Mr. Palmer, the President of Palmer and Baker, and Mr. Reece, will be visiting Western Australia to examine the matter. They will be travelling through Sydney on the Pan American Flight which arrives on Saturday, 20th March. They have expressed interest in speaking to officers from the A.A.E.C. I did not show any interest. The visit is an entirely private affair and, in view of the previous publicity, no information whatsoever is being made available to the press in the United States.

7. Mr. Bett wondered whether, in view of the imminent release in the U.S.A. of the Plowshare report (i.e. the report of the Plowshare investigation conducted by Dr. A.R.W. Wilson of the A.A.E.C. and his colleagues of the B.M.R. and S.M.H.E.A.) he might be authorised to give a copy to Palmer and Baker. I authorised him to do this in view of the fact that the U.S. authorities are about to print several hundred copies for wider distribution.

(Sgd.) M. C. Timbs

(M.C. Timbs)  
Executive Member

9th March, 1965.

**CONFIDENTIAL**

Mr. Bett  
D. Wilson  
Mr. Bett



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OUR REFERENCE

YOUR REFERENCE

BOX 41, POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES: ATOMCOM, SYDNEY - TELEPHONE: 665-1221

G.64/1752

24th February, 1965.

DEPARTMENT OF EXTERNAL AFFAIRS  
File No. 26 FEB 1965  
CONFIDENTIAL

Dear Sir,

I refer to your Memorandum 720/10/10 of 11th February, 1965 concerning the possibility of carrying out 'Plowshare' applications under international inspection.

As you point out, the U.S.A.E.C.'s view, as reported in the Atomic Energy Attache's minute of 22nd January, is at variance with that expressed to you by Dr. Wilson before his departure for the U.S.A. to investigate the 'Plowshare' programme.

Dr. Wilson's opinion, which was also that expressed by Sir William Penny in informal discussions, was that international supervision of a 'Plowshare' project would involve inspection of the device mechanism which would not be acceptable to the United States. Dr. Wilson considered that the United States would not agree to inspection of the device, not only because low fission/fusion ratio devices, which are of particular military significance, would be involved but also because the design details of any device would be regarded as of potential value to other nations.

The probable explanation of the inconsistency is that the United States no longer considers that inspection of the device is necessary to ensure that a nuclear test will not contribute to device development.

Device testing being primarily of military significance was not a subject which the U.S.A.E.C. was willing to discuss in detail with the 'Plowshare' mission. However, one can speculate that the parameters of particular importance in the development of nuclear weapons are:-

- (a) total energy release and rate of energy release, both of which can, for approximate purposes, be considered as reflected by the equivalent yield. Equivalent yield can be estimated from measurements of the shock parameters associated with an underground explosion (contained or cratering); and

The Secretary,  
Department of External Affairs,  
CANBERRA, A.C.T.

*Mr. [unclear]*  
*Dr. Thomson*  
*This is very interesting development*

*Mr. [unclear]*  
*2/3*  
*Mr. [unclear]*  
*Reson*

CONFIDENTIAL

*[Signature]*  
3/2



## CONFIDENTIAL

- (b) nuclear material utilization, which can be estimated from chemical and physical analyses of gas and solid samples recovered from around the shot point of a contained explosion as soon as practicable after detonation.

By checking that no equipment was installed to allow these measurements, one would block the most effective utilization of underground explosions for weapons development. Some estimates of yield and of fuel utilization could probably be made by measuring cavity or crater size and by examining samples recovered from the cavity at a much later date or escaping from a cratering explosion, but these would be fairly gross and would probably not be of significance at the present stage of nuclear weapons development.

If little information useful to device development could be recovered from a nuclear test, the design of the device used to obtain the required yield would probably not be of any substantial concern to the inspecting teams. It may be, therefore, that it is the stage of development which has been reached in device technology which makes the United States feel that a knowledge of the actual device design involved is no longer of great significance.

This would represent a change in United States thinking, since when the subject was discussed by Dr. Wilson with Dr. Garry Higgins (Director, 'Plowshare' Division, Lawrence Radiation Laboratory), Dr. Higgins thought that the best prospects for international control of 'Plowshare' tests lay in the provision of a stockpile of devices for 'Plowshare' projects to be held as "sealed black boxes" under international control until their design was eventually overtaken by further developments in weapons technology.

The Commission is endeavouring to make arrangements for Dr. Wilson to discuss this subject further with the U.S.A.E.C. in the course of his forthcoming overseas visit.

Yours faithfully,

*M. C. Timbs per above*

(M. C. Timbs)  
Executive Member

CONFIDENTIAL



Dr. Thomson  
File 720/10/10

FOLIO N.  
124

## The Plowshare Program—Developing Peaceful Uses of Nuclear Explosives

Statement by Glenn T. Seaborg  
Chairman, U.S. Atomic Energy Commission<sup>1</sup>

Mr. Chairman, I appreciate the opportunity to appear before the Joint Committee to discuss our program, called Plowshare, for the development of peaceful uses of nuclear explosives. I will give you some general information on the recent progress and future plans for the program. I have with me Mr. John S. Kelly, the Director of our Division of Peaceful Nuclear Explosives, who will provide you with more detailed information.

Generally, the potential peaceful applications of nuclear explosives can be divided into three classes or types of applications. One we call the scientific application. The nuclear explosive has several unique characteristics which can make possible some kinds of research investigations not possible by other means. The second type of application is in an area that might be called underground engineering. Here, nuclear explosives can be detonated deep underground to shatter rock to facilitate mining of ores and recovery of oil, stimulate flow of gas, or produce underground permeable zones for storage or waste disposal. The third type of application is the potential use of nuclear explosives in excavation for large engineering projects.

We have made substantial progress in each of these areas during 1964. Specifically, we conducted seven major Plowshare experiments in 1964, including at least one in each type of application.

<sup>1</sup> Made before the Joint Committee on Atomic Energy on Jan. 5.

Most of our effort in this field is directed toward designing a nuclear explosive which will produce new isotopes of the very heavy elements and possibly even new elements. There are 92 elements which exist in nature, ranging from the lightest, hydrogen with atomic number 1, to the heaviest, uranium with atomic number 92. In addition to these, man has produced 11 "transuranium elements," that is, elements which are heavier than uranium. These may be produced in a specially designed nuclear explosion where a target material such as uranium is bombarded with neutrons.

Two of 11 transuranium elements, einsteinium and fermium, in fact, were first produced and found in the debris from the Mike thermonuclear explosion in 1952. Since then, several experiments have been conducted underground at the Nevada Test Site to develop an improved, lower yield device to produce these very heavy elements.

The goal is to design a device in which a very large number of neutrons from the nuclear explosion bombard a target material such as uranium. Some of the atoms of the target material undergo multiple neutron capture and thus are built up to heavier elements.

In October 1964 the Lawrence Radiation Laboratory, Livermore, California, conducted one of the latest experiments in this work. This experiment was called Par. The attached chart<sup>2</sup> summarizes these results. The Par experiment shows that with the approximately

<sup>2</sup> Not printed here.



30-kiloton yield of the Par event, the neutron intensity of the 15-megaton Mike shot was exceeded by about fourfold. It would require several tens of years of operation of the world's best reactor to equal the integrated neutron flux obtained from the Par explosion.

In terms of producing isotopes of transuranium elements, the results of Par are very exciting. The analyses, to date, of the Par debris have shown that isotopes as heavy as fermium 257 were produced. More detailed analyses of larger samples of the debris are underway, and there is some evidence that isotopes of mass number 259 may be found. Isotopes of mass number 259 would be the heaviest yet produced by man by any means.

In October 1964 the Los Alamos Scientific Laboratory conducted an experiment similar to Par in conjunction with the Barbel test in the weapons program. The results from the Barbel experiment nearly match those from Par.

It now seems clear that nuclear explosives can be used to produce new isotopes and even new elements. A modest improvement in neutron flux, accompanied by the use of a heavier target material, such as one of the transuranium elements, plutonium, curium, or californium, could lead to the creation of isotopes with mass numbers greater than 270 and atomic numbers greater than 103, which would mean the discovery of new elements.

We expect to continue investigation of the scientific application at a modest but steady level. At least one such experiment will be conducted in 1965.

#### **Underground Engineering**

Prior to 1964 we had experience with fully contained underground nuclear detonations in tuff, alluvium, salt, and granite. The Handcar event of November 1964 provided important data on the effects of such detonations in dolomite. The Handcar data are particularly valuable since many underground resources are associated with carbonate formations.

We believe that we now have enough data on underground engineering to warrant undertaking a demonstration project in cooperation with industry. We have had numerous discussions

with several companies about possible joint projects. Our next step in this area will probably be guided by these interests.

#### **Excavation Application**

There are two facets to the development of nuclear excavation technology. One, of course, is the development of the cratering technology; the other is the development of clean devices and other techniques to reduce the amount of radioactive materials reaching the atmosphere from cratering detonations.

During 1964 five experiments were conducted in the excavation program. One was a high-explosive row-charge cratering experiment in basalt. More recently, the Sulky experiment was executed. We conducted three events, Klickitat, Ace, and Dub, in the clean-device and debris-entrapment program. The results of these are very promising. The amount of radioactive material reaching the atmosphere from a cratering detonation employing these techniques would be at least a factor of a hundred or more less than would have been possible prior to 1964. We have been concentrating on the development of clean nuclear explosives and on techniques for keeping debris underground.

About six or seven additional device-development tests are required to refine the device technology pioneered by the 1964 tests. Four basic cratering experiments and an intermediate-size demonstration project are required to refine the cratering technology sufficiently to permit undertaking large, useful projects. Two of the four basic tests would be row-charge experiments. For the demonstration project, we are investigating, in cooperation with the Atchison, Topeka and Santa Fe Railroad, the Bureau of Public Roads, and the California Highway Department, the feasibility of a project called Carryall. This is a 2-mile cut through the Bristol Mountains in California about 200 miles east of Los Angeles. Carryall, if conducted, would provide a cut to be used by the railroad for relocation of its main line and for a segment of new Interstate 40 (Route 66).

Despite the progress in the development of clean cratering techniques, every nuclear cratering detonation will release some radioactive



material to the atmosphere. Therefore, the present test ban treaty,<sup>3</sup> which bans underground nuclear detonations that cause radioactive debris to be present beyond the territorial limits of the country conducting such an explosion, imposes some restrictions on nuclear excavation. It appears, therefore, that large nuclear excavation projects, particularly those near territorial boundaries, such as a new sea-level, transisthmian canal, would require an agreement with other parties to the treaty.

On the other hand, as I, and other members of the administration, testified before the Senate Foreign Relations Committee on behalf of the treaty, there are some cratering experiments necessary to develop excavation technology which can be conducted without violating the treaty.

As the allowable experiments proceed, as present technical uncertainties are resolved, and as even cleaner explosives become available, we believe it will be possible to conduct, under the treaty, additional cratering experiments which will advance excavation technology. In addition, through carrying out such experiments as can be done within the limitations of the treaty and allowing international observation of the principal ones, as we did with Project Gnome, we believe that other nations may be able to observe for themselves the practicability, safety, and feasibility of using nuclear explosives for large excavation projects.

Our opinion that there is international interest in Plowshare was strengthened by the discussions on Plowshare and international cooperation in Plowshare which occurred in Geneva during the Third International Conference on Atoms for Peace.<sup>4</sup>

We probably should begin to give serious consideration to some form of international cooperation in Plowshare. This could either be in connection with the IAEA [International Atomic Energy Agency] or other appropriate international groups.

<sup>3</sup> For text, see BULLETIN of Aug. 12, 1963, p. 239; for a statement made by Secretary Rusk before the Senate Committee on Foreign Relations on Aug. 12, 1963, see *ibid.*, Sept. 2, 1963, p. 350.

<sup>4</sup> For a statement made by Dr. Seaborg at Geneva on Aug. 29, 1964, see *ibid.*, Sept. 21, 1964, p. 408.

## INTERNATIONAL ORGANIZATIONS AND CONFERENCES

### U.N. Asks All States To Refrain From Intervention in Congo

*Following are texts of statements made in the Security Council by U.S. Representative Adlai E. Stevenson on December 30 and a resolution adopted by the Council on that day.*

#### STATEMENTS BY AMBASSADOR STEVENSON

U.S./U.N. press release 4487

First let me also express the thanks of my delegation to our colleagues, Ambassador [Arsène Assouan] Usher of the Ivory Coast and Ambassador [Dey Ould] Sidi Baba of Morocco, for their indefatigable, patient, and resourceful work in bringing this long debate to a conclusion by a resolution that I believe expresses in general the anxiety of all of the members of the Security Council to see law and order restored to an independent and stable Congo.

Mr. President, the United States believes that the resolution which we have just adopted is a positive and constructive step toward the establishment of a better climate in the Congo, which in turn will facilitate an eventual solution, and that it is also a step toward improved relations between the Democratic Republic of the Congo and its neighbors. The resolution is consistent with past resolutions on the Congo in that it explicitly reaffirms the sovereignty and the territorial integrity of the Congo. It is also consistent with the OAU [Organization of African Unity] resolution of September 10, 1964.<sup>1</sup>

Perhaps the most important provision, as the distinguished representative of France has pointed out, is operative paragraph 1, which requests all states to refrain or desist from interfering in the internal affairs of the Congo. It is

<sup>1</sup> The operative sections of this resolution are contained in U.N. doc. S/6076 dated Dec. 1.



H/S  
12/3



CONFIDENTIAL

720/10/10

11th February, 1965.

A/S to McKeown (W.W.) on 12/3  
 W.T. Doig

The General Manager,  
 Australian Atomic Energy Commission,  
 "Cliffbrook",  
 45 Beach Street,  
 COOGEE. N.S.W.

"PLOWSHARE" PROGRAMME

Thank you for your memorandum G.64/1752 dated 4th February, 1965, forwarding a copy of a report by the Atomic Energy Attache in Washington concerning the "Plowshare" programme. We were particularly interested in the reported view of the U.S.A.E.C. Division of Peaceful Explosives that there would be no great difficulty in obtaining an exemption from the Nuclear Test Ban Treaty to cover "explosives involved in practical applications" and that, in this event, no problems would arise in permitting access of international inspection teams which would check, inter alia, that no new nuclear weapon technology was involved.

2. It has been our understanding that one of the difficulties in permitting international inspection of "Plowshare" operations was likely to be that the nuclear devices employed in such a programme would also have military significance. This question was discussed at a meeting in this Department in August, 1963, with the Australian team which was then about to visit the United States to inspect work on "Operation Plowshare". At that time Dr. Wilson, if we understood him correctly, said that the development of devices which would reduce the amount of radioactive fission products was of significance for weapons development as well as for peaceful applications. For this reason he thought that the United States would wish to use its more sophisticated devices for Plowshare operations and, for security reasons, it would scarcely wish these to be subject to international inspection. As we understand it, this posed something of a dilemma, since, if the United States were not prepared to agree to international (presumably including Russian) inspection of peaceful nuclear devices, the Soviet Bloc might suspect that the programme was designed as a cover for continuing atmospheric nuclear tests for military purposes.

3. We would be grateful for your comments on this question, particularly in the light of the Australian team's inspection of "Plowshare" operations in the United States.

(W.T. Doig)  
 Acting Assistant Secretary.

CONFIDENTIAL



# EXTERNAL AFFAIRS

U No.  
122

FILE No. 720/10/10

DATE 9th February

SUBJECT

'Plowshare' Programme

FOR Dr. Thomsen  
(Mr. Grew)

Two points of interest emerge from the memorandum of the Atomic Energy Council in Washington:

(i) In para three he states that no difficulty would arise in permitting international inspection teams to check that no nuclear weapon technology was involved in a Plowshare shot. This is a variance with opinion expressed by Dr. Wilson (AAEC) - see para 10 of record of convention of 21/8/63 (tagged). Since the US is still ~~perfecting its Plowshare~~ ~~the~~ attempting to reduce release of radioactivity it will presumably wish to use its most up to date devices, ~~which~~ <sup>which</sup> will presumably also be of weapons significance. ~~It is~~ It is difficult to see how the U.S. could allow international inspection of such devices.

(ii) An amendment to Test Ban Treaty which would also allow tests which do not release



# EXTERNAL AFFAIRS

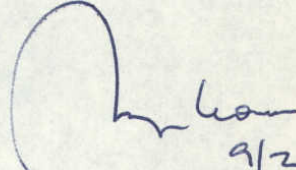
FILE No. ....

DATE .....

SUBJECT

FOR .....

More than "a given fraction of the  
international tolerance level for radiation" as  
~~needed~~ ~~required~~ by the US AEC would  
seem to be a backward step. It  
would presumably allow many countries to  
<sup>or commence</sup> resume atmospheric testing.

  
9/2



# Australian Atomic Energy Commission

Cliffbrook, 45 Beach Street, Coogee, N.S.W.

FOLIO No.  
121



OUR REFERENCE

YOUR REFERENCE

BOX 41, POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES: ATOMCOM, SYDNEY — TELEPHONE: 665-1221

G.64/1752

4th February, 1965

DEPARTMENT OF EXTERNAL AFFAIRS  
720/110/110  
5 FEB 1965  
File No.  
NOM. IND. [initials] SUB. INDEX [initials]

Dear Sir,

The Atomic Energy Attache in Washington recently forwarded to this office a copy of a memorandum on nuclear explosions which he had prepared for the Ambassador. The opinions expressed in the memorandum relate to both the Nuclear Weapons Test Ban Treaty and the prospects for the continuation of the 'Plowshare' programme.

I am therefore forwarding a copy of the memorandum for your information in case you have not received one through other channels.

Yours faithfully,

*M. C. Timbs per [initials]*

(M. C. Timbs)  
Executive Member

.. Encl.

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

*Dr. Stanger*  
*the [unclear] known to us [unclear]*



AE2.3730/65



cc. H.O.  
22nd January 1965

FOR H.E. THE AMBASSADOR Sir,

Recent newspaper reports have indicated that the U.S. Government may use the release of fission products from a large Russian underground nuclear explosion as an occasion to confront the Russians with the dangers of underground testing and the necessity of a complete ban on nuclear testing.

In discussions with U.S.A.E.C. Division of Peaceful Nuclear Explosives, I explored the expected future of these "Plowshare" explosions in the event of such a ban and in the light of U.S.A.E.C. Chairman Seaborg's statement that he would seek an exemption from such a ban for Plowshare explosions.

No great difficulty was seen in obtaining an exemption for explosions involved in practical applications e.g. canal excavations or explosions designed to assist further understanding of technology. In these cases, no problems would arise in permitting access of international inspection teams which would check a) on the safety of the explosion from the point of view of, say, ground shock damage, or release of radioactivity, and b) that no new nuclear weapon technology development was involved.

In the case of tests designed to improve device technology - e.g. the production of higher specific energy output, or lower unit radioactivity release, then it was admitted that the implementation of effective safeguards would be a much more difficult if not impossible matter. The current U.S. position of device development for Plowshare purposes is that a further 6 to 7 tests are thought to be required to develop and prove a device which will give a 100-fold reduction in radioactivity release from the original reference point of the Project Sedan crater. In the event that an underground test ban is implemented and device development tests not excluded before the 6 to 7 tests have been completed, Plowshare will then use the best available device, with technology based on this device.

Two personal opinions uttered were:

1. that the U.S. Government is rather unlikely to use the particular incident referred to as a basis for a campaign for a complete nuclear test ban - rather as an instance of its ultimate desirability.
2. that the U.S. Government, in not pressing the matter too energetically, is tacitly recognising the significance of the rather low amount or level of radioactivity detected in Japan.

It has always been a contention of U.S.A.E.C. Plowshare division that the use of the term "detectable radiation" released over a national boundary is unreal as, in order to be measurably harmful, radiation must attain a certain level and this is considerably above "detectable". This

/2..



modification of the "detectable radiation" term to say "a given fraction of the international tolerance level for radiation" has been one of the moves suggested for possible accommodations to the present limited Nuclear Test Ban Treaty which might be sought in the event that a sea level canal were to be constructed by nuclear explosives.

Respectfully submitted,

ORIGINAL SIGNED BY  
ATOMIC ENERGY ATTACHE

Frank L. Bett.  
Atomic Energy Attache.

FLB:yw



EXTERNAL AFFAIRS

FOLIO No. 120

FILE No. 720/10/10

DATE

SUBJECT

Operation Flowchart

FOR Mr Chapman

I have discussed the attached cable with Mr. [unclear]. The rather wonder why the USAEC wishes to circulate our report. Is it to convince the world - with our "independent assessment" - that flowchart exercises are not merely a way round Test Ban Treaties? If so, we would not wish to be dragged in. Or perhaps it is merely to show - by independent assessment - the merit of the system + thereby get the necessary funds from Congress etc.

There is probably nothing sinister about it +, anyway, it is really up to the AARC.

might I remind Thomas of the telegram + tell him we have no objection? In doing so, I might, in passing, mention our query.

Mr Edges  
I have no  
objection

L2T 28/1 (1)

Mr Johnson

Thomas (AARC) says the main reason the US want to publish the report is that it is by far the best + most comprehensive report on the subject. However, AARC will appropriately edit it to unclassified etc. before giving the USAEC the O.K.

Shreef 27/1

(2)

File + P.A.

NE 28/1



DEPARTMENT OF EXTERNAL AFFAIRS  
**INWARD CABLEGRAM**

*Mr. Evans.*  
*Pls bring to me*  
*McKinnis*  
*atkinson*

FOLIO No.  
119

LOM

I.2848

FROM:

DATED : 22ND JANUARY, 1965  
2122

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D : 23RD JANUARY, 1965  
1628.

182. RESTRICTED.

FOR EXECUTIVE MEMBER A.A.E.C. FROM BEMT.

U.S.A.E.C. TODAY REQUESTED INFORMATION AS TO WHEN IT MAY PUBLISH THE WILSON TEAM PLOWSHARE REPORT AS A TECHNICAL DOCUMENT, IN ORDER TO SECURE WIDER DISTRIBUTION.

PRIMARY AIM IS TO USE REPORT AS EXAMPLE OF INDEPENDENT EXPERT ASSESSMENT.

I ADVISED REPORT STILL UNDER STUDY.

VERY GRATEFUL INDICATION WHEN AND TO WHAT EXTENT REPORT MAY BE GIVEN INCREASED DISTRIBUTION BY U.S.A.E.C.

MIN. I/C. A.A.E.C. (T/T)  
A.A.E.C.  
MIN. & DEPT E.A.  
P.M.'S DEPT  
P.M.'S

23RD JANUARY, 1965

SEC FAS(1,2,3,4) DL PACAM ER



U.N. Political  
File 720/10/10

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

FOLIO No.  
178

Name of Paper NEW YORK TIMES.

File No. ....

Published at PARIS.

Date 7/1/65

# U.S. and Soviet Holding Quiet Disarmament Talks

## Foster and Tsarapkin Exploring Ideas to Prepare Possible Agreements Before Geneva Parley Reopens

By JOHN W. FINNEY

Special to The New York Times.

WASHINGTON, Jan. 6 — American and Soviet disarmament experts have been holding private conversations over the last two days in an effort to find possible areas of agreement before the disarmament conference reconvenes.

The exploratory talks between William C. Foster, director of the United States Arms Control and Disarmament Agency, and Semyon K. Tsarapkin, Soviet representative to the 17-nation disarmament conference in Geneva, are a continuation of discussions started last month by Secretary of State Dean Rusk and Foreign Minister Andrei A. Gromyko.

Sources said that in the new discussions the United States has urged the Soviet Union to follow the American example

by voluntarily placing one of its atomic power stations under inspection by the International Atomic Energy Agency.

Thus far, the Soviet officials have limited themselves to re-statement of past Soviet disarmament proposals and given no indication that they are willing to modify the terms to make them acceptable to the United States. Similarly, the United States has been standing pat on its past proposals.

If there has been any change in the Soviet position in the new round of talks being held at the State Department, it has been in the priority emphasis being given to its past proposal that the two sides agree to a

10 to 15 per cent reduction in their defense budgets.

The suggestion has drawn a negative response from the United States. American officials have pointed out that it is possible that changing military requirements may permit independent reduction of the defense budgets, such as happened recently, with the Soviet Union reducing its 1965 budget by \$555 million and the United States cutting back its budget by about \$1 billion in the past two years.

But American officials have emphasized that in the present world situation, where commitments such as South Vietnam may arise, the United States cannot commit itself to an international agreement for reducing defense budgets. Furthermore, the legal point has been made that under the Constitution it is the Congress that ultimately decides the size of the defense budget.

In a related development yesterday, Dr. Glenn T. Seaborg, chairman of the Atomic Energy Commission, told Congress that the United States should begin now to consider international cooperation on the peaceful uses of nuclear explosives.

This in turn may lead to modification of the nuclear test ban treaty, which would have to precede the use of nuclear devices to dig a sea-level version of the Panama Canal, A.E.C. officials said.

The treaty, signed by 106 nations in 1963, prohibits testing in the atmosphere or in

space. It also prohibits underground tests that would produce radioactive debris beyond the boundaries of the country exploding the device.

This would severely limit the use of nuclear devices in Panama or other small Central-American countries.

Dr. Seaborg and others appeared before the Joint Congressional Committee on Atomic Energy to report "very promising" progress in the nine-year old Plowshare program for developing peaceful uses of nuclear explosives.

Noting that the Soviet Union now appears to be showing genuine interest in this field, the officials indicated the time might be ripe to begin efforts toward international cooperation.

### Soviet Interest Noted

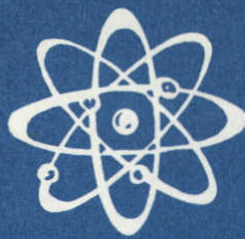
Prior to the third international conference on Atoms for Peace at Geneva last August, the Soviet had opposed Plowshare tests, calling them a subterfuge for weapons testing.

Russia expressed no opposition at that meeting, however.

"Our opinion," said Dr. Seaborg, "that there is international interest in Plowshare was strengthened by the discussions on Plowshare and international cooperation in Plowshare which occurred in Geneva during the third international conference on Atoms for Peace.

"We probably should begin to give serious consideration to some kind of international cooperation in Plowshare. This could either be in connection with the I.A.E.A. or other appropriate international groups."



FOLIO No.  
117No. G-297  
Tel. 973-3335 or  
973-3446

December 21, 1964

**NOTE TO EDITORS AND CORRESPONDENTS:**

Following is the text of an announcement dictated to the wire services at 5:30 p.m. EST, Saturday, December 19, 1964:

"The Atomic Energy Commission announced today that it conducted a low yield nuclear detonation at its Nevada Test Site on December 18, 1964. This detonation was part of the Commission's Plowshare Program to develop peaceful uses for nuclear explosives.

"The nuclear explosive had a yield of about one tenth of a kiloton (equivalent to 100 tons of TNT) and was buried at a depth of about 90 feet. The nuclear explosive was detonated at a greater depth in relation to yield than earlier experiments in the plowshare excavation program. The purpose was to determine the effects of this greater relative depth of burial. The experiment produced a mound of broken rock with a shallow depression in the center. Data significant to the nuclear excavation program were obtained."

*This is a new low yield*

#

12/21/64

*Mr. Lovelady*  
*Mr. DeKoven*  
*D. Thompson*

→ *File 720/10710*



R.L. Harry, Esq.

*Mr. Becher*

*Mr. Keown*



UN Branch 19/10

Dr. Thompson

FOLIO No.  
116

*With the Compliments*

*of the*

*Australian Atomic Energy  
Commission*

(M.C. Timbs)

*Mr. Upton:*

Watch, please. Inform *Mr. Upton*

*45 Beach Street, Coogee, N.S.W., Australia*

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File 720/10/10

c.c. Mr. Tiabs  
H.O.

AE2.2903/64

7th October 1964

FOR H.E. THE AMBASSADOR

Sir,

I refer to your conversation with Dr. H.K. Warner of the A.A.E.C. on Tuesday morning, 6th October, and to the remarks made indicating that the U.S.A.E.A. was confident of obtaining accommodation to the Limited Nuclear Test Ban Treaty to permit "Flowshare" explosions.

This point was confirmed later in the day during discussions with Mr. John Kelly, Director of Division of Peaceful Nuclear Explosives, U.S.A.E.C., who recounted that in Geneva, he had spoken to reliable senior representatives of most foreign countries, including those behind the Iron Curtain, and had gained the clear impression that in no case were the limitations of the Test Ban Treaty considered an obstacle to the progress or application of Flowshare - in fact, were a suitable project to be mooted and the necessary safety assured, it was felt that the necessary accommodations to the Test Ban Treaty could be negotiated.

Assuming that Mr. Kelly is correct, this would appear to have some interest to Australia in relation to possible harbour construction projects, and I have therefore informed the General Manager of the A.A.E.C.

Respectfully submitted,

Frank L. Bett.  
Atomic Energy Attache

FLB:yw



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FOLIO No.  
115

# East sounds out U.S. on atom link-up

from GODFREY HODGSON: Washington, Sept. 13

BOTH Russia and Rumania have gone out of their way to hint to the United States Government that they would like eventually to join in Project Plowshare, the American programme of experiments aimed at finding peaceful uses for nuclear explosions.

The Americans were taken completely by surprise by first feelers put out during the United Nations Atoms for Peace conference, which ended in Geneva last Wednesday. They are now cautiously preparing to find out what the Russians and Rumanians have in mind.

No announcement has been made, and the Communist initiative is not widely known even inside the U.S. Government. But I understand that Mr Glenn Seaborg, head of the American Atomic Energy Commission, expects to be sounded out by his Russian opposite number during next week's conference of the International Atomic Energy Agency in Vienna, and that he has been told by the White House to find out what the Russians and Rumanians have in mind.

Officials here also expect further feelers to be put out by Russian scientists at the Pugwash Conference in Prague in the near future.

## Setback

The Plowshare programme—"And they shall beat their swords into plowshares and their spears into reaping hooks"—is to study the possibility of using nuclear explosions for two main purposes: for excavating canals, harbours or railway cuttings for example, and for extracting oil, shale and other minerals from below ground.

In the past, Russian propaganda has always dismissed the programme as a sinister cover for weapons testing.

The Rumanians, who are known to have shown interest in buying nuclear reactors either from America or Britain, in spite of their abundance of other sources of energy, made the first move at Geneva. There has been speculation here whether Rumanian initiative could have been the reason for the Russians to follow suit. Relations between the two countries have been cool since Rumania has claimed greater economic independence and held talks with Washington.

The sudden Russian interest in Plowshare is thought here to be unconnected with the defection of the senior Russian scientist, Doctor Heinz Barwich, who is known to have worked on peaceful uses of nuclear energy. He is now in the U.S., presumably being debriefed by American Intelligence. Scientists here would be surprised if he can tell the Americans much that they do not know already, as Russian nuclear weapons work is kept secret even from the most senior non-military physicists.



File 720/10/10

# SECOND TRANSISTHMIAN CANAL

FOLIO No.  
114

Extract from :

## HEARINGS BEFORE THE COMMITTEE ON COMMERCE UNITED STATES SENATE EIGHTY-EIGHTH CONGRESS SECOND SESSION

ON

S. 2428

A BILL TO AUTHORIZE A STUDY OF MEANS OF INCREASING THE CAPACITY AND SECURITY OF THE PANAMA CANAL, AND FOR OTHER PURPOSES; AND

S. 2497

A BILL TO PROVIDE FOR AN INVESTIGATION AND STUDY TO DETERMINE A SITE FOR THE CONSTRUCTION OF A SEA LEVEL INTEROCEANIC CANAL THROUGH THE AMERICAN ISTHMUS

MARCH 3 AND 4, 1964

Serial 44

Printed for the use of the Senate Committee on Commerce



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## SECOND TRANSISTHMIAN CANAL

WEDNESDAY, MARCH 4, 1964

U.S. SENATE,  
COMMITTEE ON COMMERCE,  
*Washington, D.C.*

The committee met at 10 a.m., in room 5110, New Senate Office Building, Hon. Warren G. Magnuson presiding.

The CHAIRMAN. The committee will come to order.

Dr. Seaborg, we heard testimony yesterday on proposed legislation pertaining to a study of a second sea level canal. We heard from Mr. Mann of the State Department and from the Defense Department. They covered many of the items in some detail that may necessarily overlap a little with your testimony.

There has been a great deal of discussion about the possibility of using nuclear power if and when we should decide, and where, to build a sea level canal. This discussion is dictated not necessarily by any political trouble we may have but by the economic situation, and the growth of transportation. By any reasonable projection in the next 10 or 15 years, the present canal will be inadequate.

This is not a particularly new proposal in the Congress. We have been discussing similar proposals for many, many years.

In view of that, we would be glad to hear what you, as Chairman of the Atomic Energy Commission, have to say regarding the situation.

You have a prepared statement. It is very short and to the point. We would be glad to hear from you.

**STATEMENT OF DR. GLENN T. SEABORG, CHAIRMAN, U.S. ATOMIC ENERGY COMMISSION; ACCOMPANIED BY J. S. KELLY, DIRECTOR, DIVISION OF PEACEFUL NUCLEAR EXPLOSIVES, U.S. ATOMIC ENERGY COMMISSION; AND JOHN G. PALFREY, COMMISSIONER, AND JAMES T. RAMEY, COMMISSIONER**

Dr. SEABORG. Mr. Chairman, we appreciate the opportunity to appear before your committee in this capacity. As you know, the Atomic Energy Commission has been interested for some time in the possible application of nuclear explosives to projects of the kind that are under investigation here today.

I am pleased to appear before you, therefore, to testify on proposed legislation, S. 2497, or similar legislation which provides for an interagency study of the most suitable site and means of construction for a sea level canal across the American Isthmus. If this legislation were adopted, the Atomic Energy Commission would participate by supplying information on the safe use and methods of construction using nuclear explosives.



I will give you some general background on the Plowshare program and its relation to this bill. I have with me Mr. John S. Kelly, the Director of our Division of Peaceful Nuclear Explosives, and Commissioner John Palfrey, and Commissioner James Ramey, who has just come in.

Mr. Kelly will provide you with more detailed information on the concept and technical status of the nuclear excavation application within our Plowshare program, particularly as it might be applied to a major canal project.

We believe that a study along the lines of the bill would provide a valuable review and updating of information developed for the Panama Canal Company during 1959 and 1960 on this important subject. However, based upon that prior examination of the matter, it would appear to us that longer and broader studies and field surveys would be necessary before any final decisions were reached.

At this point I believe it would be helpful, in order to provide a frame of reference, to explain that excavation is only one of a number of possible peaceful applications for nuclear explosives.

Basically, we are examining two broad categories of application in our Plowshare program. In the field of industrial application, it appears that nuclear explosives can be used in mining, in oil and gas production, and in water resource development, as well as excavation.

Many of the potential projects of this type would be either too costly or infeasible unless the tremendous and relatively inexpensive energy available from nuclear explosives can be used.

Secondly, we are using nuclear explosives to conduct scientific research. An underground nuclear explosion provides, in effect, a new and unique laboratory in which scientific experiments can be carried out.

Also, our Plowshare program involves the development of nuclear explosives with special characteristics for use in these various applications. In excavation, for example, we want to have explosives which produce the least possible amount of radioactivity.

Since 1957, when we began the Plowshare program, and with it consideration of using nuclear explosives for excavation, we have received well over a hundred suggestions for projects requiring large-scale earthmoving. A number of these projects are in the United States and many more, even larger undertakings, were suggested in about 20 nations on 5 continents.

Although only a few of these suggestions were accompanied by sufficient information to permit the development of feasibility and cost estimates, it does appear, in those cases where information was available, that cost savings over conventional excavation methods could range from 50 to 90 percent.

Thus, it is our belief that a fully developed technology of nuclear excavation would be of wide usefulness in this country and abroad. Since it is our statutory responsibility to conduct research and development so that atomic energy will make the maximum contribution to the general welfare, the Atomic Energy Commission has pursued the acquisition and study of additional information on nuclear excavation.

Along this line, we have conducted over 100 experiments with chemical explosives and some with nuclear explosives. We have also obtained cratering data from a number of weapons effects tests. The



results of these experiments indicate that nuclear excavation has a very promising future.

In 1962, we developed a program of several large-scale cratering experiments to obtain additional data. In terms of technical capability, apart from test ban treaty and other considerations which I will discuss later, we believe it would take about 5 years from the time we begin the conduct of these experiments until cratering technology is developed to the point where very large practical projects can be undertaken. Concurrently, we would carry out additional safety studies in connection with these experiments.

In addition, we will continue to develop the nuclear explosives needed to carry out such a project. It would also be necessary to establish a capability to produce the specially designed explosives needed for a project of the magnitude of a sea level transisthmian canal. However, this capability can be established in an appropriate time phase with our explosive development program so that this capability could exist in 5 years. Thus, we feel that if a decision were made to use nuclear explosives in constructing such a canal, all the prerequisite work could be accomplished in 5 years.

As I have said, the Commission is currently pursuing much of this work because of its basic statutory responsibility to develop beneficial uses for atomic energy.

This means that it would not be possible to initiate nuclear excavation of such a canal for 5 or 6 years. In the meantime, however, we believe sufficient information exists to be able to undertake the studies provided for in S. 2497.

Since the time we conducted our first large-scale cratering experiment, Project Sedan, in July 1962, this Government joined with over 100 other governments in a treaty banning nuclear weapon tests in the atmosphere, outer space and underwater and banning any other nuclear explosion which causes radioactive debris to be present beyond the territorial limits of the country undertaking such an explosion.

As I said in my testimony before the Senate Foreign Relations Committee during the hearing on the treaty:

A new transisthmian canal \* \* \* probably could not be done under the present treaty limitations because of the short distance to territorial boundaries.

Explosions used in such a project would, under present technology, cause very small, but measurable, amounts of radioactive debris to be present beyond the territorial limits of the country in which the construction was undertaken.

It appears, therefore, that nuclear excavation projects of the magnitude of a sea level canal would require an agreement with the other parties to the treaty.

On the other hand, as I, and other members of the administration, testified before the Senate Foreign Relations Committee on behalf of the treaty, we believe that at least some of the cratering experiments necessary to develop excavation technology can be conducted without violating the treaty.

At the present time, there are both technical and legal uncertainties regarding the type of experiments and projects which might be possible under the Treaty. Therefore, in order to make the maximum possible progress and to resolve the technical uncertainties, we have carefully reassessed our program of large-scale experiments and have



decided for the time being to concentrate on the development of nuclear explosives which produce even less radioactive debris, on small-scale excavation experiments, and on fully contained experiments for scientific and other engineering purposes.

As the allowable experiments proceed, as present technical uncertainties are resolved, and as even cleaner explosives become available, we hope it will be possible to conduct, under the treaty, cratering experiments which will advance excavation technology further.

In addition, through carrying out such experiments as can be done within the limitations of the Treaty and allowing international observation of them, as we did with Project Gnome, we believe that other nations may be able to observe for themselves the practicability, safety, and feasibility of using nuclear explosives for the peaceful purpose of large-scale excavation.

Other countries would also be able to assure themselves that nuclear excavation does not provide us an opportunity to obtain weapons information that cannot already be obtained by underground weapons tests.

While fully supporting the objectives of S. 2497, from the standpoint of our interest, the Commission believes it would be preferable to vest in the President the authority to conduct the study in question.

We think that vesting authority in the President would facilitate the proposed study which should draw upon all available resources and data. In regard to the 6-month time limit on the proposed study, we doubt that this period would afford an adequate opportunity to complete a thorough study of this complex problem.

We believe these studies would not only provide information of use in determining the site and method of construction for a new canal, but would also help us assess our nuclear excavation program and the benefits it holds for mankind in both larger and smaller projects in the future.

The CHAIRMAN. Thank you, Doctor.

The committee heard testimony yesterday, that the 6 months' limitation contained in S. 2497 might not be satisfactory for several reasons. But, on the other hand—because we have been discussing this for many, many years up here—the possibility of a second canal—we do not wish to see too long a delay.

Too often when you don't establish a time limit, to at least make a report to the Congress and to the President, sometimes there is a tendency to delay it too long.

I do think, though, that we are all in agreement with your statement that it would take a little more time for experiments before you could decide whether you could employ nuclear excavation with less cost and so forth.

I was wondering what you would think about the proposition that this Commission or a commission appointed by the President, if we made it more flexible—including the Atomic Energy Commission—could make, say, a preliminary report including some of the things that we know we can resolve within a year, or by the time the next Congress meets, or something of that kind.

Say a site was selected and the political considerations were worked out, everything else was worked out, then comes the question of how you would build it. It would give more time for you people so that we could move this thing, expedite it a little more.

Dr. SEABORG. Yes, sir.



The CHAIRMAN. You may make technological progress before the 5-year period is over. That is possible.

Dr. SEABORG. Surely. I think we can do it that way. I don't know from our standpoint that there would be any great advantage in placing a time limit on us, because we have the incentive to go at this as expeditiously as possible.

The CHAIRMAN. Your own knowledge or lack of knowledge in this field will be the self-imposed time limit?

Dr. SEABORG. That's right.

The CHAIRMAN. You might find out a lot of things in a short period of time, or you may have to wait. That is a self-imposed time limitation. But in the meantime, we have many other things we ought to get at in this proposal—political considerations, sites, things of that kind.

Dr. SEABORG. Yes.

The CHAIRMAN. You would have no objection to that. It wouldn't involve pushing you into something that you weren't quite sure that you could do.

Dr. SEABORG. Yes. Your question is do we have—

The CHAIRMAN. We recommended in legislation that if a commission were appointed, they would make a report say to the next Congress. They could report on a lot of things and they might not be able to come to any conclusions in your particular field. We could leave that open.

Dr. SEABORG. That's right. Unless, of course, they came to some preliminary conclusion as to which route. This would be information of great value to the Atomic Energy Commission.

The CHAIRMAN. We don't want to hold up a sea level canal waiting for a decision regarding nuclear excavation. We want to go ahead with the study. This is a matter we come to in the end, the method of excavation.

Are we going to do it this way or another way?

Dr. SEABORG. Yes. You want to go as far as you can, and we agree.

The CHAIRMAN. You would have no objection to that?

Dr. SEABORG. No, sir.

The CHAIRMAN. In the meantime, your people are working in this whole field?

Dr. SEABORG. Yes. As I said, the more information that can be obtained in the meantime, as to which route is going to be chosen, the more meaningful our investigations will be, because the technique for using the explosives, the nuclear explosives, depend very much on the route chosen, on the terrain that is under consideration.

The CHAIRMAN. What type of nuclear explosion might be contemplated in this project; underground or would it have to be above ground?

Dr. SEABORG. Underground. It is basically an underground explosion. The nuclear explosive would be buried typically, many hundred feet underground. But obviously, the surface of the ground is broken in producing the excavation.

It is basically an underground explosion.

The CHAIRMAN. So that then—to use a lay term—your problem is when the ground is broken, to contain any disastrous fallout from the underground explosion?

Dr. SEABORG. Yes, to keep it confined to the vicinity of the explosion as much as possible. We do this in two ways: One, by devel-



oping nuclear explosives with smaller and smaller amounts of this radioactive fallout; and, secondly, by trying to better our techniques for containing radioactivity produced by a given explosive underground or in the immediate neighborhood.

The CHAIRMAN. You may not want to answer this question; you don't need to if you don't wish. But I think you can.

Have we a sufficient nuclear stockpile to handle this if we decided to do it that way?

Dr. SEABORG. No, we don't. That would be one of the other preparations that we would have to make. Once a determination was made to go ahead, then we would begin to build the stockpile of nuclear explosives that would be needed. Several hundred nuclear explosives would have to be—

The CHAIRMAN. You would have to add to the present stockpile?

Dr. SEABORG. Yes. The nuclear explosives that we have at the present time haven't been built for this purpose. This would require nuclear explosives specifically tailored for this purpose, and we would have to build those, beginning at the time the determination was made to go ahead with the project.

The CHAIRMAN. So that this would be the beginning.

In the event we develop a nuclear explosive that would be suitable for this type of project, this could be the beginning, for everybody in the world, of a great peaceful use of nuclear energy.

Dr. SEABORG. Yes, it could be. There are many possibilities for the use of nuclear explosives for such peacetime purposes throughout the world. I think we have something like 100 proposals.

This could, as you say, be the beginning. This could open a great new field.

The CHAIRMAN. Harbors, for example, and other waterways, not necessarily canals.

Dr. SEABORG. Yes, connecting canals between rivers, passes for roads, passes through mountains for roads, passes through mountains for railroads. Also, the closing of outlets of lakes, in order to contain the water; the building of water reservoirs; and many other applications. Also applications in mining and the recovery of low-grade deposits of oil.

A great number of applications are possible and have been studied by the Atomic Energy Commission since the initiation—

The CHAIRMAN. So the urgency of this sea level canal could act almost as a laboratory, experiment No. 1, for opening a whole new vista for the use of nuclear power?

Dr. SEABORG. Yes, it could.

The CHAIRMAN. I don't want to necessarily go into the Treaty, because I think we are going to have to look at that legally and get more interpretations of it.

Any treaty, of course, can be modified or amended with the consent of the parties.

Dr. SEABORG. Yes.

The CHAIRMAN. If we can show the kind of use for nuclear power that we are thinking of here, the possibilities for the future, it would seem to me that many of these countries would say: "Go ahead, this is worthwhile. We will agree to any legal modification if that seems necessary."



But isn't it possible that maybe we might, under the present Treaty, be able to work this out? We have to have some more interpretation, but it is possible, isn't it? To go ahead under the present Treaty?

Dr. SEABORG. It is possible to develop the explosives and do some of the cratering experiments, and possibly some small-scale actual applications might be possible under the present Treaty.

I would doubt that the actual building of the isthmian canal would be possible under the present Treaty without modification. But I am not certain.

The CHAIRMAN. We will have that explored. Surely the countries involved in the area would be concerned, and they are parties, as I understand it, to the Treaty.

Dr. SEABORG. Yes.

The CHAIRMAN. I think there would be very little problem in a modification for this purpose if we can justify what we have been talking about here for a long time.

Dr. SEABORG. I would hope you are right. When the countries of the world begin to understand—

The CHAIRMAN. What do you mean by the Plowshare program? You referred to that.

Dr. SEABORG. The Plowshare program, the name for the whole program for the peaceful use of nuclear explosives, comes from the Biblical term of beating their swords into plowshares. This is the term that has been applied as the name for this program since its beginning, sometime in 1957.

The CHAIRMAN. Is the only danger, that you could foresee in nuclear excavation the radioactive debris or fallout?

Dr. SEABORG. That is not the only danger.

The CHAIRMAN. If there are others, we would like to know of them.

Dr. SEABORG. There are other hazards that we are studying that we think can be successfully managed—the shock of the explosion, the immediate effect.

The CHAIRMAN. Heat and shock waves?

Dr. SEABORG. Not really heat. It is the shock wave in the ground and the debris, the flying rocks, just like in any explosion, and things of that sort. The possibility with an explosion as large as this—and we are talking about underground explosions which range from 100 kilotons to 100 megatons—is that you have a shock effect on neighboring nearby houses and buildings and things of that sort.

We are studying that aspect of it and believe that that can be handled, but it is a potential problem that we must give careful attention to.

The CHAIRMAN. We have had testimony on all of the proposals, the possible routes, and, of course, everyone agrees that there would be involved an evacuation of a certain small population that may live in the area. But, fortunately, there is no large concentration of population along any of the suggested routes. Evacuation could be accomplished, I think, with a minimum of difficulty.

Dr. SEABORG. Yes. And, of course, the different routes differ in this aspect—in the population in the immediate neighborhood. This would be one of the things that would be taken into consideration in making this proposed study for the purpose of determining the route that has the maximum desirability for this.



The CHAIRMAN. You mentioned that the possibility of a nuclear explosion would be, costwise, cheaper than the conventional methods.

Dr. SEABORG. Yes.

The CHAIRMAN. You estimate that the use of nuclear excavation would reduce the cost of construction by 50 to 90 percent. I appreciate that you are merely estimating. You would have to know first where you are going to build the canal. But, generally speaking, if it could be done this way, and it is technologically feasible, it would be cheaper to excavate by nuclear means.

Dr. SEABORG. It would be cheaper. And, depending on the route—I think those estimates would apply—something like 50 to 90 percent cheaper.

The CHAIRMAN. Let us suppose that under all the circumstances, political, economic, and technological, it is feasible to build a sea level canal, how long would it take, as compared to conventional means, using nuclear excavation, to build a canal that might average between 75 and 150 miles?

Dr. SEABORG. That would depend on the route. The smallest time from the most favorable point of view of the route, would require 2 to 3 years. The other routes might require up to 5, 6, 7 or even 8 to 10 years—the longer route with the mountains and so forth.

I think in each case this is substantially less time than would be required with conventional explosives.

The CHAIRMAN. This adds up to 8 to 10 years before we might have actual transit. Maybe we could shorten the time if, in your experimentations, you make rapid technological advances. But it surely points up the advisability of getting started with the study now.

Dr. SEABORG. Yes; because this would be in tandem with the 5 years that I mentioned, that is, the 5 years to do these other things, the study, the development of the clean explosive, the cratering experiments, and then the building of the 200 or 300 nuclear explosives.

All of those tasks, or many of them, could be done simultaneously if we went ahead on that basis. But certainly a minimum of 5 years and maybe somewhat more would be required to accomplish all of those tasks, and then on top of that, there would be these various time estimates that I have made for the actual construction.

The CHAIRMAN. With any conservative projection of shipping in the world, you are bound to come to the conclusion that although the present canal may not be obsolete in 10 to 12 years, it won't be able to handle all the shipping we may want to move between the two oceans.

Dr. SEABORG. That is right. There are already a number of ships that the present canal cannot handle, as you know.

The CHAIRMAN. I think within 12 years, you can figure the canal will be too crowded to handle all shipping, which will wish to use it.

One other question. How much flexibility do you think we should vest in the President in appointing this very important body to make these decisions?

Dr. SEABORG. I think as much as you feel that you could.

The CHAIRMAN. In any event, it should include what my bill calls for, Secretary of Defense, Secretary of State and yourself, because you will be primarily concerned with this project.

Dr. SEABORG. I think that will clearly be the case.

The CHAIRMAN. To go on further, I suppose it is possible that we could use private know-how, and advice.

Dr. SEABORG. Yes; and other departments.



The CHAIRMAN. Other agencies may want to participate. Senator Thurmond?

Senator THURMOND. Dr. Seaborg, we are also glad to have you with us.

Dr. SEABORG. I am glad to be here.

Senator THURMOND. On page 5, I believe you make the statement that "it appears, therefore, that nuclear excavation projects of the magnitude of a sea level canal would require an agreement with the other parties to the treaty."

As I construe that statement, it is your feeling that under the Nuclear Test Ban Treaty, it would be necessary to get the other parties to the treaty to agree to using nuclear explosions of the magnitude that would be required to build this sea level canal.

Dr. SEABORG. Yes; to modify the treaty in the way provided for by the treaty.

Senator THURMOND. I think you are right in that. That was my position when the Nuclear Test Ban Treaty went through. We were assured by some of the proponents of the treaty that it would not prohibit peaceful uses, but the treaty doesn't read that way, and I think your construction, undoubtedly, is the correct construction.

Dr. SEABORG. I quoted my own testimony in that regard, indicating that I thought at that time, when I testified in regard to the Test Ban Treaty, that probably for an undertaking of this magnitude, a modification of the treaty would be required.

Senator THURMOND. The Plowshare program that the distinguished chairman referred to is a program for the peaceful uses of atomic energy, I believe.

Dr. SEABORG. Yes; it is, with a number of aspects in addition to the one we are discussing here today, as I indicated in the earlier part of my testimony.

Senator THURMOND. I don't know whether you have expressed an opinion on this point or not. Maybe you have. I happened to be out part of the time attending another subcommittee meeting on stockpiling.

Do you expect to encounter any difficulties with other countries if an effort were made to obtain their approval in building this canal?

Dr. SEABORG. Encounter any difficulties?

Senator THURMOND. With the other countries to the Nuclear Test Ban Treaty.

Dr. SEABORG. We don't know at this stage. We don't know what their attitudes would be. As I indicated, I would hope that after they see the value of this and after it becomes clear to them that this doesn't offer a way for us to surreptitiously further develop nuclear weapons—because, after all, we can do that by testing underground, which is permitted under the treaty—after the representatives of the other countries see this, it would be our hope that we wouldn't encounter any difficulty.

We also could further strengthen our allegations that this won't lead to the further development of nuclear weapons by allowing observers to see these tests. There would be no objection to that, because we have no other purpose than to develop the cratering technology. We would be perfectly willing to let anybody see that type of an experiment.



Senator THURMOND. The other powers to the Nuclear Test Ban Treaty would have no just basis for objecting for the reasons you stated.

Dr. SEABORG. That would be my opinion; yes, very definitely.

Senator THURMOND. This would offer an opportunity for other nations of the world to see how useful atomic energy could be in matters of this kind.

Dr. SEABORG. Yes.

Senator THURMOND. And to understand that similar projects might be undertaken in some of those countries.

Dr. SEABORG. I think so. That would be my view and it is my hope that that would be the reaction.

Senator THURMOND. So, unless the Soviets would arbitrarily object, the prospect is that we could get approval and proceed if it is determined to build such a canal.

Dr. SEABORG. I don't know whether the prospects are that we would. But I think there are very logical arguments that would make it seem reasonable that people should see it that way.

Senator THURMOND. Thank you very much, Dr. Seaborg. Thank you very much.

The CHAIRMAN. Soviet engineers over the years—and I have read a lot of the translations—have some hopes, as we have here, of being able to do some of the same things in their areas.

One of them may sound a little fantastic now, but I am to the point where things that I thought 20 years ago were fantastic are today realities, so I am not passing on that.

Dr. SEABORG. I think we are all at that point.

The CHAIRMAN. Soviet engineers are talking about a similar type of project in the Bering Straits that would change the currents up there and make the straits more navigable and northern Siberia a little warmer.

This isn't too farfetched at all; it is a very narrow, shallow strait. That is why we have no icebergs in the North Pacific because they can't get through that strait. They have been talking about this for a long time, hoping that new nuclear technology can be put to some good uses.

And Russian engineers have talked on many occasions about building harbors along the northern route to the Siberian coast by the use of nuclear explosives.

Dr. SEABORG. I don't know how feasible the opening of the Bering Strait is.

The CHAIRMAN. I don't know, either.

Dr. SEABORG. But the manufacture of harbors we do consider feasible and we have studied a number of places where that could be done very effectively in different places of the world.

The Soviets were interested, publicly, in the use of nuclear explosives for these earthmoving types of projects in the late 1940's. They made their views known on a number of occasions then. They have been more or less silent on it since that time.

The CHAIRMAN. Senator Morton?

Senator MORTON. No questions. Thank you, Mr. Chairman. It is very interesting testimony.

The CHAIRMAN. Senator Hart?

Senator HART. I apologize for coming late, due to another meeting. I have read your statement, Doctor.



Mr. Chairman, did you inquire of Dr. Seaborg whether he would be in a position to express any ideas as to the feasibility of a trans-U.S. canal using nuclear explosives?

The CHAIRMAN. No. I didn't.

Senator HART. You said that 20 years ago things seemed impossible, but are possible now.

The CHAIRMAN. I mentioned that.

Senator HART. One of these resolutions, or bills, would limit the analysis to a transisthmian canal. But the Cotton bill has no limit on the location.

Dr. SEABORG. That is an intriguing concept. I think that the cost would probably be prohibitive. After all, we are talking of costs—

The CHAIRMAN. You mean as of now?

Dr. SEABORG. As of now. We can more or less project what, under the most favorable circumstances, we could come to in the way of improvements in 10 or 20 years.

When you think in terms of distances of a thousand miles or more, as compared to distances here, as we have indicated, of thirty or forty miles, where costs, even though low compared to conventional explosives, are still of the order of \$500 million, it does look like we would be talking of costs of the order of a hundred times that.

Senator HART. Dr. Seaborg, would you suggest we foreclose in this proposed study a consideration—including cost estimates—of a canal across the United States?

Dr. SEABORG. No, I wouldn't.

Senator HART. I would hope that the study would include consideration of such a route.

Dr. SEABORG. I personally wouldn't foreclose that, and I would welcome the inclusion of that. I don't think that a large proportion of our time and energy should go into that, but enough to make a better assessment, for example, than the one I am making here this morning.

Senator HART. Exactly. S. 2497 would limit the study through the American Isthmus. I would hope that we would be able also to get the judgment of this group on the feasibility of a trans-U.S. canal.

Dr. SEABORG. I think that would be wise.

The CHAIRMAN. We are getting curious now, as long as we have you here. If a decision were made to build the canal through Nicaragua—the route that has been proposed for years—it will be necessary to go through a long lake.

Would that pose any different problems? A deep lake, too. I have been there.

Dr. SEABORG. This is one of the things we would have to assess.

The CHAIRMAN. You are dealing with a lot of water there.

Dr. SEABORG. Yes. I suppose one possibility would be to skirt the lake, to go around the lake.

The CHAIRMAN. On the edge?

Dr. SEABORG. On the edges, but far enough away to be safe. I suppose another possibility, if you wanted to change the environment that much, would be to drain the lake gradually, in some way or other, in the course of the construction process.

The CHAIRMAN. I want to put in the record a thumbnail sketch of the five possible routes.

The Tehuantepec route in Mexico would be the most costly. I think everyone is in agreement on that. It has some great advantages but the cost figures are high.



UN/Political  
File No 720/10/10

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

Name of Paper NEW YORK TIMES.

File No. ....

Published at PARIS.

Date 1-7-64

FOLIO No.  
113

**U.S. Sets Off Atom Blast  
Underground in Nevada**

WASHINGTON, June 30 (AP)—A nuclear test in Nevada today sought further solutions to the problem of using atomic explosives for excavation projects, such as harbors and canals.

The Atomic Energy commission said the low-yield blast, with a force less than that of 20,000 tons of TNT, was set off underground at its Nevada test site.

The test was one of a series, and the third this year designed to develop nuclear devices for use in possible later excavation experiments. This is part of a program for the development of peaceful uses for nuclear explosives.



CONFIDENTIAL



AUSTRALIAN EMBASSY  
OF EXTERNAL AFFAIRS  
WASHINGTON, D. C.

CANBERRA

22 JUN 1964

June 15, 1964

42  
101703

Memorandum No. 788/64.

File No.

NOM. INDEX

SUB. INDEX

The Secretary,  
Department of External Affairs,  
CANBERRA, A.C.T.,  
AUSTRALIA.

GERALDTON HARBOUR

Your file 919/8/1.

*Mr. Baker*  
The conclusion appears to  
be that, at least in the present  
state of technology, a Geraldton-type  
explosion would NOT be permitted  
under the Test Ban Treaty, Article I(ii)(b)

*Mr. Baker*  
*Dr. Thompson*  
*Referred to*  
This memo has  
been transferred  
to file 789/10/10

*W. D. D.*

We have discussed the contents of your memorandum 382 with William Oakley, Deputy Director of Plowshare Division, U.S. Atomic Energy Commission, and with Charles van Doren, Deputy General Counsel of the Arms Control and Disarmament Agency. Both made essentially similar comments about the legal implications of a Plowshare-type explosion to deepen Geraldton Harbour.

2. Van Doren said that the U.S. was deeply interested in assisting the development of peaceful uses of nuclear energy, and for that reason had during the negotiation of the Nuclear Test Ban Treaty advocated an exemption clause to permit peaceful explosions. Although the U.S.S.R. has done some work of its own in the direction of peaceful uses, the inclusion of such provisions was apparently not felt to meet Soviet interests at the time and the exemption clause had to be dropped from the draft. Therefore, as is pointed out in your paragraph 5, there is under the present Treaty no meaningful exception to permit the concept of a peaceful explosion.

3. The U.S. continued to be interested in the subject and was developing as much information as it could on the peaceful application of nuclear energy by means of underground tests conducted within the limits of the Treaty. One of the objects of the American programme was to reduce radioactive debris to an absolute minimum and it was hoped that the evolution of suitable devices would eventually permit a wide range of civilian applications which would be compatible with the Test Ban Treaty as it stands at present.

4. Van Doren went on to say that the subject of peaceful explosions and their compatibility with the Treaty had been extensively discussed during hearings in Washington. He cited the following as the principal references:

(i) Joint Committee on Atomic Energy of the U.S. Congress, Atomic Energy Commission: Authorising Legislation Fiscal Year 1965, pages 1195-1246.

(ii) Senate Foreign Relations Committee, Hearings on the Test Ban Treaty, pages 210-212. (Van Doren said that the testimony by Dr. Seaborg in this section could be taken as the latest statement).

(iii) U.S. Senate Committee on Commerce, Hearings on the Second Transisthmian Canal.

5. All of these references should be available in the Department.

6. It was evident from (iii), which was the record of lengthy discussions on the possible use of nuclear energy for canal construction, that the use of nuclear detonations for canal construction for

*Mr. Mackenzie*

CONFIDENTIAL



some time to come was difficult to conceive without violation of the Treaty. There were fewer references available on the question of harbours, but much of the quoted testimony was relevant. The main point was that, in the opinion of the qualified people in the Administration, possibilities for the legal use of using nuclear energy in this way were, in the present state of technical knowledge, quite limited. Van Doren quoted Dr. Seaborg's summing up with regard to canal construction in Panama: "It is possible to develop the explosives and do some of the cratering experiments, and possibly some small-scale applications might be possible under the present Treaty".

*The US never appears to be that an explosion under the seabed is an "underground" not an "underwater" explosion - at least so long as it produces effects above ground.*

7. With regard to Article (i)(a) of the Treaty, van Doren said that the text (which he pointed out was not quoted in full in your memorandum) was extremely restrictive as to the categories of detonation to be permitted. For example it specifically excluded underground explosions which vented into the water. Nevertheless he considered that if an underwater explosion could be so conducted that its principal effects occurred underground, it could be maintained successfully that no infringement of the Treaty was involved. Oakley was of the same opinion on this point.

8. Both van Doren and Oakley considered that the major difficulty would arise from Article (1)(i)(b) in view of the fact that in the present state of technology it would be difficult to contrive a detonation which did not release at least a small proportion of radioactive debris. In the American Plowshare series this factor did not present legal difficulties because the radioactive effects could be confined within the national boundaries of the United States. However this would not be the case at Geraldton in view of the proximity of the 3-mile maritime limit of Australian territory. Oakley was of the opinion that, after some 3- 4 years of necessary engineering evaluation, and further Plowshare development tests (in the U.S.A.) it was very possible that a well-documented case could be made, demonstrating the utility of the project for civil purposes and the absence of any significant health hazard, which would permit an approach to signatory governments for an exemption from the Treaty. This is the line of development which is currently favoured by the U.S.A.E.C. Plowshare Division as the most likely way of successfully accommodating such detonations within the Treaty. Van Doren showed much more caution on this point. He agreed that such a course was not prohibited by the terms of the Treaty but pointed out that it was one whose political implications needed careful consideration - it might be "opening a Pandora's box".

*Parham*

9. Van Doren went on to say that in its general policy of peaceful development of nuclear energy, and in its conduct of the Plowshare experiments, the Atomic Energy Commission was proceeding on the assumption that legal difficulties, although an impediment at present, would eventually be removed. One possibility was that they would be overcome by technical advances in the development of clean devices. Otherwise, in particular if a significant number of states found themselves attracted by peaceful uses, a modification of the Treaty in this sense would probably come to be politically feasible. However in the present state of technical knowledge and world opinion, a step of this kind was still some years away.

10. We are sending a copy of this memorandum to London, Moscow and AUSTUNAT, N.Y.

*John Kirtley*  
(J. M. Kirtley)  
First Secretary.



DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

File 720/10/10  
FOLIO 111  
unpolitical

Name of Paper Missiles & Rockets

File No. ....

Published at Washington

Date 1 June

involved.

**How to Learn to Love the Bomb**

Despite technical, treaty, and public relations roadblocks delaying the use of controlled nuclear explosions in construction projects, the AEC has released, for planning purposes, figures on costs involved. It says a 10-kiloton device can be provided for \$350,000, including arming and firing services. A 2-megaton device will cost \$600,000. Bernard J. O'Keefe, executive vice president of Edgerton, Germeshausen & Grier, Inc., calculates that to construct a 46-mi.-long sea-level canal across Panama (political considerations aside) would require about 170 megatons of explosives and cost roughly a half-billion dollars—compared with \$5 billion using conventional explosives.



TEL. 65-1221



"Cliffbrook" FOLIO 110  
45 Beach Street  
Coogee, N.S.W.

DEPARTMENT OF EXTERNAL AFFAIRS	
CANBERRA	
19 JUN 1964	18th June, 1964.
File No.	
NOM. INDEX	SUB. INDEX

720/10/10

Dear Sir,

Enclosed are two copies of the report of our technical mission to the United States in 1963 to investigate Programme Plowshare.

Yours faithfully,

*K. Miller*  


K. Miller.

The Secretary,  
 Department of External Affairs,  
 Canberra, A.C.T.

*Mr. Weston*  


*Mr. Weston to Mr. D. R. Anderson*  




ENCLOSURES ATTACHEES

→ 720/10/10.  
919/8/1.

382

18th May, 1964.

Australian Embassy,  
WASHINGTON.Nuclear Test Ban Treaty : Proposal to Deepen  
Geraldton Harbour.

*Dr. Thompson*

We have been giving some thought to the implications, in the context of our signature of the Nuclear Test Ban Treaty, of the proposal, which the West Australian Government is reported to have been considering, to carry out Plowshare explosions to deepen Geraldton harbour.

2. As this matter now stands, no approach has been made to the Commonwealth Government about this proposal and present indications are that the Western Australian Government are not considering such an approach. However the proposition as it was apparently put to a Western Australian Minister while in the United States raises some points which, although hypothetical, could be significant in the event that it, or a similar proposition, is to be discussed later. Two provisions of the Nuclear Test Ban Treaty require particular consideration:

- (i) Article I(1)(a) prohibits "any nuclear weapon test explosion or any other nuclear explosion, at any place under its jurisdiction or control in the atmosphere, beyond its limits, including outer space, or underwater, including territorial waters or high seas."
- (ii) Article I(1)(b) prohibits any such explosions "in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted".

3. There is no definition in the treaty of what constitutes an explosion "in the atmosphere". It is possible to envisage cases in which it might be difficult to distinguish between an underground explosion, which is permitted subject to Article I(1)(b), and an explosion in the atmosphere, which is forbidden. To take one example, a nuclear device detonated under six inches of soil could hardly be regarded as an underground explosion as it would in fact have all the characteristics of a ground level burst (i.e. in the atmosphere). Our understanding of what is involved in the "Plowshare" operations is that nuclear explosions would be used to create large cavities and although the charge would be placed well underground, it would burst into the upper

CHECKED

2...



- 2 -

ground and atmosphere. It could be argued, and we must anticipate that the Russians and others would argue, that this is an explosion "in the atmosphere" within the meaning of the Treaty. On the other hand it might be inferred from Article I(1)(b) that such explosions are permitted provided that radioactive debris is not spread across the territorial border of the State concerned. We note that the Chairman of the U.S. Atomic Energy Commission is on record as saying that "it is recognized [By the Test Ban Treaty] that there may be venting to the atmosphere from some of these underground explosions and a limitation has been set upon the delivery of radioactive debris outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted. In these cases where venting does take place, no problems are presented if the effects are noticed solely within the United States" (Statement before the Senate Committee in Foreign Relations on the Nuclear Test Ban Treaty, 14th August, 1963).

4. There is also no definition in the Treaty of what constitutes an "underwater" explosion. It is not certain, for example, whether an explosion under the sea-bed should be regarded as an "underwater" explosion, (the U.S. Attorney-General was reported to have felt that the position was sufficiently uncertain as to make consultation with the Original Parties desirable in the event that such an explosion was contemplated). It is open to argument whether the fact that an explosion in the sea-bed does or does not "vent" into the superjacent sea affects the determination of whether it is an "underwater" explosion. It is also a matter for consideration whether the fact that the hole in which the explosive charge is placed is drilled from above high water mark, but then extends below this mark so that the explosive charge is located under the sea-bed, is a relevant consideration (this is one of the methods which had apparently been mentioned with regard to the Geraldton proposal).

5. It should also be noted that Article I(1)(a) applies not only to nuclear weapons test explosions but also to "any other nuclear explosion" including explosions for peaceful purposes. One of the difficulties, of course, is in distinguishing between an explosion for peaceful purposes and a nuclear weapons test explosion, particularly in view of the Soviet suspicion that the former may be used to cover up military tests. The Chairman of the United States Atomic Energy Commission has admitted that there is a close similarity between the military and peaceful applications of nuclear explosions, both in the explosive devices used and in the conditions under which they are tested. He stated that United States nuclear devices, though developed and tested specifically for ~~the~~ Blowshare, utilized the most sophisticated design principles they knew. Excavation required nuclear explosions especially designed to minimize the production

3...



- 3 -

and release of radioactive debris and it is precisely this sort of device which would have important military applications. Parties to the nuclear test ban treaty would have some grounds for claiming that nuclear explosions, even those designed for peaceful purposes, could have a significance for weapon development. For security reasons we could not expect (and the experience of the Australian team which recently inspected U.S. Plowshare operations would seem to confirm this) that the United States would be prepared to allow inspection of its firing devices by other parties to the Treaty. We must also anticipate that if a Plowshare operation were to be carried out in Australia, particularly if there were any possible doubt as to whether it was permissible under the Test Ban Treaty, Australia could become the target of Soviet accusations that we were assisting the United States to carry out clandestine weapons tests, with all the possible implications that this would have for the Test Ban Treaty itself.

6. On the assumption that the provisions of Article I(1)(a) of the Treaty did not prohibit the explosions, Article I(1)(b) would still forbid it if an explosion caused radioactive debris to be present outside the territorial limits of the state concerned, i.e. outside the three mile limit of Australian territorial waters. The Chairman of the United States Atomic Energy Commission has interpreted this Article as prohibiting a test which resulted in a quantity of radioactive debris being delivered outside a country's territorial limits in amounts sufficient to establish that such contamination resulted from a recent test within that country. Although we are given to understand that the United States has been developing increasingly sophisticated devices for its "Plowshare" programme, and assuming favourable wind conditions, a very delicate calculation would still be necessary to estimate whether radio-active debris would be deposited or carried by sea currents beyond the three mile limit. The question whether or not an explosion was a violation of the Test Ban Treaty might well depend on the accuracy with which this calculation could be made.

7. We should be glad if you would discuss these points with the relevant United States officials concerned with disarmament matters, emphasising however that they are quite hypothetical at this stage, and that the Australia does not have before it any specific proposal for a "Plowshare" operation within its territory.

8. A copy of this memorandum has been sent for information to the Australian High Commission, London, the Australian Embassy, Moscow and the Australian Mission to the United Nations New York.

Austemba, LONDON, MOSCOW.  
Austunat, NEW YORK.

Referred for your information.

(Patrick Shaw)  
First Assistant Secretary,  
Division II.

(Sgd) P. Shaw  
(Patrick Shaw)  
First Assistant Secretary  
Division II.



# Nuclear harbour

FROM A SPECIAL CORRESPONDENT

**If Australia is to have the world's first nuclear harbour, it will probably be created at the end of a peninsular near Geraldton, W.A.**

Advocates of using nuclear power to blast out a 60ft-deep harbour estimate that it would more than halve the cost.

The first big obstacle to this way of breaking the present shallow harbour's restrictive grip on the town is whether the people would object.

Artist Barry Lee's sketch shows the existing channel and breakwater in shallow water in Champion Bay and the way nuclear blasts could form a harbour from Moore Point.

Engineers estimate that to deepen the 12,000ft channel by conventional explosions would take about 50 shots at £180,000 each—a cost of about £9,000,000.

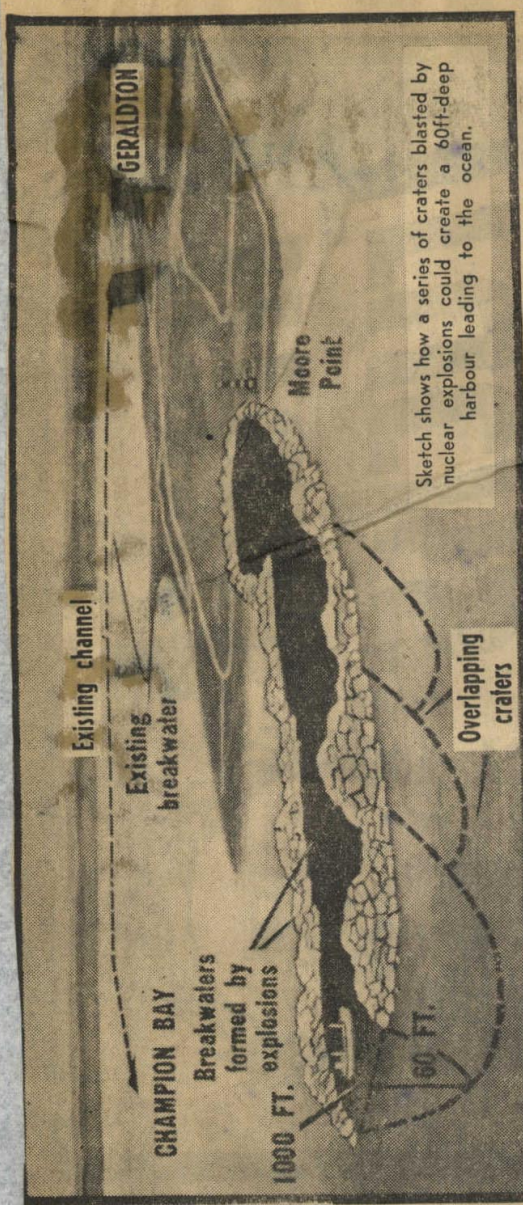
Nuclear explosives could create a 5,000ft channel straight off Moore Point into 60ft of water—a cost of around £4,000,000.

The Moore Point site would remove the scene of nuclear blasting from the town, Geraldton now sits right alongside its harbour.

The new channel would be 1,000ft wide and average 60ft deep.

It would take ten 10-kiloton devices (a kiloton is the explosive equivalent of 1,000 tons of TNT).

Drilling 36in diameter holes to 270ft would be no problem. (Industry now



## Australia may be first

Plowshare plans a channel excavation study in the Nevada desert, probably this year.

At the moment of explosion in the drill hole, the walls are hit with a pressure several million times the atmospheric pressure. It generates heat of about 3,600 degrees.

The first few feet outward from the explosion chamber melt into glass

and are said to seal into an inviolable mass 95 per cent of the radio-active products.

The shock jolts out a crater and fractures the rock.

Rock collapsing into the explosion area is said to trap 5 per cent of radio-active products not trapped in the glass and the sea takes care of any that escape this rock fall.

For the project to go ahead this has to be so. As a signatory to the Nuclear Test Ban Agreement Australia has agreed not to take part in any nuclear project that would contaminate air.

The only type of blast permissible are those so far underground that the explosion's radio-active products are not released to the atmosphere.

Sketch shows how a series of craters blasted by nuclear explosions could create a 60ft-deep harbour leading to the ocean.

All the aspects are being weighed as the West-Australian Government considers whether to invite Washington nuclear engineers Palmer and Baker to Geraldton.

Suppose all obstacles are overcome 10 nuclear blasts go off and Geraldton is blessed with a harbour 60ft deep (at least).

The best harbour on the W.A. coast could then float the world's biggest ship.

Bulk cargoes could be freighted out of Geraldton cheaper than any other W.A. port.

Most of the research in Project Plowshare has been done by Dr. Edward Teller, associate director of the American Atomic Energy Commission's Lawrence Radiation Laboratory in California.

The man who started it all for Geraldton, Gordon John Porteus, is a chemist at Dongara.

A retired major, Mr Porteus, 57, has a number of publications from the U.S. Atomic Energy Commission about Project Plowshare.

"The work would attract to Geraldton many scientists of world renown," he said. "This would be the first harbour ever enlarged in this way."

"I hope that the Western Australian Government will consult fully with the nuclear engineers of Palmer and Baker of Washington, and with our own Australian Atomic Energy Commission."

If the American Atomic Energy Commission could be interested the whole work would not cost much."

108

UN/Political

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

Name of Paper SYDNEY MORNING HERALD. File No.

Date 17-5-64

Published at SYDNEY.



107

*[Handwritten signature]*

OUTWARD CABLEGRAM

SRD

O. 11696

Sent: 8th May, 1964  
1330

TO:

Australian Embassy,  
WASHINGTON.

1190. CONFIDENTIAL.

Flowshare Explosives:Geraldton Harbour:

Your telegram 1246.

Question of deepening approaches to Geraldton Harbour is a matter for the Government of Western Australia which has not sought Commonwealth assistance or advice. Not proposed to give any consideration to matter unless an approach is made by the State Government.

MIN. & DEPT NATIONAL DEVELOPMENT  
A.A.E.C.  
MIN. & DEPT E.A. (720/10/10)  
MIN. & DEPT DEFENCE  
P.M.'s DEPT  
P.M.'s

8th May, 1964

SEC FAS(1,2,4) AS(JIC) DL UN PACAM AMSP INF PIO ER

CONFIDENTIAL





COMMONWEALTH OF AUSTRALIA.

FOLIO No.  
106

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS: NATDEV, CANBERRA.  
TELEPHONE: M 9.

IN REPLY QUOTE:

DEPARTMENT OF EXTERNAL AFFAIRS  
CANBERRA  
- 6 MAY 1964  
File No. 720/10/10  
NOM. INDEX SUB. INDEX

DEPARTMENT OF NATIONAL DEVELOPMENT,

PARKES,

CANBERRA, A.C.T.

6th May, 1964.

CONFIDENTIAL

The Secretary,  
Department of External Affairs,  
CANBERRA. A. C. T.

Plowshare Explosives : Geraldton Harbour

My Minister has told me that Cabinet discussed Cable 1246 addressed to him by the Australian Ambassador, Washington, and that the decision was that no action should be taken by the Commonwealth unless a formal approach was made by the West Australian Government.

2. The Minister requests that a reply be sent to the Ambassador in the following terms :

"Question of deepening approaches to Geraldton Harbour is a matter for the Government of Western Australia which has not sought Commonwealth assistance or advice. Not proposed to give any consideration to matter unless an approach is made by the State Government."

*H. G. Raggatt*  
(H. G. RAGGATT)  
Secretary

*Mr. McKeown*

*Mr. Hoehling* Sir Harold Raggatt told me that he was sending us this draft telegram early in afternoon of 6 May. Any draft telegrams should be dealt with on the day they are received. There has been a two day delay in this case. *W. Ham 8/5/64*





COMMONWEALTH OF AUSTRALIA.

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS: NATDEV, CANBERRA,  
TELEPHONE: M 9.

DEPARTMENT OF NATIONAL DEVELOPMENT,  
PARKES,  
CANBERRA, A.C.T.

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(Sgd) H. G. RAGGATT  
(H. G. RAGGATT)  
Secretary



CAUTION

THIS IS A CABINET DOCUMENT

C A B I N E T M I N U T E

ITS CONTENTS SHOULD BE  
SAFEGUARDED AS INDICATED IN  
ADMINISTRATIVE CIRCULAR No. 156/62.

Canberra, 5th May, 1964

720/10/10

C O N F I D E N T I A L

COPY No. 33

FOLIO No.  
105

Decision No. 184

Without Memorandum - Underground Atomic Explosion - Geraldton Harbour.

The Minister for National Development informed the Cabinet of a cable received by him from the Australian Ambassador to the United States, dealing with a proposal for an underground nuclear explosion project to be carried out near Geraldton for the purpose of harbour improvement, and indicating that the United States Government is most interested in helping the Australian Government in any way possible in considering the use of Project "Ploughshare" in development projects.

2. The Cabinet decided that it should take no initiative in this matter but should await an approach, if any, from the Western Australian Government.

Certified true copy

*J. J. Bunting*

Secretary to Cabinet.

*Read 7/5/1964*

- 1. Registrar*
- 2. Mr Sharpe*



EXTERNAL AFFAIRS

FOLIO No. 104

FILE No. \_\_\_\_\_

DATE \_\_\_\_\_

SUBJECT

FOR *Mr. Boardman*

*You may wish to draw  
the attached press cutting  
to Mr. Stans' attention.*

*SMH 2/5/64*

**Nuclear Blast  
Plan To  
Clear Harbour**

CANBERRA, Friday.—The Western Australian Government may use an atomic explosion to blast rock from Geraldton Harbour, the Minister for Industrial Development, Mr C. W. M. Court, said today.

He said the cost of an atomic explosion would be about £9m.

Mr Court said conventional methods of clearing rock from the harbour, 300 miles north of Perth, had failed.

He said the W.A. Government had held "purely exploratory" talks with the Plowshare organisation of America which proposed an atomic explosion to clear the harbour.

The Plowshare organisation promoted the peaceful use of nuclear energy.

Mr Court is in Canberra for today's symposium at the Academy of Science on the relationship of research to industrial development in Australia.

In an interview, Mr Court said that although the talks with the U.S. organisation were "purely exploratory," the Government may have to use an atomic explosion to clear Geraldton Harbour.

"The technical feasibility will be the determining factor with the nuclear blast," he said.

"The cost is considerable and £9m has been suggested."

However, the W.A. Government was also investigating new "conventional methods" of clearing harbours.

Mr Court said the Plowshare organisation had claimed an atomic explosion in Geraldton Harbour would not endanger the public.

Nor would there be any danger to marine life beyond a five-mile limit.

He said the project, if accepted, would come under the international partial test ban treaty.

Because of its isolation Geraldton would not present serious international complications.

This should assist any negotiations for permission to use a nuclear device.

**New Cal  
Link  
T**



EXTERNAL AFFAIRS

FOLIO No.  
104

FILE No. \_\_\_\_\_

DATE \_\_\_\_\_

SUBJECT

FOR Mr. Bonchian

You may wish to draw  
the attached press cutting  
to Mr. Staw's attention.

J. D. Johnson



*4. July 1964*

FOLIO 103

DEPARTMENT OF EXTERNAL AFFAIRS

LJH.

INWARD CABLEGRAM I. 14270.

DATED: 30TH APRIL, 1964.  
1855.

FROM:

REC'D: 1ST MAY, 1964.  
0951.

AUSTRALIAN EMBASSY,  
WASHINGTON.

1246. CONFIDENTIAL.

FOR SPOONER FROM BEALE.

REPEATED CHAIRMAN, AUSTRALIA A.E.C.

U.S.A.E.C. HAS INFORMED BY ATOMIC ENERGY ATTACHE THAT UNITED STATES GOVERNMENT MOST INTERESTED IN HELPING AUSTRALIAN GOVERNMENT IN ANY WAY POSSIBLE IN CONSIDERING USE OF PROJECT PLOWSHARE IN DEVELOPMENT PROJECTS - E.G. GERALDTON HARBOUR.

IF PLOWSHARE EXPLOSIVES IN AUSTRALIA WERE DECIDED ON, AND WOULD YIELD RESULTS FOR THE UNITED STATES PLOWSHARE EXPERIMENTAL PROGRAMME, FAVOURABLE COSTS COULD BE NEGOTIATED ON A GOVERNMENT-TO-GOVERNMENT BASIS.

MIN. & DEPT NATIONAL DEVELOPMENT.  
A.A.E.C. (T/T) (S)  
MIN. & DEPT E.A.  
P.M.'s DEPT.  
P.M.'s.

1ST MAY, 1964.

CONFIDENTIAL

SEC FAS.(4) PACAM AMSP ER@

*u.N.*



UN/Political

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

Name of Paper CANBERRA TIMES.

File No.

FOLIO No. 102

Published at CANBERRA.

Date 29-4-64

PANAMA LOCKS INADEQUATE

# N-Blasts Studied For New Canal

Recent riots in the Panama Canal Zone focussed attention on the famous Atlantic-Pacific link, but by raising emotional temperatures in Central America and in the United States, the riots blurred the real problem of the canal's future.

That future is tied up closely with nuclear explosives. Not bombs — but excavation by nuclear-powered blasting. If this is done, it probably would be the most important engineering development of the second half of the 20th century.

Though much experimentation and study remains to be done, there is no longer any doubt that we are on the threshold of very important uses of nuclear power for peacetime purposes. The first major theatre for use of this tremendous new engineering tool could be the Central American isthmus.

The existing Panama Canal is no longer adequate for shipping needs. A lock canal, it carries ships up and over the Isthmus of Panama by a series of steps, each of which requires lock opening and pumping.

## Two m.p.h.

A ship cannot navigate through the locks. It must be towed and manoeuvred by a team of six locomotives at two miles an hour.

With forecasts of continuing increases in traffic, a bigger, wider, deeper, sea-level canal without locks seems to be imperative.

The pressure for a big sea-level canal has been growing for years. In 1957 the U.S. House of Representatives Committee on Merchant Marine and Fisheries appointed a board of consultants — engineers — to investigate and report.

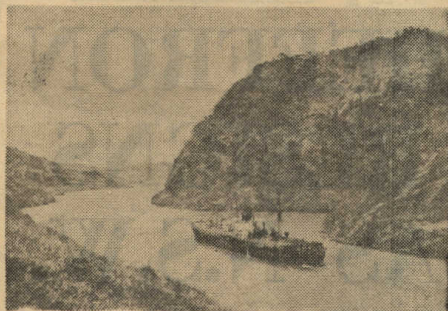
The board found that the cheapest solution possible with conventional engineering methods would be deepening and widening the present canal, converting it to a sea-level waterway.

The estimated cost was almost 3,000 million dollars (£A1,350 million).

Maj. Gen. W. E. Potter, Governor of the Canal Zone and a member of the board, wondered if there was not a better alternative.

About this time another group of experts received another mission.

This was the Atomic Energy Commission's Project Ploughshare, aimed at exploring the potential of nuclear energy for peaceful purposes.



A freighter moves through the Panama Canal. The complicated system of locks can handle shipping only slowly.

From An Associated Press Correspondent

## Qualified

The famed Lawrence Radiation Laboratory of the University of California was picked as the home base of Project Ploughshare.

To the Lawrence Laboratory, in 1960, Gen. Potter addressed a query: What would be the cost of digging a sea-level canal in the Central American isthmus by nuclear power?

The experts at the Lawrence Laboratory gave an encouraging, though qualified, reply. If the cheapest potential route were used, that from Sasardi to Morti, in Panama, an entirely new, wide, sea-level canal could be dug for about 800 million dollars (£A360 million).

Since 1960 some important developments have occurred.

When, last November, Sen. John O. Pastore, of Rhode Island, chairman of the Joint Committee on Atomic Energy, queried Dr. Gerald Johnson, associate director of the Lawrence Laboratory for Ploughshare, Dr. Johnson was able to give a considerably more specific answer than had been possible in 1960.

The cost could actually be reduced even from the low 1960 estimate, and the fallout danger was already greatly diminished, with the vanishing point possibly in sight.

In the light of Dr. Johnson's reply to Sen. Pastore, in fact, it seems all but inevitable that a new, bigger, deeper isthmian canal will be dug eventually by nuclear excavation — although Dr. Johnson emphasises that five years of development, explosives production and cratering experiments must be carried out first.

Dr. Johnson estimates the cost of a nuclear-excavated sea-level canal at no more than 500 million dollars (£225 million).

Even a small nuclear charge will eject the excavated material, cutting out virtually all need for mechanical excavation.

Little, if any, fallout would be added to the world's atmosphere. With further experimentation there is every reason to believe that even this tiny amount could be greatly reduced.

## No Fallout

A sort of small-scale version of the canal excavation may be carried out by Ploughshare scientists within two to three years.

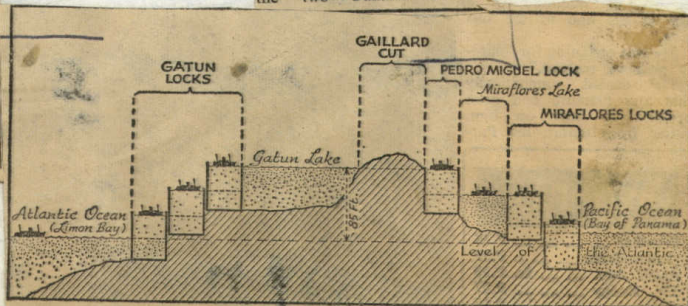
This is the Santa Fe railroad's proposed cut through the Bristol Mountains 200 miles east of Los Angeles. Dr. Johnson and his colleagues estimate that 22 charges would be required to dig this two-mile pass.

The new Panama Canal — which may not be in Panama — could be a much bigger job, requiring at least 300 separate charges, if the shortest (Sasardi-Morti) route is chosen. There are five possible routes in the Central American Isthmus, apart from the present one.

## Two Years

The westernmost is in Southern Mexico (Tehuantepec), the easternmost just inside the border of Colombia. Of the three in between, two are in the Republic of Panama and one crosses the border from Nicaragua into Costa Rica.

Most expensive would be the Mexican route, which would cost an estimated 2,300 million dollars (£A1,035 million). Cheapest would be the two Panama routes.



An illustration of the Panama Canal and the levels of its locks which carry ships between the Atlantic and Pacific Oceans.



INWARD CABLEGRAM

*ten days ago*  
F72/10/10  
FOLIO 101

LJH.

I. 12745.

DATED: 17TH APRIL, 1964.  
1910.

FROM:

REC'D: 18TH APRIL, 1964.  
1339.

AUSTRALIAN EMBASSY,  
WASHINGTON.

1111. CONFIDENTIAL. PRIORITY.

PROPOSAL TO DEEPEN GERALDTON HARBOUR.

YOUR TELEGRAM 1033.

COURT RANG THE AMBASSADOR FROM PITTSBURGH TWO DAYS AGO AND ASKED HIM TO MAKE ENQUIRIES CONCERNING THE CREDENTIALS OF PALMER AND BAKER (NOT TURNER AND BAKER) AND AS TO WHAT VIEW THE U.S.A.E.C. TOOK ON THE PRACTICABILITY OF A PLOWSHARE OPERATION ON GERALDTON HARBOUR, WHAT ASSISTANCE THEY MIGHT GIVE, AND WHAT INTERNATIONAL COMPLICATIONS, IF ANY, MIGHT BE INVOLVED.

2. WHEN COURT TELEPHONED AGAIN ON APRIL 16TH THE AMBASSADOR BRIEFED HIM ALONG THE LINES OF THE FOLLOWING NOTE PREPARED BY OUR ATOMIC ENERGY ATTACHE AFTER ENQUIRIES MADE BY HIM AT THE U.S.A.E.C.

BEGINS -

THE UNITED STATES CONSUL IN PERTH HAS BEEN ACTIVE FOR SOME TIME IN PROMOTING UNITED STATES ENGINEERING INTEREST IN HARBOUR CONSTRUCTION IN WEST AUSTRALIA AND HAS BROUGHT THE WEST AUSTRALIAN GOVERNMENT TOGETHER WITH PALMER AND BAKER.

THIS INFORMATION WAS PROVIDED BY THE U.S.A.E.C. WHO ALSO HAVE THE IMPRESSION THAT THE WEST AUSTRALIAN GOVERNMENT WILL ASK PALMER AND BAKER TO MAKE A PRELIMINARY FEASIBILITY STUDY OF A HARBOUR EXCAVATION, BOTH AT GERALDTON AND 10 MILES NORTH OF GERALDTON, BEARING IN MIND THE FACT THAT THE SEISMIC SHOCK FROM AN EXCAVATION AT GERALDTON WOULD PROBABLY DEMOLISH THE TOWN.

THIS STUDY WOULD BE AT THE EXPENSE OF THE WEST AUSTRALIAN GOVERNMENT.

THE REASON FOR USING NUCLEAR EXPLOSIVES IS THAT THE EXCESSIVE OCEAN SWELL AROUND GERALDTON WOULD MAKE UNDERWATER DRILLING FOR CONVENTIONAL EXPLOSIVES EXCESSIVELY EXPENSIVE COMPARED WITH NUCLEAR EXPLOSIVES.

MR. REECE, A SENIOR EXECUTIVE OF PALMER AND BAKER, HAS DISCUSSED THE LICENSING AND REGULATION AND SAFETY ASPECTS OF THE PROPOSED EXCAVATION WITH THE U.S.A.E.C. AND HAS DISCUSSED THE PROPOSED EXCAVATION IN GENERAL TERMS WITH THE U.S.A.E.C. PLOWSHARE DIVISION.

IT SHOULD BE NOTED THAT PALMER AND BAKER ARE AN INDEPENDENT FIRM IN THIS PROPOSED EXCAVATION AND WOULD SIMPLY REQUEST INFORMATION AS NECESSARY FROM THE U.S.A.E.C.

THE U.S.A.E.C. IS HAPPY TO PROVIDE PLOWSHARE INFORMATION TO REPUTABLE ENGINEERING FIRMS (THIS INCLUDES PALMER AND BAKER), BUT IN THE CASE OF THE PROPOSED EXCAVATION, WOULD CAREFULLY CHECK ALL THE PROPOSALS IN DETAIL BEFORE COMMITTING ITSELF TO A NUCLEAR DETONATION.

THE U.S.A.E.C. ITSELF WOULD PLACE AND FIRE THE EXPLOSIVE.

THERE COULD WELL BE INTERNATIONAL OBJECTIONS TO SUCH A PROPOSED EXCAVATION.

CONFIDENTIAL



INWARD CABLEGRAM

LJH.

- 2 -

I. 12745.

THE PROVISIONS OF THE LIMITED NUCLEAR TEST BAN TREATY, WHILE PERMITTING AN UNDERGROUND NUCLEAR DETONATION, DO NOT PERMIT CARRY-OVER OF FALLOUT OVER NATIONAL BOUNDARIES.

THIS PROBLEM IS CURRENTLY UNDER EXAMINATION, AND IT MAY BE THAT IN SOME FEW YEARS TIME AN AMENDMENT TO THE TEST BAN TREATY WILL ALLOW LIMITED FALLOUT CARRY-OVER OVER NATIONAL BOUNDARIES.

AT PRESENT, IT IS ALMOST CERTAIN THAT THE PROVISIONS OF THE TREATY WOULD PREVENT SUCH AN EXCAVATION.

WHILE THE U.S.A.E.C. WOULD PROBABLY NOT OBJECT TO SUCH AN EXCAVATION, THE UNITED STATES GOVERNMENT WOULD NOT ALLOW THE U.S.A.E.C. TO PARTICIPATE WITHOUT THE AGREEMENT OF THE COMMONWEALTH GOVERNMENT, AND THE COMMONWEALTH GOVERNMENT WOULD NEED TO SATISFY ITSELF ON SAFETY AND FEASIBILITY ASPECTS THROUGH THE AUSTRALIAN A.E.C. AND, ON POLITICAL ASPECTS - PRESUMABLY THROUGH THE DEPARTMENT OF EXTERNAL AFFAIRS.

ON THE SUBJECT OF PRICE AND ATTRACTIVE RATES, IF THE DEAL WERE COMMERCIAL, NO DISCOUNTS WOULD BE GIVEN, BUT THIS WOULD NOT NECESSARILY BE THE CASE IN THE EVENT THAT THE PROJECT WAS NEGOTIATED BETWEEN THE GOVERNMENT OF THE U.S.A. AND THE GOVERNMENT OF AUSTRALIA.

IT SHOULD BE NOTED THAT THE PRICE OF NUCLEAR EXPLOSIVES IS BEING REDUCED STEADILY, FOLLOWING TECHNOLOGICAL DEVELOPMENTS.

ENDS.

3. THE AMBASSADOR PARTICULARLY EMPHASISED TO COURT THAT THE U.S.A.E.C. WOULD NOT DEAL WITH THE STATE GOVERNMENT BUT ONLY WITH THE COMMONWEALTH GOVERNMENT, AND ADMISED COURT THAT HE SHOULD APPRISE THE COMMONWEALTH GOVERNMENT OF HIS GOVERNMENT'S INTEREST IN THE MATTER AND WORK THROUGH THEM.  
COURT FREELY ACCEPTED THIS POSITION.

MIN. & DEPT E.A. (720/10/10)  
MIN. & DEPT N.D.  
MIN. I/C A.A.E.C.  
A.A.E.C.  
P.M.'s.

18TH APRIL, 1964.

SEC FAS(2,4) DL INT UN PACAM AMSP ER

CONFIDENTIAL

CONFIDENTIAL



DEPARTMENT OF EXTERNAL AFFAIRS

OUTWARD CABLEGRAM

*Mr DeLongue*  
*J. T. Rafter full.*  
*is - the A.A.E.C.*  
*got at him.*  
0. 9892. *AD*

100

LJH.

TO:

Sent: 18th April, 1964.  
1342.

Australian Embassy,  
WASHINGTON.

1034. UNCLASSIFIED.

Sir William Spooner, Minister for National Development, last night issued the following Press statement -

"My attention has been drawn to a report in the West Australian Press about a proposal for an underground nuclear explosion project to be carried out near Geraldton for the purpose of harbour improvements there.

I know nothing about this except what I have seen in the Press.

If and when the Western Australian Government approaches the Commonwealth on the matter, that will be the time for us to consider it. In the meantime comment would be premature".

MIN. & DEPT NATIONAL DEVELOPMENT.  
MIN. & DEPT E.A. (720/10/10)  
A.A.E.C.  
P.M.'s.

20th April, 1964.

SEC FAS(1,2,4) DL INT UN PACAM AMSP ER@



*Mr. Holt*

FOLIO No.  
99

OUTWARD CABLEGRAM

GMO

Q.9874

TO:

Sent: 16th April, 1964.  
2010

Australian Embassy,  
WASHINGTON.

1033 CONFIDENTIAL. PRIORITY.

Western Australian press today publicised negotiations which have apparently been proceeding in the United States involving firm of Turner and Barker of Washington about deepening of Geraldton harbour by nuclear explosions.

2. National Development understand from times that Mr. Court has been in touch with Embassy in connection with Geraldton proposal. Please advise.

3. You will appreciate problems arising out of our signature of Nuclear Test Ban Treaty, implications of which for proposal of this kind would require closest consideration. Grateful if you could discreetly point out to Mr. Court that this might raise issues for Australia under our international obligations, and indicate to him that Commonwealth would need to give very careful consideration to any proposal such as that which has been publicised with regard to Geraldton.

4. Text of statement which Minister for National Development is expected to make today, pointing out inter alia that Commonwealth has not been approached on this matter, will be cabled to you after clearance with Senator Spooner.

5. For some further background you might ask Australian Mission to United Nations in New York for copy of record of inter-departmental discussions of 21st August, 1963.

MIN. & DEPT E.A. (720/10/10)  
MIN. & DEPT N.D.  
MIN. I/C A.A.E.C.  
P.M.'s

18th April, 1964.

SEC FAS(2,4) INT DL UN PACAM AMSP ER

CONFIDENTIAL



EXTERNAL AFFAIRS.

FOLIO No.  
98

File No. ....

Date 17th April, 1964

6340/63.

SUBJECT

FOR DR. THOMSON  
E.R.

Sir Harold Raggatt telephoned after speaking to Moodie and failing to get on to Waller about an atomic energy matter which falls within E.R. Branch. He says that Timbs of the A.E.C. has reported from Washington that the Deputy Premier of Western Australia has been negotiating with a Pittsburg firm for a "plowshare" operation in Western Australia. The press in Western Australia have this story. The first he, Sir Harold Raggatt, or Professor Baxter have heard about it was from these press reports. Raggatt points out that we are by no means decided about accepting any plowshare operation in Western Australia and the subject is still being considered. As I recalled there were problems regarding our accession to the Nuclear Test Ban Treaty which we would like to consider also.

2. I told Raggatt that I was not aware that we had any information from our Embassy about the Western Australian negotiations. Raggatt thought that the Embassy might have had some information about the progress of the talks and they should also have had sufficient guidance about plowshare to warn the Western Australians. He asked that we check to see what background we had sent to our Embassy. Dr. McCay of Department of National Development would also check and would consult us about the terms of a message to be sent to our Embassy in Washington.

3. Would you please consider urgently and deal direct with Dr. McCay on this matter.

*AKS.L. McCay*

~~*Dr. DeLong*~~  
*Plowshare*

*pb*  
(Patrick Shaw)  
First Assistant Secretary  
Division II



ALTERNATIVE CANAL ACROSS SOUTHERN MEXICO PROPOSED - PANAMA CANAL "INADEQUATE"

President Chiari of Panama has confirmed that his country's specific aim in its coming talks with America will be the writing of a new treaty governing the Panama Canal Zone. Panama yesterday agreed to resume diplomatic relations with the United States in return for an American undertaking that control of the Canal Zone will be discussed. Under the treaty of 1903, America has control of the zone for ever. However the joint communique announcing the agreement, avoided use of the term 'revision of the treaty' to which the American Government objected and to which it was therefore not committed. In a radio broadcast last night, President Chiari said that Panama's representatives in the talks with America would be instructed to negotiate and subscribe a new treaty outlining with all clarity the rights of Panama. President Chiari said he would not waver for one moment and would adhere to the position he had outlined. In Washington, the American Senate Democratic leader, Senator Mansfield, has proposed that America and other maritime nations, should finance the construction of a canal across Southern Mexico. Senator Mansfield in a prepared statement described the Panama Canal as "inadequate", noting that already it could not handle America's bigger warships and tankers or any vessel of more than 40,000 tons. He said that it was, or soon would be, outmoded for the needs of world shipping and the defence of the Americas. Senator Mansfield said that an alternative canal across Southern Mexico, though long, was entirely feasible, particularly if nuclear explosions were used for much of the excavation.

FEDERAL CABINET CONTINUING DISCUSSIONS ON MALAYSIA

In Canberra today, the Federal Cabinet has been continuing its discussion of the dispute between Indonesia and Malaysia. The A.B.C.'s political correspondent says the Prime Minister, Sir Robert Menzies, probably will make a statement this afternoon announcing decisions made by Cabinet on the issue. Yesterday the Minister for External Affairs, Sir Garfield Barwick, gave Cabinet a report on latest developments in the Malaysia dispute.

NEW SUPERSONIC AIRLINER

Plans have been submitted to the American Federal Aviation Agency for three supersonic airliners designed to compete with the Concord aircraft being developed jointly by Britain and France. United Press International said that three American companies, Boeing, Lockheed and North American each submitted designs. One will be chosen for Government backing in a development programme to cost close to £450 m. U.P.I. said American aviation officials indicated that the Government would choose an airliner capable of 1,750 miles an hour. This would be 300 miles an hour more than the speed the Concord was expected to attain.

MEETING BETWEEN BRITISH PRIME MINISTER AND WEST GERMAN CHANCELLOR

The British Prime Minister, Sir Alec Douglas Home, and the Chancellor of West Germany, Dr. Erhard, have had their first meeting as Heads of Government. Late yesterday they met in London and held the first of a series of talks to extend over two days. At a luncheon given in his honour, Dr. Erhard made a fresh appeal for Britain to be included in a unified Western Europe. Only with Britain, he said, could Europe maintain itself prosperous and free. Dr. Erhard went on, "If Europe is to play its part in world politics, if Europe is to make its influence felt, this can only be brought about if Europe acts and works as one whole". The West German Chancellor said "We want to move very cautiously in order not to deepen the gap between Europe and Britain".

NINTH MEETING OF S.E.A.T.O. TO BE HELD IN MANILA IN APRIL

The Ministerial Council of the South East Asia Treaty Organisation will hold its Ninth Meeting in Manila in April. It will coincide with the tenth anniversary of the founding of the Organisation. The Philippines Foreign Secretary, Mr Lopez said yesterday that the meeting of the SEATO military advisers would be held at Baguio City, north of Manila several days before the Ministers met.

ER  
for file Operahan Plow (ugh) share

16/1

All



DEPARTMENT OF EXTERNAL AFFAIRS.

92

FOLIO No. 96

# INWARD TELETYPE MESSAGE.

720/10/10

*Thomson  
fin*

AEC598

TO EXTERNAL AFFAIRS

CANBERRA (FOR M.J. WILSON)

*M. Pashey*

FROM THOMAS ATOMCOM SYDNEY

EX COMMG BRANCH

1963 DEC 4 AM 10:12

YOUR TELEPRINTER 560 RE PLOWSHARE STOP OTHER AUTHORS  
STILL PREPARING MATERIAL AND WE DO NOT ~~EXT~~ ~~IT~~ ~~FE~~  
EXPECT SEE COMPLETED DOCUMENT TILL NEW YEAR STOP

*File*

CHICKED

ENDS



DEPARTMENT OF EXTERNAL AFFAIRS.

OUTWARD TELETYPE MESSAGE.

FOLIO No. 95

FOR THOMAS AAEC SYDNEY - 560  
FROM WILSON EA CANBERRA.

PLOUGH SHARE.

GLAD ADVICE WHETHER DR. WILSON COMPLETED HIS REPORT  
BEFORE DEPARTURE FOR VIENNA. IF SO, WOULD YOU LET ME KNOW  
WHEN WE MIGHT EXPECT COPIES.

CFM 560 ENDS

ER SECTION 2/12/63 1335 AEST PJ

SENT 2

EX COMMS BRANCH

'1963 DEC 2 PM 1:57

*File*

*720/10/10*



MJW.HMS

94

720/10/10

966

19th November, 1963.

The Australian Embassy,  
WASHINGTON

PLOUGHSHARE

Dr. A.R. Wilson of the Australian Atomic Energy Commission and the other two officers have now returned to Australia. The A.A.E.C. has asked if you would convey to the Chairman of the U.S.A.E.C., its appreciation of the arrangements made to receive Dr. Wilson and his colleagues.

2. Dr. Wilson has stated that every effort was made by the U.S.A.E.C. and its contractors to provide all the information which the team sought and he feels he is now in a position to report fully to the Government on the "Ploughshare" programme. Dr. Wilson and his colleagues also greatly appreciated the warmth and sincerity of their reception by the U.S.A.E.C. officials concerned.

(M.J. Wilson)  
for the Acting Secretary.

✓



OUR REFERENCE

YOUR REFERENCE

POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES: ATOMCOM, SYDNEY - TELEPHONE: 665-1221



C.62/142  
C.62/214

12th November, 1963

Dear Sir,

I refer to my letter, C.62/142 of 6th. June, 1963 relating to a visit to the United States by Dr. A.R.W. Wilson of this Commission and officers of the Snowy Mountains Hydro-Electric Authority and the Bureau of Mineral Resources to study the "Plowshare" programme.

The officers concerned have now returned from the visit and are engaged in the preparation of their report. Accordingly, I would be grateful if you now could arrange for the Ambassador to convey to the Chairman, U.S.A.E.C., this Commission's appreciation of the arrangements made to receive Dr. Wilson and his colleagues.

~~The Ambassador may care to note that Dr. Wilson has stated that every effort was made by the U.S.A.E.C. and its contractors to provide all the information which the team sought and he feels he is now in a position to report fully to the Australian Government on the "Plowshare" programme. The Ambassador also might care to mention that Dr. Wilson and his colleagues greatly appreciated the warmth and sincerity of their reception by the U.S.A.E.C. officials concerned.~~

*also*

Yours faithfully,

*MFR*

*[Handwritten signature]*  
M. C. Timbs  
General Manager.

*File*

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

*R/S with file*

*[Handwritten scribble]*

*in 4/12 127*

*15/11 MM*







OUTWARD CABLEGRAM

TM.

0.24054.

Sent: 29th October, 1963.  
1908.

TO:

Australian Embassy,  
WASHINGTON.

120/10/10

2707. CONFIDENTIAL.

For F.L. Bett from Timbs, A.A.E.C., Sydney.

Reference proposals for course of instructions on Plowshare (Ambassador's cable No.2878). Would be grateful for urgent reply as to what precisely is meant by the term "Professor". Does this necessarily mean a Professor from one of the Universities or other teaching institutions or would the nomination of suitable engineer or scientist from a research institution be acceptable to the United States authorities?

*Ch. Wills*

MIN. i/c A.A.E.C.  
MIN. & DEPT N.D.  
A.A.E.C (S)  
P.M's.

30th October, 1963.

SEC FAS(4) ER

CHRYSE *W*

CONFIDENTIAL



572  
18/1/81

7

STANDARD



EXTERNAL AFFAIRS.

Mr M. Wilson  
signature PLS.  
FOLIO No. 91  
15/11  
M

~~McKee~~

~~Rowsham~~

I spoke informally to Dr Wilson.

He is writing the report on their visit to the US. He describes it as a "technical report for laymen", but he is uncertain when it will be finished, especially as he is off to Vienna at the end of November to attend 2 IAEA technical meetings. He is quite prepared to come to Canberra to talk to us. He thinks we would find it interesting but not spectacular.

Thanks

Wilson asked me about this again last week up in mid-November PLS  
Follows 30/10 Hg  
M



EXTERNAL AFFAIRS

FOLIO No.  
90

~~Mr. Pegeley~~

~~Wheaton~~

Plowshare Programme

The "Shoal Shot" yesterday  
seems to have been only just  
contained, judging from the  
press reports.

~~Wheaton~~

28/10

~~diffs -~~

He will be writing  
up the bar  
coming up.

28/10



EXTERNAL AFFAIRS

FOLIO No.  
89

FILE No. \_\_\_\_\_

DATE 24 Oct 63

SUBJECT

"Nowshere"

FOR

*A. H. H. H.*

Ref. letter on his file.  
Munro (Dun) told me she was thinking of getting Dr. Wilson up to Canberra to speak to an inter-departmental meeting.

I said that we would, in any case, want to have been over to the department on Kesberg aspects. I thought she should leave the question of a visit to us, & he has agreed. I'll speak to Dr. Wilson as soon as he returns.

28/10

*A. H. H. H.*

24/10



INWARD CABLEGRAM

RB

I.29403

FROM:

DATED: 25TH OCTOBER, 1963  
1820

720/10/10

REC'D: 26TH OCTOBER, 1963  
0905

AUSTRALIAN EMBASSY,  
WASHINGTON.

2878. CONFIDENTIAL.

FOR MINISTER FOR NATIONAL DEVELOPMENT FROM AMBASSADOR.

U.S.A.E.C. AND ATOMIC INDUSTRIAL FORUM REPORTED CONSIDERING  
A COURSE OF INSTRUCTION ON USES OF PLOWSHARE FOR PRACTISING  
UNIVERSITY PROFESSORS OF CIVIL, MINING, MECHANICAL ENGINEERING  
OR GEOLOGY TO BE GIVEN 1964 IN U.S.A.

PROFESSORS TO USE INFORMATION IN LECTURE COURSES.  
ONE OF FIVE PLACES TENTATIVELY RESERVED FOR FOREIGNERS  
IN PROPOSED CLASS OF TWENTY-FOUR IS FOR AN AUSTRALIAN  
PROFESSOR.

DO YOU WISH TO INDICATE INTEREST IN ATTENDANCE BY  
AUSTRALIAN?

THESE PLANS ARE CONFIDENTIAL AND THEIR SPREAD SHOULD  
BE AVOIDED.

MIN. & DEPT NATIONAL DEVELOPMENT  
P.M.'s.

26TH OCTOBER, 1963

F

SEC FAS(4)

*Mr. Peckey*  
*10/26/63*

CONFIDENTIAL



DEPARTMENT OF EXTERNAL AFFAIRS  
**INWARD CABLEGRAM**

FILE NO.  
87

IM

I.29001

FROM:

DATED: 22ND OCTOBER, 1963.  
2123

AUSTRALIAN EMBASSY,  
WASHINGTON.

*720/10/10*

REC'D: 23RD OCTOBER, 1963.  
2117

2826 UNCLASSIFIED.

FOR THOMAS, ATOMCOM FROM BETT  
PLOWSHARE.

PENDER REQUESTS YOU BOOK HIM EARLIEST TO COOMA OR CANBERRA  
SATURDAY.  
NOTIFY BOOKING TO SMH, TELEPHONE 710 E.2009.

A.A.E.C.  
P.M'S

23RD OCTOBER, 1963.

SEC FAS(1,2,4) DL INT PACAM AMSP ER

*Full*  
*Waltson*  
*Ms speak to Mr. Peasley*  
*when he gets reports back*  
*to ensure we get*  
*what reports come*  
*Mr. Peasley*  
*in return to*  
*my*

*Will the whole group be back.  
I hope we are to get their report.  
All 23/10*



AEC

FOLIO No.

86

UNITED STATES  
ATOMIC ENERGY COMMISSION  
Washington, D.C. 20545

No. F-204  
Tel. HAZelwood 7-7831  
Ext. 3446

October 14, 1963

NOTE TO EDITORS AND CORRESPONDENTS:

Following is the text of an announcement dictated to the wire services at 5:20 p.m. EDT, Friday, October 11, 1963:

"Two nuclear tests with different purposes were conducted by the Atomic Energy Commission at its Nevada Test Site today. Both were underground and of low yield. One was a weapons-related test; the other was part of the Commission's Plowshare Program to develop peaceful uses for nuclear explosives.

"Today's Plowshare test is part of an experimental effort to develop nuclear devices especially designed for peaceful uses. This test was one of a series to develop devices for possible use in proposed excavation experiments."

- 30 -

10/14/63





FOLIO No.  
85

*With the Compliments*

*of the*

*Australian Atomic Energy*  
*Commission*

*Commission*

*Mr. Timbs to see*  
*Att.*

M.C. TIMBS

*Mr. Peacock*

*M. Timbs*  
*2/10*

*45 Beach Street, Coogee, N.S.W., Australia*

BOX 41, POST OFFICE, COOGEE, N.S.W.



COPY:

C/- Atomic Energy Attache,  
Australian Embassy,  
WASHINGTON. D.C.

14th October, 1963.

The Acting Executive Member,  
Australian Atomic Energy Commission,  
P.O. Box 41,  
COOGEE. N.S.W.

720/10/10

Dear Maurice,

In reporting back to you on the progress of our investigations, I am assuming that Commissioners would prefer that I delay my comments on the technical status of Flowshare until they can be supported by the detailed material in our report. Certainly, at this stage, I would prefer to avoid committing myself to opinions which I may wish to modify after fuller discussion with my colleagues. However, there are three allied matters which I would like to bring to your attention, viz:-

(1) In a previous letter I referred to the importance which L.R.L. senior staff attached to the proposed "Schooner" cratering shot as a test case in the interpretation of the treaty. A condition of U.S.A.E.C. approval for the shot was that it had to be fired before 1st March, 1964 (this date was chosen to allow adequate decay of the radio-iodine fall-out before the cows began their spring grazing). Even on the basis of the most optimistic predictions on the frequency of favourable firing conditions and no delays in the construction programme, firing before 1st March, 1964, would have required Presidential endorsement of U.S.A.E.C. approval before the end of last week (Friday, 11th October). Dr. Edward Fleming, the L.R.L. technical director for Schooner, spent the early part of that week in Washington answering questions posed by the President's scientific advisers and returned to Livermore fairly hopeful that Presidential approval would be forthcoming. The focus of interest in Washington seemed to be in the level of fall-out which might be experienced in Canada should unexpected post-shot variations in the weather pattern take the cloud over Canadian territory. (The proposed site of the Schooner shot was Bruno, about 50 miles west of Twin Falls Idaho). By the end of the week L.R.L. had learnt that Presidential approval had been with-held. Although no reasons for the decision have been given to date, the L.R.L. senior staff are interpreting it as foreboding a fairly inflexible approach by the Administration to cratering shots in general.

Meantime, the Vila Uniform "Shoal" shot at Fallon, Nevada scheduled for 20th October has been postponed for a week by the U.S.A.E.C. because of uncertainty on the possibility of venting through a nearby fault. The Vila Uniform programme is tied to the development of seismic detection methods and the Shoal shot should be completely contained.

(2) I have commented previously on the wholehearted co-operation we have been afforded in gathering information and have speculated on the reasons for this, out of the ordinary, attention. I believe I can now add another reason to those I previously advanced. It is apparent that in many places our visit has been accepted as a means of obtaining an independent assessment of the technical direction and value of the Flowshare



programme. Fairly early in our stay at L.R.L., Dr. Johnson asked that we give Mr. Lucius Hale, an engineer in the State Department Agency for International Development (A.I.D.), a brief run-down on the role which we thought Flowshare could play in development schemes. Last Wednesday I was asked to review the programme with particular emphasis on the distribution of effort at a meeting of senior Flowshare staff. On Friday, Dr. Foster, the director of L.R.L., came across to our trailer with Dr. Johnson and asked me to comment on what the programme was achieving. I understand that Dr. Seaborg and General Luedecke wish to talk with us next week and hear our opinions. Everyone has asked that I be completely frank in my comments and, within the limits of courtesy, I have endeavoured to meet their request. I am probably the main victim of these sessions as my nervous energy is channelled inwards rather than outwards!

(3) Suggestions for longer-term Australian association with Flowshare have now been put to us on two separate occasions. At the meeting with Mr. Hale, Dr. Johnson, backed up by Mr. John Philip, Head of the Special Projects Division of the U.S.A.E.C. San Francisco Office, expressed the hope that some continuing association can be achieved. He put forward the following three suggestions, viz:

- (a) As a minimum a channel might be established to facilitate the flow of Flowshare information to Australia.
- (b) Arrangements might be developed for regular meetings between U.S. and Australian working groups concerned with Flowshare applications.
- (c) Australian scientists and engineers might participate in Flowshare events, (either as members of U.S. teams working on L.R.L. experiments or as an Australian group working on an Australian sponsored experiment).

Dr. Johnson pointed out that the security problem would not prove a major impediment to the latter suggestion since an increasing number of Flowshare events are to be detonated away from the weapons test site and can therefore be unclassified in all aspects except the actual device technology.

The subject of continued association was raised again when Dr. Foster, the Director of Lawrence Radiation Laboratory, and Dr. Johnson came across to talk to us before our departure from Livermore last Friday. Dr. Foster (an ex Canadian) rather brushed over Dr. Johnson's suggestions. He expressed the view that if the Australian Government decided that Flowshare was worth following up, it would be interested primarily in an arrangement which would provide it with scientists and engineers who could control all aspects of any Australian project except device emplacement and detonation. He argued that this could be achieved only by having a group of Australian scientists and engineers working within the Flowshare group at Livermore. He suggested that the membership of the group should be changed on a regular cycle so as to build up an experienced group in Australia as quickly as possible. Dr. Foster is preparing to break out the unclassified portions of L.R.L. work (thermo-nuclear, computer development, Flowshare etc.) into an unrestricted access area, primarily to assist the operation of a School of Advanced Nuclear Studies which is being established



at Livermore. When this is done there will be no security impediment to Australians working on any aspect of Plowshare other than device development. Dr. Foster expressed the further opinion that any Plowshare group formed in Australia from scientists and engineers returning after attachment to Livermore would not become viable until it reached a complement of at least 10.

Dr. Foster's suggestion is obviously very similar to the position the Commission arrived at when discussing the implementation of the Cabinet Decision. However, should it not prove possible to follow it up, in my opinion, from the Australian viewpoint, there would be merit in setting up a small study group in Australia to keep abreast of the technology and to evaluate the types of projects which might one day be undertaken in Australia. This would serve to define at an early stage, the types of problems which might arise in practical situations.

I look forward to the opportunity to comment in more detail on these various matters when I return to Coogee early in the week beginning Monday, 28th October. Finally, I should mention that some of the information in this letter, and particularly that relating to the "Schooner" event, was given to me on a personal confidential basis and could embarrass the persons concerned if it were to filter back to the "establishment".

I am taking the liberty of copying this letter to Frank Bett for his information.

With kindest regards,

Yours sincerely,

(Sgd.) Alan Wilson.



INWARD CABLEGRAM

RB

I.28848

FROM:

DATED: 21ST OCTOBER, 1963  
1717

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 22ND OCTOBER, 1963  
0156

2816. UNCLASSIFIED.

FOR THOMAS, A.A.E.C. FROM BETT.

WILSON TEAM ARRIVE SYDNEY QANTAS 587, SATURDAY 26TH OCTOBER.

CARTER PROCEEDING DIRECT TO CANBERRA.  
PLEASE NOTIFY MRS. WILSON, B.M.R. AND SMHEA.

CARR ARRIVED, PROCEEDED TO PITTSBURGH.  
ARRANGEMENTS LAWRENCE IN HAND.

720/10/10

A.A.E.C. (T/T)  
P.M.'s.

22ND OCTOBER, 1963

*File*  
*Roughshare*

ER



720/10/10

~~Mr Peacher~~ <sup>Thomas</sup>

1, 1700

Plushkare ↙

His 8 - onwards

are interesting

14/10

Mr

File



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(Sub)  
NOT FOR PUBLICATION UNTIL RELEASED  
BY THE SENATE FOREIGN RELATIONS COMMITTEE

August 14, 1963

STATEMENT BY GLENN T. SEABORG, CHAIRMAN  
U. S. ATOMIC ENERGY COMMISSION  
BEFORE THE SENATE COMMITTEE ON FOREIGN RELATIONS  
ON NUCLEAR TEST BAN TREATY

MR. CHAIRMAN AND SENATORS:

It is a pleasure to appear before you today to discuss the Treaty banning nuclear weapons tests in the atmosphere, in outer space, and underwater, and the impact which it would have, upon ratification, on atomic energy developments in the United States. There are two aspects to be considered, first, this country's defense posture and, second, the exploitation of nuclear explosives for peaceful purposes. Since these developments are quite different, they will be discussed separately.

First let me state that I support this Test Ban Treaty. The arguments presented by Secretaries Rusk and McNamara plus the factors which I wish to discuss with you today cause me to conclude that ratification of the Treaty is in the best interests of the United States.

The terms of the Treaty prohibit tests in the atmosphere, outer space, and underwater. It is recognized that testing can be carried out under certain conditions underground; a limitation has been placed upon delivery of radioactive debris outside of a nation's territorial limits. Thus, opportunity is available to each of the parties to carry out testing under defined conditions.



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By statutory authority, the Atomic Energy Commission has the responsibility to develop atomic energy so as to make the maximum contributions to the common defense and security of the United States. We have discharged this responsibility faithfully in the past and will continue to do so in the future. In this connection, I wish to review with you, some of the actions which the Commission, and I as its Chairman, are taking or expect to take in the discharge of our responsibilities within the terms of the Treaty.

I

The limited test ban will not in itself end the arms race nor eliminate the dangers we have faced in recent decades. It is thus essential that the US defense posture be maintained and that opportunities for its improvement be pursued under the Treaty. We will continue to vigorously support research and development in our weapons laboratories; the terms of the Treaty permit us to carry out an active underground testing program and we are doing so.

The intent of the Test Ban Treaty is to prohibit tests in the atmosphere, outer space or underwater, but to permit underground nuclear explosions. It is recognized that there may be venting to the atmosphere from some of these underground explosions, and a limitation has been set upon the delivery of radioactive debris outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted. In those cases where venting does take place, no problems are presented if the effects are noticed solely within the United States. The Treaty would prohibit a test which resulted in a quantity of radioactive debris delivered outside of the country's territorial



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limits in amounts sufficient to establish that such contamination resulted from a recent test within that country. We are in the process of developing guides for the use of those responsible for the carrying out of underground nuclear explosions so that there will be assurance that detectable and identifiable amounts of radioactive debris do not leave the territorial limits. There is nothing in the treaty to prohibit the kind of underground weapons testing we are conducting.

Before proceeding to discuss the benefits to be derived from further underground testing, I would like to take a minute to define a few terms relating to kinds of nuclear tests. The term "development test" refers to any test performed from the conception of the design through all the intermediate stages up to the final warhead or bomb design for a weapon. In development tests, devices, not weapons, are tested. The term "proof-test" includes warhead or bomb tests and systems tests. Proof-tests are conducted to determine whether or not the yields are as calculated, and thus usually involve warheads or systems which have entered or are about to enter a stockpile. "Effects tests" are aimed at determining, by either direct observation or by indirect means, practical results of nuclear detonations. They include: (a) Direct observation of the effects on such things as military equipment (including nuclear warheads) or installations and/or biological systems; (b) observation and measurement of the effects on the environment -- the ground, the atmosphere, the sea, etc. -- from which effects of practical importance can be calculated or inferred; and (c) measurements of the "outputs" of



the test device, e.g., neutron or gamma ray flux, X-ray intensity, light intensity, etc., to be used in predicting results under (a) and (b) above. Effects tests are usually conducted using a warhead for which the yield has been previously confirmed by one or more proof tests.

It appears technically feasible to test underground up to several hundred kilotons, and perhaps with more experience and greater ingenuity, to even higher levels. This would permit a wide range of development including complete development and proof-test of warheads for battlefield, air defense, anti-missile, and anti-submarine use. Included could be more sophisticated weapons for both tactical and ABM purposes, and reduced fallout weapons for battlefield use at the highest yields required for such applications. A program to develop all-fusion devices could be pursued.

Continued progress could also be made on larger weapons for strategic purposes. It should be possible to develop fully and to proof-test the smaller weapons of this type. For those weapons whose yields are larger than the underground test limitations, full development of some designs by testing at yields considerably smaller than that finally desired is possible so that with some uncertainty in final yield it should be feasible to develop, though not proof-test, weapons into the range of several megatons.

Hence, it seems likely that in the weapons development area only the complete development of new types of very large weapons above several megatons in yield would be very difficult if possible at all. Progress would, of course, be slower in many



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areas without atmospheric testing, especially at the larger yields where very deep holes and special precautions are necessary, but the ultimate results should be unchanged except in the high-yield range.

Weapons effects tests will continue to be conducted in the underground program. Radiation outputs of test devices and warheads can be studied. The vulnerability of warheads and other systems components can be examined for many effects associated with a nuclear explosion; however, complete studies involving blast and fireball as well as radiation effects directed at major weapons delivery systems would be impossible to carry out. Also, the study of those effects which are completely dependent on the atmosphere at operational altitudes would be essentially impossible and would thus limit the acquisition of new knowledge bearing on radar and communications. I agree with Secretary McNamara that progress will be forthcoming both from underground testing and from other improvements which can be made without need for nuclear testing.

Thus, we can foresee significant progress in our development program. Where there are limitations on our testing program, there are also limitations on the Soviets and on the other signatories.

## II

Our ability to maintain a vigorous, imaginative, and productive program including the development of the necessary scientific and technical "know-how" is dependent on the retention



of able scientists and engineers in our weapons laboratories and the attraction of new ones to the program. They must be challenged by new problems, work in a stimulating environment with adequate equipment, facilities and other support, and have maximum opportunities consistent with national policy to test the products of their laboratory experiments and calculations. We will strongly support these laboratories and will encourage the planning and execution of the programs, including allowed testing, necessary to meet our requirements. Public recognition of the need for strong laboratories and of the contributions made by the scientists is necessary.

### III

We must always remain alert to the fact that one side may try to acquire a superior advantage through violation or abrogation of the Treaty. The effect of such an action on the other parties is decidedly less where underground testing is permitted and where an active program of world-wide nuclear test detection is continued.

It does not seem possible to be forewarned against a surprise abrogation. Even if the three months notice period for any country planning to withdraw is given, it would possibly have been accompanied by an earlier period of preparation. Consequently, we will pursue the most promising directions of development permissible under the Treaty and will maintain a state of readiness for conducting tests in the atmosphere and other media. This readiness posture has been stated as national policy by the President.



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To minimize the slowing down of scientific developments which would otherwise provide advantages to a nation considering withdrawal, we will continue vigorous programs of development and underground testing by the weapons laboratories with strong support by the government through the provision of necessary advanced facilities and equipment and adequate supporting staff. Under the Test Ban Treaty, the Nevada Test Site and possibly other continental sites will be maintained on a continuing operational basis in order to support the test program which must be carried out. The maintenance of a state of complete test readiness, however, cannot be satisfied by the maintenance of only underground test sites.

If another nation should abrogate, we would find it necessary to carry out promptly atmospheric and other tests -- first, proof-tests of warheads and systems, along with limited effects tests because they can be staged more quickly, then weapons development tests and the more complex weapons effects tests. The major difference between maintaining a readiness to conduct proof-tests and to conduct development tests lies in the fact that for the development tests the devices themselves must be developed to the state where a test serves the maximum purpose. This is the primary function of the weapons laboratories.

The simplest proof-test requires a safe detonation area which may be over either land or water, a vehicle for delivery of the warhead, means for determining yield, a rather large number of technically trained personnel, and logistical support. Similar



requirements exist for carrying out development tests in the atmosphere; however, in addition, more complex diagnostic instruments will usually be required as will a complex communication system both to provide for safety and to facilitate the collection of data. Additional technical personnel and greater logistical support are obviously required.

Thus, the readiness to resume a full-scale weapons development program after a surprise treaty abrogation involves two independent, though related aspects -- the development of devices and experiments to be used in tests and the maintenance of a capability to carry out tests. As I have previously stated, the weapons laboratories will play a major role in maintaining a state of readiness through their development of new devices. Maintaining a mechanical readiness to conduct field tests on relatively short notice is difficult. Retention of a high technical test capability, however, will be assisted to a considerable extent by the continuation of an intensive underground test program. Also, under the determined and vigorous policy, which we expect to follow, no nation will be able to gain more than a temporary advantage through surprise abrogation.

#### IV

There is a second aspect to the utilization of nuclear explosives, namely, their application for peaceful purposes. This work is carried out by the Commission under its Plowshare program. The fact that these applications fall under the Treaty permits from the close similarity both of the explosive devices



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used and the conditions under which they are tested to those of the weapons program. This is not a new situation. Ever since man's first use of explosives, he has successfully developed and utilized the energy from explosions for his economic and social well being as well as for his defense.

It might be helpful if I take a few minutes to remind you of the scope of the Flowshare program, in order that you will have an appreciation of the impact which implementation of the Treaty will have on this program.

There are two broad categories toward which we are directing our attention. In the field of direct application, one finds projects such as excavation, mining, the recovery of oil and gas, and water resources development. The type of undertakings under consideration are either too costly or just not feasible without the use of nuclear explosives. Let us take excavation as an example. Nuclear explosives can be used to move dirt and rocks in civil engineering projects such as digging canals, harbors, passes through mountains for transportation purposes and, in general, any application which requires moving vast amounts of material. The experimental program to date has indicated that large civil engineering projects can be carried out with nuclear explosives at a fraction of the cost that would be required for conventional methods. In many cases the difference is such that these projects would not be undertaken by conventional means. The experimental program has also shown that methods can be developed for doing such projects safely. Basically, this is accomplished by using nuclear explosives which produce very little



radioactivity and emplacing them underground in such a way that nearly all of the radioactivity is trapped underground. The small amount of radioactivity that is released will be deposited from the lower atmosphere close to or immediately downwind from the shot site.

The Commission has received literally dozens of suggestions for using nuclear explosives in excavation projects in the United States and elsewhere in the world. These include digging canals and harbors, clearing navigation obstructions, and cutting passes through mountains for land transportation. A new trans-Isthmian canal is an interesting example; however, it probably could not be done under the present Treaty limitations because of the short distances to territorial boundaries.

The second category is concerned more directly with scientific research. Here, nuclear explosives used in an underground environment constitute a new and unique laboratory in which scientists can carry out experiments. The tremendous number of neutrons produced by nuclear explosives, many orders of magnitude higher than that of any other neutron source, can be used, for example, to produce man-made isotopes of very heavy elements which cannot be made in any other way. Similarly, these neutrons can be used in experiments to get data on neutron spectroscopy, the fission processes, neutron-neutron reactions, and many other data essential to our understanding of nuclear physics that may not be possible by any other means. The combination of extremely high temperatures and pressure makes it possible to conduct investigations of basic chemical reactions which cannot be duplicated in laboratories.



The various applications envisaged require the development of nuclear explosives with specific characteristics. For example, excavation requires nuclear explosives especially designed to minimize the production and release of radioactive debris. This requires devices which utilize very little fission energy and in which precautions have been taken to greatly minimize induced activity. Devices which can be used in large-scale excavation projects should be available after two to three years of test explosion experimentation. Other applications require different devices. Even though these devices are being developed and tested specifically for Plowshare, they utilize the most sophisticated design principles we know. This device development can be carried out deep underground in the manner used for weapons testing.

A series of experiments has been planned to develop nuclear excavation technology. An important part of this program is to refine the techniques of entrapping radioactive debris underground. This program requires about two experiments per year. We expect that in four or five years both the devices and technology will be available to undertake almost any of the many worthwhile projects which have been suggested; selected projects may be undertaken earlier as part of the experimental program.

Device development and the program for scientific studies planned for the immediate Plowshare program can clearly proceed under the terms of the Treaty. This is also true of applications for mining and water resource developments which would be carried



out deep underground and involve the release of very little, if any, radioactivity. In the excavation application, however, some radioactivity will reach the atmosphere and a careful determination will have to be made that a given project is permissible. Guidelines similar to those which we are developing for the use in weapons testing will be applied here. Our present considerations lead us to believe that excavation experiments or projects which have a downwind distance of several hundred miles from the project site to a territorial limit probably can be conducted, and that these experiments will be sufficient to develop the excavation technology.

We believe that the Plowshare program has a great potential for the benefit of mankind. We believe that within the next few years this potential and the safety aspects can be demonstrated within the terms of the Treaty. At some future time when it is clearly demonstrated that these benefits can be realized through the use of nuclear explosives, I would hope that the parties would seek ways of modifying the Treaty so that the technology developed could be put to more widespread practical application.

V

I would like now to summarize.

(1) Weapons development activities will go forward under the Test Ban Treaty with the exception of investigations of certain weapons effects and the complete development of complex multi-megaton weapons. This situation applies to all of the



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parties. The rate of progress in any country will be determined by its willingness to undertake extensive underground testing and its ingenuity in planning and in carrying out the program. The importance to a country both of future development of higher yield weapons and of future weapons effects tests prevented under the test ban will depend on the present state of advancement of that country's total weapons program. US progress is at least comparable, if not superior, to that of the USSR.

(2) The weapons development laboratories will be provided the support necessary to maintain strong programs, including test support activities. Attention will be given to the provision of equipment and facilities required for a modern effective research and development undertaking and for maintaining the confidence and morale of the associated scientists and other personnel. Continuation of Plowshare development in these laboratories will contribute to their viability.

(3) Systems to detect possible violation of the Treaty will be maintained and continually improved.

(4) A state of test readiness will be maintained and improved, including the overt preparations and maintenance required to achieve a readiness to conduct atmospheric nuclear tests at suitable off-continent locations and at continental test sites. Such preparations will include the maintenance in readiness of forces such as the Defense Atomic Support Agency and the nucleus of a Joint Task Force to plan and prepare for the conduct of off-continent tests.



(5) It is the national policy to maintain a continuing dynamic program of weapons development and a state of readiness to resume atmospheric testing should the Treaty be abrogated. This policy will achieve maximum effectiveness with the full support and understanding of the Congress and of the public.

(6) Promising applications of nuclear explosives for peaceful purposes will be developed and demonstrated under the Treaty. At such time as the benefits have been demonstrated, the parties may wish to modify the Treaty to permit extension of the technology and benefits to all.

\* \* \* \*

Mr. Chairman, this concludes my prepared testimony.





OUR REFERENCE

YOUR REFERENCE

BOX 41, POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES : ATOMCOM. SYDNEY — TELEPHONE : 665-1221

C.63/206

720/10/10

10th October, 1963.



Attention: M.J. Wilson Esq.

Dear Sir,

Effect of Nuclear Test Ban on Flowshare Programme

Thank you for your letter of 8th October. We have now received a copy of Dr. Seaborg's statement and I am pleased to enclose a copy for your use.

Yours faithfully,

*M.C. Timbs*

(M.C. Timbs)  
Acting Executive Member

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

*as per*

*M.J. Wilson*

*11/10*

*File*



720/10/10



FOLIO No.  
81

*With the Compliments*

*of the*

*Australian Atomic Energy  
Commission*

*M. C. Timbs*

From: M.C. Timbs  
Acting Executive Member

12

45 Beach Street, Coogee, N.S.W., Australia  
BOX 41, POST OFFICE, COOGEE, N.S.W.

*Mr Peasberry*

*11/10 LWS*



FLOWSHARE INVESTIGATION - FIRST INTERIM REPORT

1. The purpose of the visit is to collect information relevant to an evaluation of the possibility of using nuclear explosives for engineering works in Australia.

2. The first three weeks of the visit have been spent as follows:-

A) Week commencing Monday, 2nd September, Washington D.C.

Discussions with U.S.A.E.C. Corps of Engineers, U.S. Geological Survey and U.S. Bureau of Mines, concerning their interest and participation in the Flowshare Programme.

B) Week commencing Monday, 9th September, Berkeley and Livermore, Calif.

Exploration of organisational arrangements by U.S.A.E.C. San Francisco Operations Office. Preliminary technical discussions at Livermore.

C) Week commencing Monday, 16th September. Las Vegas and Camp Mercury, Nevada.

Description of nuclear device testing organisation by U.S.A.E.C. Nevada Operations Office. Inspection of Flowshare experiments at Test Site.

3. The discussions during the period have served to define areas of interest and develop procedures for collecting the necessary information. It is thought that the purposes of the visit can be met in 8 rather than 11 weeks and a proposal to this effect has been put to the AAEC.

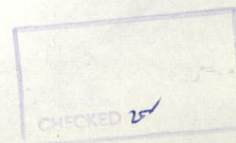
4. The U.S.A.E.C. obviously welcomes Australian interest in Flowshare and we are receiving maximum co-operation from all concerned. The strict security measures in force at N.T.S. did not prevent us viewing all areas relevant to Flowshare applications.

5. When talking with us, Dr. Teller, Dr. Gerald Johnson and Dr. Higgins have all speculated on possible Flowshare type projects in Australia. Nevertheless, they have readily accepted the limitations of our brief and have restricted their proposals to ways in which Australian knowledge of, and interest in, Flowshare might be facilitated.

6. Our investigations have not reached a point where we feel we are willing to venture an opinion on either the potential or progress of the Flowshare programme.

(Signed) A.R.W. Wilson

Livermore,  
24th September, 1963.





OC/ED.

DESPATCHED
8 OCT 1963
per <i>[Signature]</i> .....

FOLIO No.  
80

720/10/10

8th October, 1963.

The Secretary,  
Australian Atomic Energy Commission,  
Box 41, P.O.,  
COOGEE, N.S.W.

Effect of Nuclear Test Ban on Plowshare Programme.

Further to our teleprinter message of September 15th we should be glad to have, if you have received one direct, a copy of the statement before the Senate Committee on Foreign Relations made by Seaborg, Chairman of the U.S.A.E.H. on 14th August. Washington cablegram 2405 - I.24167 of 9th September 1963, refers.

*[Signature]*  
(M.J. Wilson)  
for the Secretary.



EXTERNAL AFFAIRS

FOLIO No.  
79

FILE No. \_\_\_\_\_

DATE 1 Oct

SUBJECT

*Rowshare*

FOR

*Mr. Hoover*

*Mr. Shaw*

*10/2/10*

*After as we  
learned the  
treaty could  
limit this  
program*

*B*

*You will be  
interested in para. 1  
on page 2*

*A*

*File*





*With the Compliments*

*of the*

*Australian Atomic Energy  
Commission*

M.C. TIMBS

*M. Beach 26/9*

*M. Timbs 1/60*

*45 Beach Street, Coogee, N.S.W., Australia*

BOX 41, POST OFFICE, COOGEE, N.S.W.



COPY

C/- Mr. Harold Curtis,  
United States Atomic Energy  
Commission,  
San Francisco Operations Office,  
2111 Bancroft Way,  
Berkeley 4 California  
U.S.A.

15/10/63

The Acting Executive Member,  
A.A.E.C.,  
P.O. Box 41,  
Coogee, N.S.W.

720/10/10

Dear Maurice,

At the conclusion of the first two weeks of our visit I am pleased to report that our study is proceeding satisfactorily. In particular, the discussions to date have served to identify the areas which are of critical importance in the evaluation of the feasibility of a nuclear explosion project and which, therefore, must be covered fully in the report which is to be the ultimate outcome of our visit.

We have been received most warmly, both by the U.S.A.E.C. and the other government agencies concerned with Plowshare and I am impressed by their obviously genuine anxiety to make our visit successful. This has been reflected in our talks with Dr. Teller, Dr. Gerald Johnson - Assistant Secretary for Defence (Atomic Energy) and Dr. Spofford English Director of Research and Development, U.S.A.E.C. It has been apparent that several of the U.S.A.E.C. officials we have met had hoped that we would be in a position to discuss specific projects which could be tackled in Australia within the Plowshare experimental programme. Nevertheless, their disappointment on having the terms of our brief explained to them has not prevented us receiving their fullest co-operation.

During our talks in Washington, John Kelly stated that the experimental programme planned for Plowshare was being held up by the need to develop cleaner devices to limit population exposures from fallout. I gained the impression that the U.S.A.E.C.'s interest in co-operation with Australia in the execution of an experiment could arise, at least in part, out of a desire to circumvent this obstacle. Over here at Livermore I believe the interest arises rather from the boost which the programme would receive from a demonstration of its relevance to immediate practical problems. I have indicated previously the apparent reason for the State Department's interest and to complete the picture, need only refer to the Defence Department's connection with Plowshare. The Corps of Engineers, which as you are doubtless aware undertakes a large section of this country's public works programme during peacetime, has a group of engineers participating in the programme at Livermore. From a conversation with Gary Higgins I gather that its interest arises, not only from the civil construction angle, but also from the potential which cratering explosions offer as a demolition and obstruction technique in strategic areas.

.../2



The recent nuclear test ban treaty is apparently a source of some concern to the Plowshare proponents and particularly to Dr. Teller. Article I(b) of the treaty prohibits any nuclear explosion (including any underground one) which would cause radio-active debris to be present outside of the territorial limits of the State exploding the device. The anxiety over Plowshare stems from uncertainty as to how this requirement will be interpreted. If interpreted to mean measurable contamination, it would rule out cratering experiments. We have been told on a semi-confidential basis that the U.S.A.E.C. has endorsed the proposed March 1964 Schooner shot and requested presidential approval. The Livermore people are hopeful that the administration will show its hand before the U.S. ratifies the treaty and thus define its interpretation. The U.S.A.E.C. also has sought the Attorney-General's opinion whether nuclear explosions in water covered strata are allowable under the treaty. The Attorney-General at first saw no objection to such explosions, but subsequently indicated that there is sufficient uncertainty to make consultation with the "original parties" necessary in the event that such an explosion was contemplated.

You will remember that the U.S.A.E.C., when agreeing to receive us, restricted its suggestion on an appropriate programme to a broad outline of the way in which we might divide our time between Washington, Livermore and the Nevada Test Site. I have now discussed the programme in considerable detail both in Washington and here in Livermore and have come to the conclusion, with which the Livermore people agree, that by the end of 8 weeks we should have gathered as much information within the terms of our brief as is now available. Whilst L.R.L. (Lawrence Radiation Laboratory, Livermore) would be willing to allow us to remain for the full 11 weeks, they would undoubtedly prefer that the complex administrative arrangements which they have made to accommodate us should not be unnecessarily prolonged. In this connection, I should explain that at L.R.L. we have been given office space in a trailer outside of the security fence and do not have any access to the laboratories. We are collecting the information we require by arranging for the specialists in the various areas of the Plowshare programme to come out to the trailer and discuss their work with us. I assume that the Commission (A.A.E.C.) would wish us to return to Australia as soon as we have gathered all available information, and I will make our arrangements on that basis unless I hear from you to the contrary. An earlier return would rule out my attendance at the Atomic Industrial Forum meeting in New York, but you may feel that you can make suitable alternative arrangements to meet that situation.

The preparation of our report would be facilitated if the three of us could spend the remaining three of the scheduled 11 weeks working together at Coogee. If you are agreeable to this suggestion, perhaps John Pearce might write to S.M.H.E.A. and B.M.R. on your behalf, seeking their agreement to Mr. Pender and Dr. Carter being in Sydney.

I hesitate to raise one further point. The manner in which we have been received, particularly here at L.R.L., puts us very much in everyone's debt. I am endeavouring to show our appreciation by entertaining various staff members



but entertainment here is fairly expensive. Since future co-operation will be aided by establishing the friendliest relations with those responsible for the programme, I am led to suggest that the Commission might consider allowing me say a \$50 entertainment allowance with the proviso that receipts covering the relevant expenditures should be produced. However, should the Commission feel that any such action would set an undesirable precedent, I am confident that the three of us will nevertheless rise to the occasion.

I cannot close without saying how interesting and exciting I am finding the visit and how much I appreciate the confidence the Commission has shown in designating me to lead the group.

With kindest regards,

Yours sincerely,

(Sgd.) Alan Wilson

P.S. Could a copy of this letter be sent to the Atomic Energy Attache, Washington, for his information please?

*For 3 people  
for 4 weeks!*



*Foot*

DEPARTMENT OF EXTERNAL AFFAIRS.

FOLIO No.  
78

# OUTWARD TELETYPE MESSAGE.

FOR THOMAS ATOMCOM SYDNEY - 450  
FROM EXTERNAL CANBERRA.

RE WASHINGTON CABLEGRAM 2405 FROM BETT FOR THOMAS A.A.E.G.  
PLOWSHARE.

GRATEFUL FOR A COPY OF SEABORG'S STATEMENT IF YOU HAVE  
ALREADY RECEIVED SONE DIRECT.

CFM 450 2405 ENDS

FILE 720/10/10 ER SECTION 17/9/63M 9.15 PJ

*13-1*

EX COMMS BRANCH

SEP 18 AM 9:46

*JW*

*Plowshare*



## OUTWARD CABLEGRAM

ISW.

0.20022. *Wils*

TO:

Sent: 12th September, 1963.  
1915.Australian Embassy,  
MOSCOW.*Jde* *Phuthare*  
193. CONFIDENTIAL. PRIORITY. *720/10/63*

Your 297.

We have no further matters we wish you to raise with Gromyko. We have had an exchange of views this week with France over proposed nuclear tests in Pacific. If Gromyko raises this, you could say that we have rejected French allegations of discrimination over Government's attitude towards French proposals, and French claim that U.S.S.R. and United States carried out series of atmospheric tests in 1961 and 1962 without protests having been lodged by Australia. In reply to French Ambassador on 9th September, the substance of which has been released to the press, Minister recalled that Prime Minister had expressed concern in Parliament on 13th September, 1961, over resumption of Soviet testing and said that when, in a private interview on 31st August, 1961, Prime Minister had protested to Soviet Ambassador, latter had given continuation of French testing as one of reasons that led to Soviet decision. Minister also recalled that he himself had expressed in March, 1962, deep regret that, because of Soviet actions, United States had decided to conduct tests at Johnson and Christmas Island.

2. Our reply to French expressed Australia's concern, not merely with hazards to health, but with the danger of further testing and the proliferation of nuclear weapons. French tests might well provide pretext for countries to refuse to sign, or to invoke escape clause of, Test Ban Treaty. Australian Government had consistently supported efforts to reach international test ban agreement which, to be complete, must include provision for verification and must be signed by as many states as possible.

3. On 10th September Loginov sought support for Soviet opposition at forthcoming Conference to amendment of I.A.E.A. Constitution. United States and United Kingdom favour including technical assistance (now financed by voluntary contributions) in regular budget. We told Loginov Australia would abstain.

4. During this interview we discussed possibilities of using nuclear explosions for peaceful engineering (e.g. large craters for harbours or water storage) and we enquired whether U.S.S.R. had ever carried out river diversion works reported as being studied some years ago. Australian team is now in

CONFIDENTIAL



OUTWARD CABLEGRAM

ISW.

-2-

0.20022.

United States studying American techniques. If Gromyko enquires you should make clear that no decision whatever has been taken to carry out explosion in Australia and that we are merely studying geological, engineering and health aspects of technique which could some day be used for development projects.

---

A/MIN. & DEPT. E.A. (69/1/3/5)  
P.M.'S.

12th September, 1963.

SEC FAS(1,2,4) LA UN ER PACAM S&SEA EAMEC@ E DL IC

FA-4ZM0-mZOC  
FA-4ZM0-mZOC



File 919/1571 UN DOL

76

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

Name of Paper CANBERRA TIMES.

File No. ....

Published at CANBERRA.

Date 10 - 9 - 63

# NUCLEAR BLASTS FOR DAMS SUGGESTED

Nuclear explosives had obvious application to en masse dam construction, Sir Harold Raggatt said yesterday.

Sir Harold was speaking at the national symposium on water resources at the Academy of Science yesterday.

The explosives could also be used for the excavation of deep cavities with relatively small surface areas to serve as large and efficient storages in high evaporation areas where dam sites did not exist.

Sir Harold said, "There are many problems, including the necessity to pump water out of the deep excavation, but we should not regard the apparent difficulties of today as insuperable.

"Australia will continue to receive expert advice on progress and possibilities in this field."

Sir Harold said that desalination plants undoubtedly had a place in Australia's future, but it was difficult to see any general requirement for them at present.

Desalination was important to Australia because of the assured source of sea-water supply.

The possibility of economic desalination by large nuclear reactors had been given wide spread publicity recently.

Supporters of the scheme claimed that fresh water could be produced for a cost as low as 10 cents per 1,000 U.S. gallons.

Sir Harold said, "The reactor alone would cost several hundred million dollars.



INWARD CABLEGRAM

JPH:

I.24167.

Dated: 9th September, 1963.

1750.

Rec'd: 10th September, 1963.

1532.

FROM:

Australian Embassy,  
WASHINGTON.

2405.

UNCLASSIFIED.

For Thomas A.A.E.C. from Bett.

Your 2188.

Plowshare.

*File 720/10/10*

- 1. Seaborg's statement airmailed today.
- 2. Wilson saw Minister's statement.

*R/S on*

*16/9*

*[Signature]*  
F.7  
10th September, 1963.

MIN. & DEPT E.A.  
MIN. I/C A.A.E.C.  
A.A.E.C.  
P.M.'s

(T/T) (S)

10th September, 1963.



OUTWARD CABLEGRAM

AM

TO:

O.19778

Australian Embassy,  
WASHINGTON.

Sent: 9th September, 1963  
1645

2188. UNCLASSIFIED.

*Sturges*

Your 2381.

Plowshape.

Please forward by air Seaborg's statement of 14th  
August.

2. We assume that Wilson has seen Minister's statement  
of 1st September sent to you by telegram.

MIN. & DEPT E.A.  
MIN. I/C A.A.E.C.  
A.A.E.C.  
P.M.'s.

10th September, 1963

F

SEC A/S(DIV.1,2,4) ER@ PAC&AM AM&SP



INWARD CABLEGRAM

JT

I.23875

DATED: 5TH SEPTEMBER, 1963.  
2125

FROM:

REC'D: 6TH SEPTEMBER, 1963.  
1639

AUSTRALIAN EMBASSY,  
WASHINGTON.

720/10/10

2381 CONFIDENTIAL.

PLEASE PASS TO TIMBS, A.A.E.C.

FROM BISSET.

EFFECT OF NUCLEAR TEST BAN ON PLOWSHARE PROGRAMME.

OAKELY (U.S.A.E.C. DIVISION OF NUCLEAR EXPLOSIVES) INFORMED US ON 3RD SEPTEMBER THAT THE UNDERGROUND EXPERIMENTAL PROGRAMME WOULD NOT BE AFFECTED IN ANY WAY BY THE NUCLEAR TEST BAN TREATY.

HOWEVER, IT WAS THE CONSIDERED OPINION OF THE U.S.A.E.H. (SEE CHAIRMAN SEABORG'S STATEMENT BEFORE THE SENATE COMMITTEE ON FOREIGN RELATIONS ON NUCLEAR TEST BAN TREATY DATED 14 AUGUST 1963) THAT APPLICATIONS OF PROJECT PLOWSHARE INVOLVING EXCAVATIONS NEAR NATIONAL BOUNDARIES WOULD NOT BE POSSIBLE WITHOUT AMENDMENT TO THE TREATY.

2. IT APPEARS TECHNICALLY FEASIBLE TO TEST UNDERGROUND DEVICES UP TO SEVERAL HUNDRED KILOTONS YIELD, BUT IT WILL REQUIRE A FURTHER TWO OR THREE YEARS OF TEST EXPLOSION EXPERIMENTATION BEFORE SUCH DEVICES ARE AVAILABLE FOR USE IN LARGE SCALE EXCAVATION PROJECTS.

3. THE U.S.A.E.C. BELIEVES THAT SMALLER SCALE EXCAVATION EXPERIMENTS OR PROJECTS WHICH HAVE A DOWN-WIND DISTANCE OF SEVERAL HUNDRED MILES FROM THE PROJECT SITE TO THE TERRITORIAL LIMIT COULD BE CONDUCTED UNDER THE TERMS OF THE TREATY.

MIN I/C A.A.E.C.  
A.A.E.C(T/T)  
MIN. & DEPT E.A.  
P.M'S

7TH SEPTEMBER, 1963.

*Can he body help on this? (para. 1.)*

SEC FAS(1,2,4) PACAM AMSP ER@

CONFIDENTIAL





EMBARGO

DEPARTMENT OF EXTERNAL AFFAIRS,  
CANBERRA.

**FOR THE PRESS**

(Released only in Canberra.  
Not to be cabled, published or  
broadcast before 1200 hours,  
Sunday, 1st September).

PR 100

1st September, 1963.

*Wilson*

OPERATION PLOUGHSHARE

Statement by the Minister for External Affairs

The Minister for External Affairs, Sir Garfield Barwick, said today that Australia had accepted an invitation from the United States Atomic Energy Commission to inspect work being carried out in the United States on 'Operation Ploughshare' - work connected with the use of underground nuclear explosives for peaceful engineering purposes, a new technique which may very well develop to a point where it can be of significance to Australia, both in construction work at the seaboard and in the inland. It is therefore of importance that Australia keep abreast of the development.

Three Australian officials, led by Dr. A. R. Wilson of the Australian Atomic Energy Commission, will go to the United States next week to study the scientific, engineering and safety aspects of the 'Ploughshare' programme. The Australian team will have discussions in Washington and then spend some time at the experiment sites in the western United States.



INWARD CABLEGRAM

JT

I.23875

DATED: 5TH SEPTEMBER, 1963.  
2125  
REC'D: 6TH SEPTEMBER, 1963.  
1639

FROM:

AUSTRALIAN EMBASSY,  
WASHINGTON.

2381 CONFIDENTIAL.

PLEASE PASS TO TIMBS, A.A.E.C.

FROM BISSET.

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OAKELY (U.S.A.E.C. DIVISION OF NUCLEAR EXPLOSIVES) INFORMED US ON 3RD SEPTEMBER THAT THE UNDERGROUND EXPERIMENTAL PROGRAMME WOULD NOT BE AFFECTED IN ANY WAY BY THE NUCLEAR TEST BAN TREATY.

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3. THE U.S.A.E.C. BELIEVES THAT SMALLER SCALE EXCAVATION EXPERIMENTS OR PROJECTS WHICH HAVE A DOWN-WIND DISTANCE OF SEVERAL HUNDRED MILES FROM THE PROJECT SITE TO THE TERRITORIAL LIMIT COULD BE CONDUCTED UNDER THE TERMS OF THE TREATY.

MIN I/C A.A.E.C.  
A.A.E.C (T/T)  
MIN. & DEPT E.A.  
P.M'S

7TH SEPTEMBER, 1963.

*F Plowshare*

*720/10/10*

*Whitson*  
*Mr. Peacocky:*

SEC FAS(1,2,4) PACAM AMSP ER@

*Let us get Seaborg's Statement*

*les*

CONFIDENTIAL



INWARD CABLEGRAM

MB.

I. 23863.

FROM:

DATED: 5TH SEPTEMBER, 1963.  
1705.

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 6TH SEPTEMBER, 1963.  
1438.

2368. SECRET.

*Wilson*

TO EXTERNAL AFFAIRS AND EXECUTIVE MEMBER A.A.E.C. FROM WILSON.

AT A PARTY AT BETTS HOME ON TUESDAY NIGHT CARL THOMAS, STATE DEPARTMENT, ASKED ME HOW SERIOUS THE AUSTRALIAN GOVERNMENT IS ABOUT BECOMING INVOLVED IN PLOWSHARE EXPERIMENTS.

PRESSING HIS ENQUIRY THOMAS SAID THAT HIS DEPARTMENTS INTEREST AROSE OUT OF UNITED STATES EXPECTATIONS THAT COMMUNIST CHINA WILL EXPLODE ITS FIRST NUCLEAR WEAPON SOMEWHERE BETWEEN 30 DAYS AND 3 YEARS FROM NOW.

HE SUGGESTED THAT A NUCLEAR EXPLOSION IN AUSTRALIA, IN THE CONTEXT OF A PEACEFUL USES PROGRAMME SHORTLY THEREAFTER WOULD BE IN UNITED STATES / AUSTRALIAN INTEREST.

I WAS OBVIOUSLY EXPECTED TO PLACE MY OWN INTERPRETATION ON THIS REMARK AND DID NOT FOLLOW IT UP.

IN ANSWER TO HIS QUESTION I SAID THAT THE AUSTRALIAN GOVERNMENT RECOGNISED THAT NUCLEAR EXPLOSION TECHNIQUES COULD SOME DAY BE OF RELEVANCE TO AUSTRALIAN DEVELOPMENTAL PROJECTS, BUT THAT AT THIS STAGE ITS CONCERN WAS SIMPLY TO REVIEW THE PROGRESS MADE IN THE PLOWSHARE PROGRAMME.

MIN. & DEPT E.A.  
MIN. I/C A.A.E.C.  
A.A.E.C. (T/T)  
P.M.'s

6TH SEPTEMBER, 1963.

*I think he should have a reply, possibly agreeing with his action & telling him (as he will of course know) to retract himself to his own release.*

SEC FAS(1, 2, 4) S&SEA UN PACAM AMSP EA EAMEC ER@

*Draft Mr. for me to discuss with the Harvey before you speak to A.A.E.C. - Nat. Dev.*

*29/9*

SECRET

SECRET

SECRET



EXTERNAL AFFAIRS

*Confidential*

FOLIO No.  
69

FILE No. \_\_\_\_\_

DATE 30 Aug 63

SUBJECT

*"Howshare"*

FOR

*[Signature]*

*[Signature]*  
30/8.

You will be interested in the tabbed letter on this file, particularly (p. 2) Kelly's statement that US will not permit international inspection of the nuclear devices used in Project Howshare.

*[Signature]*  
30/8

*[Large stylized mark]*



CONFIDENTIAL



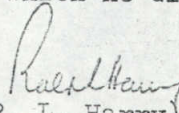
2nd September, 1963

Dear Sir Harold,

... With reference to our telephone conversation this morning, I attach copies of :

- (a) Record of discussion with officers of A.A.E.C., B.M.R. and J.M.A. on 21st August ;
- (b) My submission to Sir Garfield Barwick on 28th August, to which was attached Bunting's note on Cabinet Submission 625.

My recollection was at fault when I said that we had originally proposed a statement by your Minister. We did, however, suggest to Sir Garfield that he discuss the matter with Sir William Spooner, which he did.

  
(R. L. Harry)

Sir Harold Raggatt, C.B.E.,  
Secretary,  
Department of National Development,  
CANBERRA. A.C.T.

CONFIDENTIAL

Mr. Peachey

W. Wilson  
3/9



700/10/10 file

Plowshare

thirty inches in diameter, so you will see how small these weapons are and what an incredibly great amount of energy they are able to release. On the other hand, if we do not put the uranium 238 around the deuterium, but increase the lithium deuteride, then we can make clean weapons because in the fusion or thermonuclear process no fission products are produced, except those from the detonator or core—and developments are going on now to eliminate even those. It is thought that the fission process might be eliminated altogether as the detonator of the fusion process, but that has not been accomplished yet.

and N.E. P.P.

What I now want to discuss is the way in which these nuclear explosives can be used for peaceful purposes, especially in Australia. We are used to thinking of these weapons purely as agents of mass destruction, not realising how extraordinarily useful to mankind they might be, and how foolish it is not to make use of them. In the United States a project has been proceeding for some years, what they call the "Plowshare Project," to transform these weapons into useful tools. This project envisages the use of nuclear explosives for large-scale excavations in the ground, for breaking up underground structures, for mining purposes, for building harbours, and so on. If this is done on a large scale with devices of not less than one megaton, then the American experiments in the Nevada Desert show that one can excavate enormous craters at very little cost as compared with the normal means by which we make reservoirs and dams. Indeed, the excavation costs for straight work on reservoirs turn out to be between one-fifth (being as pessimistic as possible) and one-hundredth of that for excavating by normal civil engineering methods of using ordinary explosives, earth-moving equipment, and so on.

W.D. ... etc

The United States has revealed that a one-megaton device can be put down a hole about 30 in. in diameter. When the people who drill holes for oil were asked about drilling holes some 30 ins. in diameter, at first they were dubious but when they came to do so they found it was rather easier to drill a 30 in. diameter hole than an 8 in. Indeed, they drilled a hole over 1,000 ft. deep in solid granite in only a few weeks of work. So that the cost of placing these nuclear devices under the ground in order to produce excavations was quite negligible in comparison with that of removing earth from the ground. It has also been shown that, even with existing devices, hazards arising from radio-activity are very small. It is possible to go into these excavations: a good indication of this is that miners' unions, very sensitive to any hazards to their

members, are willing to dig channels through these exploded areas only a fortnight or so after an explosion was set off.

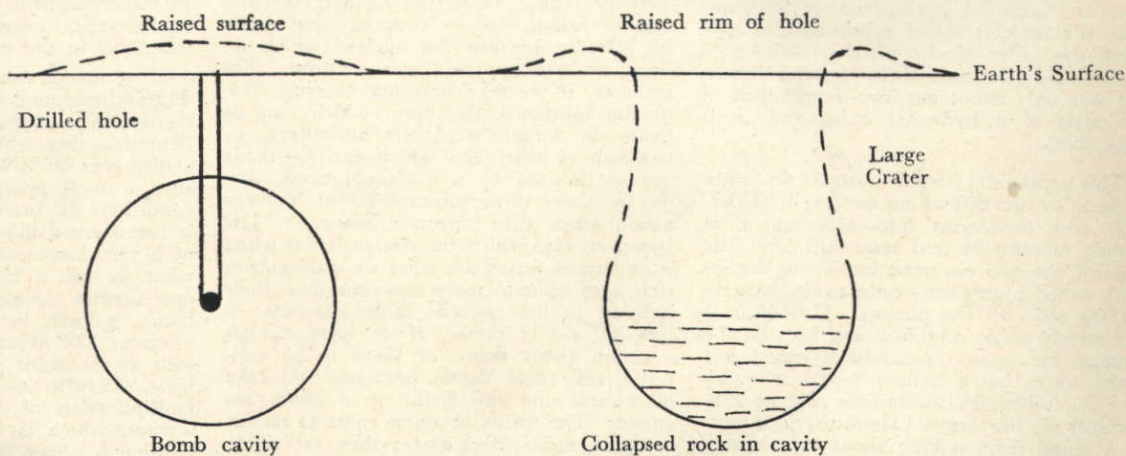
What is done is to drill a hole and put a nuclear device at the bottom, tamping the hole with sand. The bomb is then detonated, the earth and rock are forced back, and an enormous cavity is formed underground. If the shot is made at a sufficient distance underground, the surface of the ground is raised but is not actually broken. The temperature in the cavity is so high after the explosion has taken place that the whole of the walls of the cavity are fused by the intense heat into glass which fuses within the whole of the radio-active fission products resulting from the explosion. The glass is quite insoluble in water, so that underground sources of water are not contaminated. After the process is all over, if the explosion has not been too far below the earth's surface, the roof of the cavity collapses and we are left with a hole in the ground which looks very like a crater on the moon. It even has the raised rim around it. There is a mass of rubble on the bottom, but it forms a great reservoir for holding water. The same process could be used also for breaking up minerals, and so on, underground. Think what it would mean to Australia, the driest continent in the world, if we could carry out great Snowy Mountain schemes—building great reservoirs to hold water shed in winter at one-fifth or one-hundredth of the cost of existing methods. The Plowshare Project certainly offers a great contribution to the future of this country.

Dr. Teller was telling me only the week before last as we drove to the airport in San Francisco about another idea he has for producing water. He suggests taking a re-

out of the top—which can be condensed back to pure water at the surface. According to Dr. Teller's calculations, pure water in very large quantities can be obtained by distillation of sea water in this way at a very low cost indeed. We end up finally with a hole full of solid salt and start afresh at another spot.

Dr. Hammond, of the Los Alamos Laboratories in the United States, has been calculating the possibility of building very large nuclear reactors, with a heat output equivalent to say 100,000 megawatts, or  $10^8$  kilowatts of energy. These would be huge things, far bigger than one would require for power production because one simply could not use the power. They have studied both fast neutron reactors and slow ones, and find that, at a capital investment cost of about 5 dollars per kilowatt of heat produced, they can distil sea water for about 10 cents (about 1/-) per thousand gallons. This is less than most of us pay in Australia, and many parts, like South Australia and even Melbourne recently, would be very glad to have such a supply of water. It has to be done on a big scale, at the rate of about a billion gallons a day, in order to be profitable, but this water is cheap enough to be used for irrigation.

So we begin to see ways in which these nuclear processes, which we were accustomed to think of as weapons, or as producing electricity for industrial power, can be used in very different ways for the benefit of a country like Australia: first of all for the building of reservoirs in this the driest continent of the world and, secondly, for the filling of these reservoirs by distillation of sea water. I can think of no bigger boon than the solution of the water problem: in-



gion of the earth's surface where the temperature gradient downwards is high, such as the whole of the eastern side of Australia, and exploding a thermo-nuclear device at a depth of say 10,000 or 15,000 ft. With all the energy of the explosion trapped in the hole which results from the bomb, and with a high temperature at such a depth because of heat flowing from the interior of the earth in any case, sea water is poured down the hole, is evaporated, salt remains behind and steam comes pouring

deed, if one looks ahead for a generation or two, it is going to be this problem which sets a limit to the development of this country of ours. To supply enough fresh water to satisfy industrial and irrigation requirements would be a contribution to the Australian economy far greater than any other which Science could possibly make. In the Course of the next twenty or thirty years we may see nuclear energy making this great gift to our future welfare by solving Australia's water problem.



67

# OUTWARD TELETYPE MESSAGE.

CONFIDENTIAL.

720/10/10

FOR DR. A.R.WILSON, ATOMCOM SYDNEY 417.

FROM WILSON E.A. CANBERRA.

EX COMMS BRANCH  
1963 AUG 30 PM 12:15

FOLLOWING IS TEXT OF DRAFT PRESS RELEASE SENT TO THE MINISTER WITH SUGGESTION THAT HE DISCUSS IT WITH SIR WILLIAM SPOONER.

FOLLOWING IS TEXT.....BEGINS:.....

THE MINISTER FOR EXTERNAL AFFAIRS, SIR GARFIELD BARWICK, SAID TODAY THAT AUSTRALIA HAD ACCEPTED AN INVITATION FROM THE UNITED STATES ATOMIC ENERGY COMMISSION TO INSPECT WORK BEING CARRIED OUT IN THE UNITED STATES ON 'OPERATION PLOWSHARE' - THE USE OF UNDERGROUND NUCLEAR EXPLOSIONS FOR PEACEFUL ENGINEERING PURPOSES.

F

THREE AUSTRALIAN OFFICIALS, LED BY DR.A.R. WILSON OF THE AUSTRALIAN ATOMIC ENERGY COMMISSION, WILL GO TO THE UNITED STATES NEXT WEEK TO STUDY THE SCIENTIFIC, ENGINEERING AND SAFETY ASPECTS OF THE 'PLOWSHARE' PROGRAMME. THE AUSTRALIAN TEAM WILL HAVE DISCUSSIONS IN WASHINGTON AND THEN SPEND SOME TIME AT THE EXPERIMENT SITES IN WESTERN UNITED STATES.

(CFM 417).

ENDS 1125. MB

EA SECTION 30/8/63.

SENT 1 PLS



FOLIO No.  
66

DEPARTMENT OF EXTERNAL AFFAIRS

OUTWARD CABLEGRAM

ISW.

0.19828.

TO:

Sent: 28th August, 1963.  
2030.

Australian Embassy,  
WASHINGTON....2088

REPEATED:

Australian Consulate-General,  
NEW YORK....1677.

CONFIDENTIAL.

*Whits-*

Plowshare.

Wilson, Carter and Pender arrive 2nd September by flight VA822. Please meet. Please pay Dr. Carter travelling allowance at Senior Officer rate charging National Development vote 413/2/01. Advice concerning travelling allowance for Wilson has been sent direct. Pender has been paid travelling allowance, interval travel should be charged to their respective offices.

*File*

MIN. & DEPT E.A. (720/10/10)  
A.A.E.C.  
N.D.  
S.M.A.  
P.M.'s

29th August, 1963.

SEC FAS(1)(2)(4) AS(3) DL PACAM AMSP ER@ ADMIN PERS  
TRAV FIN

CONFIDENTIAL



EXTERNAL AFFAIRS

FOLIO No. 65

FILE No .....

DATE 28th August, 1963.

SUBJECT

Peaceful Uses of Nuclear Explosions

FOR The Minister

OFFICE OF THE  
MINISTER FOR  
29 AUG 1963  
EXTERNAL AFFAIRS  
CANBERRA

\* Attached is letter dated 13th May, from Secretary to Cabinet.

Late last year the Chairman of the U.S. Atomic Energy Commission invited Australia to discuss in detail the possibility of a mutual U.S.-Australian experimental programme of nuclear excavation. Ministers have approved that a group of technical officers should visit the U.S. to seek a first hand appreciation of the scientific, engineering and safety aspects of nuclear explosives without any suggestion at this stage that Australia's interest will be extended further, and without any commitment to accept international inspection if and when any explosion takes place.\*

2. The team has been selected and will leave on 1st September; it consists of Dr. A. R. Wilson, A.A.E.C., (leader); Dr. E.K. Carter, Bureau of Mineral Resources and Mr. E. S. Pender, Snowy Mountains Authority. They will spend ten weeks in the United States, mostly in California and Nevada at the site of "Plowshare" (peaceful uses) experiments.

3. It is for consideration whether a brief press statement about the nature and purpose of the visit should be made. There is always the possibility that the U.S. Atomic Energy Commission will make an announcement when the team arrives in Washington next week for preliminary discussions. There may be speculation and it might be better to make a routine statement to avoid an impression of furtiveness and secrecy. There is some press interest here. Last week the "Bulletin" had an article (attached) on the possibility of peaceful nuclear explosions in Australia inspired by a reference in your Parliamentary Statement on the nuclear test ban treaty.

4. You may wish to discuss this with Sir William Spooner and the draft of a possible press statement is attached.

*What to know  
the  
announcement  
2/18*

*Ruehlkamp*  
(R. L. HARRY)  
First Assistant Secretary.  
Division IV.

Economic Relations Branch  
M.J. Wilson/CM



CONFIDENTIAL



PRIME MINISTER'S DEPARTMENT.

CANBERRA.

13 MAY 1963

*In reply quote No.*

Dear Dr. Raggatt,

I attach a copy of the Cabinet decision which relates to Cabinet Submission No. 625 by the Minister for National Development on the subject of the peaceful use of nuclear explosives.

During the course of the discussion the Minister for External Affairs expressed a view to the effect that the Government might make it clear from the outset that should a programme involving nuclear explosion in Australia be agreed upon, it will be open to international inspection. The Cabinet did not dissent from the proposition of inspection. On the contrary, it gave support. But since no programme was in contemplation at this stage - on this point see the decision - it was felt that there was no call to make any announcement about inspection. However, it was agreed that the Minister for National Development would, in handling any issues which arise, be sensitive to the point made by the Minister for External Affairs.

Yours sincerely,

(E.J. Bunting)  
Secretary.

Dr. H.G. Raggatt, C.B.E.,  
Secretary,  
Department of National Development  
CANBERRA. A.C.T.



## ATOMIC ENERGY

# Nuclear Explosions in Australia

By 1965?

FROM ALAN REID IN CANBERRA



SIR G. BARWICK  
*Aside*

AUSTRALIA may soon be exploding nuclear devices — for peace, not war. External Affairs Minister Sir Garfield Barwick made an intriguing reference to this possibility last week in his House of Representatives speech when he desisted momentarily from his analysis of the nuclear ban treaty between the US, the Soviet and Britain to make this cryptic aside.

When listing a defect in the treaty — the freedom the nuclear powers still retain to test and explode nuclear weapons underground — Barwick added: "Explosions underground for peaceful engineering purposes, conducted publicly with proper safeguards to health, would still, of course, be possible, and might some day be of importance in the development of Australia."

In this aside Barwick was reflecting information received by the Commonwealth Government from its own atomic experts and the Government parties' Atomic Research Committee, a Parliamentary group which operates under the chairmanship of Liberal William Wentworth. This information is that it is hoped by 1965, though possibly it may be a little longer (Government projects in America as well as in Australia have a habit of lagging behind their officially laid-down timetable), the US will be in a position to give Australia firm quotations for staging and conducting on Australian soil nuclear explosions with a commercial purpose.

One of the people through which this information was officially conveyed to the Australian Government was Dr Garie Higgins of the US Atomic Energy Commission, who apparently has been a significant figure in that phase of the Commission's activities which operates under the appropriate code name of "Operation Ploughshare" and is devoted exclusively to steering nuclear energy and explosions into peaceful and productive channels. When Dr Higgins addressed the Atomic Energy Research Committee on March 22, 1962, he said that the US was confident that it would be in a position to offer explosions to Australia on a firm basis by 1965.

As an example of what the US

would be offering he set out a tentative price list, all, naturally, in US dollars. Australia could buy itself a neat little explosion, equivalent to 1000 tons of TNT, for as little as 600,000 dollars. If it wanted a larger model it would probably get a bang equal to that of 1,000,000 tons of TNT for as little as 1,100,000 dollars. If it wants something still bigger and better, it could have the equivalent of 10,000,000 tons of TNT for 1,400,000 US dollars. Size of the hole blown would depend on the depth at which the nuclear explosive was buried. But such precision had the experiments reached that the size of the hole could be computed in each case even before the nuclear device was set off.

There were limitations upon the ab-

solute free use of nuclear devices. Though control had been established and was constantly being improved, it would be unwise to release an explosion 10 miles from inhabited points.

From the Australian viewpoint, with the country's limited manpower such an explosion would do the work that would absorb the energies of hundreds of men for several years, and do it not only more expeditiously but just as tidily. Whole harbors could be blown into parts of Australia's lonely coastline where nature had made no provision, and a nation such as Australia would be able to undertake vast water works, possibly even the diversion of coastal rivers into the dry inland, on a scale that would be completely beyond its capacity if it were dependent on its limited manpower and conventional facilities. The range of jobs that Australia could face up to in developing the continent would widen spectacularly overnight. The whole thing, according to Dr Higgins, could be done safely, with both the explosion and fallout controlled and rendered harmless.

In analysing the value and weaknesses of the nuclear ban treaty between the US, the Soviet and Britain, Barwick gave his impressions of what he thought might be the shape of things for the world. But his aside revealed what might be the shape of things to come for Australia.



PROF. G. SAWER  
*"Losses"*

## UNIVERSITIES

# More Room at the Shop

*Over-award Payments*

FROM DAVID ROBERTSON IN CANBERRA

AUSTRALIAN universities are feeling the impact of a donnish cold war raging between the universities of the English-speaking world. The war is over the dearth of academic staff, qualified and suited to fill the top jobs in the universities which in postwar years have had to expand at an unprecedented rate. Professor Geoffrey Sawyer, Professor of Law and President of the Australian National University Staff Association, told me this week of one experience: "Recently I hoped to get a man from England for a particular appointment in Australia. One of his referees in praising this man and recommending him for the position also said I was not offering him nearly enough money. This referee was in a powerful position. He proceeded to

outbid me for this man, partly because the English university staffs, about three months earlier, had received a ten per cent increase in salaries and partly because their universities tend to appoint people to positions higher up the scale than we do."

Professor Sawyer concedes that Australia may suffer further losses against England as the campaign continues. He said: "Overcoming the effect of this recent increase in England depends on how rapidly the increase just granted to the University of NSW carries through to the other universities here. We should be again on a competitive basis with England when it does."

There is no question that there is a considerable range of jobs now vacant



UNPOL

DEPARTMENT OF EXTERNAL AFFAIRS, CANBERRA.

FOLIO No.  
64

Name of Paper CANBERRA TIMES.

File No.....

Published at CANBERRA.

Date..... 2-8-63

# Australia To See U.S. Atom Technique

**Australia will send observers to study the latest American techniques in underground nuclear explosions for peaceful engineering purposes.**

The Minister for External Affairs, Sir Garfield Barwick, said yesterday that three members of the Australian Atomic Energy Commission would leave for America next week to study the American Atomic Energy Commission's operation Ploughshare.

Sir Garfield said this was a new technique in the use of underground atomic explosions which could well develop to a point where it could be of significance to Australia.

The technique could be applied in construction work on the Australian seaboard and inland.

## Important

"It is therefore important that Australia keep abreast of the developments," he said.

Dr. A. R. Wilson will lead the team which will study the scientific engineering and safety aspects of the Ploughshare programme.

The Australian team will have discussions in Washington, then spend some time at the experiment sites in Western U.S.A.



PRESS STATEMENT

The Minister for External Affairs, Sir Garfield Barwick, said today that Australia had accepted an invitation from the United States Atomic Energy Commission to inspect work being carried out in the United States on "Operation Plowshare" - work connected with the use of underground nuclear explosions for peaceful engineering purposes, a new technique which may very well develop to a point where it can be of both significance to Australia, in construction work at the seaboard and in the Inland. It is therefore of importance that Australia keep abreast of the development.

Three Australian officials, led by Dr A.R. Wilson of the Australian Atomic Energy Commission, will go to the United States next week to study the scientific, engineering and safety aspects of the "Plowshare" programme. The Australian team will have discussions in Washington and then spend some time at the experiment sites in Western United States.



DRAFT

PRESS STATEMENT

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 Atomic Energy Commission to inspect work being  
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 peaceful <sup>engineering</sup> purposes, <sup>a new technique which</sup>

*both  
concepts  
new*

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 in western United States.

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 to Australia, ~~both at the~~  
~~research~~ ~~institutions~~ ~~work~~ ~~at the~~  
 research ~~and~~ ~~in~~ ~~the~~ ~~United~~ ~~States~~. ~~The~~  
~~importance~~ ~~of~~ ~~any~~ ~~importance~~ ~~that~~  
 Australia ~~has~~ ~~been~~ ~~able~~ ~~to~~ ~~develop~~  
 development.*



OUTWARD CABLEGRAM

:GS

0.19131

TO:

Sent: 30th August, 1963  
2112

Australian Embassy,  
WASHINGTON.

2108. RESTRICTED. PRIORITY.

Operation Ploughshare.

Following is the text of a statement by the Minister which will be released in Canberra at 1200 hours E.S.T. Sunday, 1st September. Please advise the Americans in advance of release.

Begins:

The Minister for External Affairs, Sir Garfield Barwick, said today that Australia had accepted an invitation from the United States Atomic Energy Commission to inspect work being carried out in the United States on "Operation Ploughshare" - work connected with the use of underground nuclear explosives for peaceful engineering purposes, a new technique which may very well develop to a point where it can be of significance to Australia, both in construction work at the seaboard and in the inland. It is, therefore, of importance that Australia keep abreast of the development.

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Ends.

MIN.&DEPT E.A.  
MIN.&DEPT N.D.  
MIN.I/C A.A.E.C.  
A.A.E.C.  
P.M.'s

31st August, 1963

SEC A/Ss ER@ PACAM AMSP EAMEC INF

RECEIVED  
DEPT OF EXTERNAL AFFAIRS  
31 AUG 1963



INWARD CABLEGRAM

PJ.

I.2335L.

Dated: 30th August, 1963.  
1825.

FROM:

Rec'd: 31st August, 1963.  
1102.

Australian Embassy,  
WASHINGTON.

2335. RESTRICTED.

Repeat A.A.E.C. Sydney from Bett.

Your 2108, Plowshare.

*hms*

Contents passed to State and U.S.A.E.C. Friday, 30th  
August.

Contents very well received.

E.A.  
~~NATIONAL~~ DEVELOPMENT  
A.A.E.C. (T/T)  
P.M.'S

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31st August, 1963.

SEC FAS(1) (2) (4) AMSP PACAM EAF&ME ER@ INF

DEPARTMENT OF EXTERNAL AFFAIRS



100  
1963 AUG 30 PM 14:49  
COMMS BRANCH

INWARD TELETYPE MESSAGE.

~~OPERATION PLOUGHSHARE~~  
Statement by the Minister for Ext Aff.

FOLIO No.  
59

E A CANBERRA 2474

FOR MR M J WILSON FROM KINGSMILL, MINISTER'S OFFICE, SYDNEY

PEACEFUL USES OF NUCLEAR EXPLOSIVES.

MINISTER HAS AMENDED YOUR DRAFT PRESS RELEASE WHICH NOW READS:

THE MINISTER FOR EXTERNAL AFAIRS, SIR GARFIELD BARWICK, SAID TODAY THAT AUSTRALIA HAD ACCEPTED AN INVITATION FROM THE UNITED STATES ATOMIC ENERGY COMMISSION TO INSPECT WORK BEING CARRIED OUT IN THE UNITED STATES ON 'OPERATION PLOW<sup>UGH</sup>SHARE' - WORK CONNECTED WITH THE USE OF UNDERGROUND NUCLEAR EXPLOS<sup>IVES</sup> FOR PEACEFUL ENGINEERING PURPOSES, A NEW TECHNIQUE WHICH MAY VERY WELL DEVELOP TO A POINT WHERE IT CAN BE OF ~~SOME~~ SIGNIFICANCE TO AUSTRALIA, BOTH IN CONSTRUCTION WORK AT THE SEABOARD AND IN THE IN<sup>LAND</sup>. IT IS THEREFORE OF IMPORTANCE THAT AUSTRALIA KEEP ABREAST OF THE DEVELOPMENT.

File

THRE<sup>E</sup> AUSTRALIAN OFFICIALS, LED BY DR A.R. WILSON OF THE AUSTRALIAN ATMIC ENERGY COMMISSION, WILL GO TO THE UNITED STATES NEXT WEEK TO STUDY THE SCIENTIFIC, ENGINEERING AND SAFETY ASPECTS OF THE 'PLOW<sup>UGH</sup>SHARE' PROGRAMME. THE AUSTRALIAN TEAM WILL HAVE DISCUSSIONS IN WASHINGTON AND THEN SPEND SOME TIME AT THE EXPERIMENT SITES IN THE WESTERN UNITED STATES.

720/10/10

CFM 2474

ENDS 30.8.63 1645



**DEPARTMENT OF EXTERNAL AFFAIRS**

Record of Conversation with Dr. A.R.W. Wilson (Aust. Atomic Energy Commission), Dr. K. Carter (Bureau of Mineral Resources), Mr. E.S. Pender (Snowy Mounts. Auth.) on 21st August, 1963.

Officers Present Mr. Shaw  
Mr. Harry  
Mr. Peachey  
Mr. McKeown

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MAIN SUBJECTS (S): Operation Plowshare - Visit of Australian Experts

The meeting was arranged, at the request of External Affairs, with representatives of three Australian agencies who were going to the United States to inspect work being carried out on "Operation Plowshare" - the use of nuclear explosions for peaceful purposes - to determine the possible application of these techniques in Australia. The purpose of the meeting was to brief the representatives on the broader External Affairs interest in the subject of nuclear testing in the context of the disarmament negotiations and the Test Ban Treaty.

2. Mr. Shaw in introduction outlined the background of disarmament negotiations, covering the Western objective of general, controlled, phased disarmament, Western insistence on including conventional as well as nuclear armaments, the negotiations for a test ban treaty, the difficulty of detecting underground tests and the failure to agree on inspection arrangements in regard to such tests. He explained the provisions of the test ban treaty, in so far as they affected explosions for peaceful purposes, and indicated the reasons for Australia's becoming one of the first signatories after the major nuclear powers.

3. Mr. Shaw said that the treaty left the way open for what the Minister in his statement of 15th August described as "explosions underground for peaceful engineering purposes conducted publicly with proper safeguards to health which might some day be of importance in the development of Australia." However, the intention was to continue the search for a treaty "resulting in the permanent ban of all nuclear test explosions including all such explosions underground." If there was to be such a ban on underground explosions there might still be provision for some explosions to be held under agreed conditions of inspection and control.

4. Mr. Shaw said that we had to remember that some of our Asian neighbours, and particularly the Japanese, were very sensitive on the subject of nuclear explosions. The Russians were also deeply suspicious of the possibility of peaceful explosions being used for military purposes. For this reason we might well consider that any peaceful nuclear explosion on which we might later decide to embark should be open for inspection, whether or not this was required under the terms of any international agreement.

5. Mr. Harry put the question of nuclear explosions for peaceful purposes in the context of the early stages of discussions on disarmament and the banning of nuclear weapons and weapons tests. He said that the Russians had been made aware of the possibility of nuclear explosions being used for peaceful purposes and there were

DISTRIBUTION: Secretary  
First Assistant Secretary Division I.  
Legal Adviser  
United Nations Branch  
Diplomatic Liaison Branch  
Economic Relations Branch  
First Assistant Secretary Division II

Report prepared by .....Mr. J.A. McKeown.....

ACTION:  
4858/56.

FOLLOWING POST:

CONFIDENTIAL

New York



- 2 -

reports that they had since done their own experimenting in this field. He recalled the endeavours of the United States negotiators to frame conditions to be written into a test ban agreement under which such explosions could still take place subject to international inspection and control. He suggested that this would require the inspection of the actual explosive devices on the spot so that other Governments participating in the treaty could be assured that the ~~explosive devices on the spot so that other Governments participating in the treaty could be assured that~~ the explosion was not designed to test new weapons but <sup>was</sup> genuinely peaceful in intent. Mr. Harry said that no doubt the Americans would continue to press for provisions to cover peaceful explosions in any eventual treaty banning nuclear tests in all environments, including underground testing. It was important that neither the Australian public nor the test-ban negotiators should get the impression that our study of 'Plowshare' was designed for evasion of the recently concluded agreement or to prepare for evasion of a total ban on tests.

6. Mr. Harry then raised the following questions concerning technical aspects of "Operation Plowshare" explosions:

- (i) By what mechanisms could fission products be sealed in molten rock and thus prevented from dispersing after detonation of an underground explosion?
- (ii) What would be the distribution of radio active material in the case of an excavation in which the crater was formed by a "collapsed bubble"?
- (iii) Would any radio-active material be released to be dispersed by tides and currents after an explosion under the sea bed?

7. Dr. Wilson said that there were two sorts of nuclear explosions which were of interest to them:

- (i) Crater experiments: these were detonated underground from a depth of perhaps a few hundred feet and formed a crater at the surface. These were of more immediate significance and it was estimated that these methods might be operational for civil engineering purposes by about 1967.
- (ii) Contained experiments: in this case the nuclear blast would be completely contained and would not break the surface at ground level. This type of explosion offered possibilities for power production, desalinisation of water etc. but was of less immediate significance for "Plowshare" type operations.

8. Dr. Wilson said that in an underground explosion large quantities of fission products were filtered off by the material above. Experiments had been conducted in which only about 5% of these products escaped into the atmosphere and were deposited as local fall-out over a fairly limited area. Dr. Wilson said that in explosions under the sea bed the material under the ocean floor would filter off large quantities of fission products though possibly not so effectively as in the case of underground explosions.

9. Mr. Shaw said that the Treaty did not define what constituted



an underground explosion. Presumably a crater explosion was an underground explosion. On this view, to take an extreme case, a bomb detonated under a few inches of earth would be an underground explosion. The only restriction on underground explosions was article 1 (b) which prohibited explosions which caused radio-active debris to be present outside the territorial limits of the state concerned.

10. Referring to a point made by Mr. Harry concerning the inspection of nuclear explosive charges, Dr. Wilson said that scientists were continually working on the development of devices in which there would be the highest possible fusion to fission ratio. This was important because it would reduce the amount of radio active fission products. Developments in these devices would be applicable to nuclear weapons as well as to peaceful nuclear explosions. Dr. Wilson was quite sure that the United States would not wish its latest developments in nuclear devices to be subject to international inspection.

11. Mr. Harry said that the alternative might be to use for engineering purposes "dirty" bombs of known types or none at all - assuming that a ban on testing underground was still the objective.

12. On the question of what might be said by the Australian team if questioned about their mission Mr. Harry suggested that they might base themselves on the remarks already made by the Minister for External Affairs on this subject. He felt that any appearance of secrecy would give an impression of furtiveness.

13. Dr. Wilson said that their instructions were simply to make "no comment" though he pointed out that there was bound to be some speculation about the nature of their trip and some reports might leak out from the United States. Mr. Harry proposed, and it was agreed that we should take up with the Minister for External Affairs the question whether a "routine" public statement should not be issued in consultation with the Minister for National Development stating the nature and purpose of the overseas visit.



28th August, 1963.

Peaceful Uses of Nuclear Explosions

The Minister

Late last year the Chairman of the U.S. Atomic Energy Commission invited Australia to discuss in detail the possibility of a mutual U.S.-Australian experimental programme of nuclear excavation. Ministers have approved that a group of technical officers should visit the U.S. to seek a first hand appreciation of the scientific, engineering and safety aspects of nuclear explosives without any suggestion at this stage that Australia's interest will be extended further.

2. The team has been selected and will leave on 1st September; it consists of Dr. A. R. Wilson, A.A.E.C., (leader); Dr. E.K. Carter, Bureau of Mineral Resources and Mr. E. S. Pender, Snowy Mountains Authority. They will spend ten weeks in the United States, mostly in California and Nevada at the site of "Plowshare" (peaceful uses) experiments.

3. It is for consideration whether a brief press statement about the nature and purpose of the visit should be made. There is always the possibility that the U.S. Atomic Energy Commission will make an announcement when the team arrives in Washington next week for preliminary discussions. There may be speculation and it might be better to make a routine statement to avoid an impression of furtiveness and secrecy. There is some press interest here. Last week the "Bulletin" had an article (attached) on the possibility of peaceful nuclear explosions in Australia inspired by a reference in your Parliamentary Statement on the nuclear test ban treaty.

....

4. You may wish to discuss this with Sir William Spooner and the draft of a possible press statement is attached.

....

(R. L. HARRY)  
First Assistant Secretary.  
Division IV.

Economic Relations Branch  
M.J. Wilson/CM



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CONFIDENTIAL

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CONFIDENTIAL



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COMMONWEALTH OF AUSTRALIA.

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS : NATDEV; CANBERRA.  
TELEPHONE : M 9.  
IN REPLY QUOTE : 62/1911



DEPARTMENT OF NATIONAL DEVELOPMENT,  
PARKES,  
CANBERRA, A.C.T.

27 AUG 1963

CONFIDENTIAL

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

Overseas Visit - Dr. E.K. Carter.

Dr. E.K. Carter, Supervising Geologist, (2738-2882), Bureau of Mineral Resources, Geology and Geophysics, of this Department, will be travelling to the United States of America as a member of a group to study the "Flowshare" programme. The leader of the group will be Dr. A.R.W. Wilson of the Australian Atomic Energy Commission.

... 2. Dr. Carter will depart Sydney for San Francisco by Qantas Flight QF586 at noon on Sunday, 1st September, continuing on to Washington by Flight UA822, arriving 7.10 a.m. on 2nd September. Attached is a tentative itinerary for the three members of the group. ✓

3. Dr. Carter will require assistance with internal travel arrangements, particulars of which will be notified by Dr. Wilson to the Atomic Energy Attache in Washington. ✓

4. It would be appreciated therefore if you would notify your overseas posts in Washington, New York and San Francisco of the visit and request them to provide any assistance which may be required, including internal travel arrangements and payment of travelling allowance advances. Dr. Carter will be entitled to travelling allowance advances at the senior officer rate.

5. Any expenses incurred on Dr. Carter's behalf should be debited against this Department's vote 413-2-01.

*Wilson  
5/8/63*

*H. G. Raggatt*  
(H. G. RAGGATT)  
Secretary *HR*

CONFIDENTIAL



COPY

CONFIDENTIAL

20  
19

SUGGESTED ITINERARY FOR VISIT OF THREE OFFICIALS OF  
AUSTRALIAN ATOMIC ENERGY IN RELATION TO THE  
'PLOWSHARE' PROGRAMME

Week of September 2 (Start Sept. 3)

Washington, D.C. A.E.C. Headquarters

Orientation and general introduction to Plowshare Program.  
Meetings with officials of other concerned AEC Divisions  
and Government Agencies.

Week of September 9

Livermore, California

Introductory discussions on major technical aspects of  
Plowshare Program.

Week of September 15

Las Vegas, Nevada

Introductory discussions on operational safety aspects  
of the Plowshare Program.

Visits to Plowshare related project sites on Nevada  
Test Site.

Weeks of September 23, 30 and October 7

Livermore, California

Lectures and detailed discussions on theory and design  
of experiments.

Week of October 14

Las Vegas, Nevada

Detailed discussions on operational safety, engineering  
and support for Plowshare experiments.

Weeks of October 21, 28 and November 4

Livermore, California

Conclude technical discussions.

Visits to sites of other activities according to interest,  
such as Carlsbad, New Mexico (Gnome) and Hattiesburg,  
Mississippi (Dribble).

Week of November 11

Washington, D.C.

Review of visit and discussions with pertinent Washington  
officials.

\* \* \* \* \*



FOLIO No.  
54



*With the Compliments*

*of the*

*Australian Atomic Energy  
Commission*

M.C. TIMBS.



*45 Beach Street, Coogee, N.S.W., Australia*

BOX 41, POST OFFICE, COOGEE, N.S.W.

*MR PEACOCKEY,*





*Confidential*

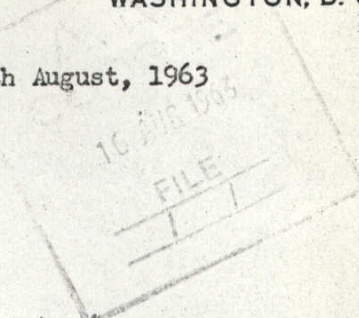
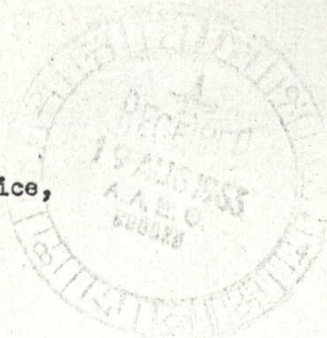


AUSTRALIAN EMBASSY  
WASHINGTON, D. C.

AE.374/63

13th August, 1963

Mr. M.C. Timbs,  
Executive Member,  
A.A.E.C. Head Office,  
P.O. Box 41,  
Coogee, N.S.W.  
Australia.



7.20/10/10

Dear Maurice,

TEST BAN TREATY AFFECT ON PLOWSHARE

You will have read the statements by the Prime Minister and Sir Garfield Barwick made on July 26th regarding the Plowshare Nuclear Test Ban Treaty, the text of which is enclosed herewith, together with President Kennedy's report to the people on the nuclear test ban treaty.

During Professor Baxter's discussions with Mr. John Kelly, Director of the Division of Peaceful Nuclear Explosives, on Monday, the 5th August, I asked Kelly whether he thought that Article I (see page 18 of pamphlet) would place any restrictions on the continuation of the Plowshare Program. He replied that it depends on how one interprets the phrase "if such explosion causes radio-active debris to be present outside the territorial limits of the State under whose jurisdiction or control such an explosion is conducted". If one considers that this statement applies to a single radio-active atom, then the Plowshare Program would become greatly restricted. However, he is hopeful that no such interpretation will be adopted, and there are no indications at this stage that the Plowshare Program will be restricted.

Kelly then went on to outline the five-year programme which includes such underground shots as SCHOONER, DOGSLED, GONDOLA, BUGGY and GALLEY. The first two of the above are 100 Kiloton shots which are described in detail in the Plowshare section of the U.S.A.E.C. Annual Report for 1962, commencing on page 241 - 263 (copies of this report have been previously sent to you). GONDOLA is to be a 100 Kiloton in soft wet muck. BUGGY and GALLEY will be experiments to determine the effects of setting off a row of nuclear charges. Parameters to be studied will be spacing of charges, depth of burial, effect of uneven surface and effect on heterogeneous rock.

*Confidential*



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Part III of the five-year programme (1963-1968) will be scale up detonations of megaton size, and Section IV will deal with multiple operations; for example, blowing-off the top half of a mountain with one shot and then the lower half with a second shot. Kelly stated that release of radioactivity was the least problem concerned with the use of peaceful nuclear explosives, and stated that ground shock effects and reflected air blast waves were of greater concern. He also stated that very much cleaner nuclear devices had been developed (classified) and that techniques had been developed for debris entrapment (also classified). On answering a question from Professor Baxter, Kelly stated that in principle he saw no difficulty in the use of nuclear explosives for the construction of land-slide dams. Professor Baxter asked Kelly whether there was any size limit on nuclear charges, Kelly replied that ground shock was the limiting factor. For example, a one megaton shot in solid rock would break glass windows at 30 miles due to the ground shock wave.

Professor Baxter stated that, due to the relatively uninhabited areas in Australia, ground shock problems would be of no great concern.

As a possible application for peaceful nuclear explosives, Professor Baxter mentioned the idea of digging holes two miles in diameter and as deep as possible in the Georgina and Dimantina channel country. Kelly stated that such holes might leak the first time they were filled, but zeolitic action would eventually seal the dam. Professor Baxter stated that the water leakage would not matter as the water would leak into the Artesian system and not be lost. Professor Baxter then referred to the huge iron-ore deposits in Western Australia, the possible use of 100,000 tons ore carriers and the need for creating harbours on the north west coast of Australia. In reply to Professor Baxter's question, Kelly stated that the U.S. would not permit international inspection of the nuclear devices used in Project Plowshare.

In response to my question, Kelly stated that the U.S. Corps of Engineers were working at Livermore and were preparing a report on the use of nuclear explosives to construct a second Panama Canal. Kelly then stated that the Australian team would be permitted to participate in the calculations for the SCHOONER shot and also to do calculations on possible Australian situations. It was suggested that, as the SCHOONER shot would not occur in 1963, the Australian team should be sent back to participate in the actual SCHOONER explosion. Professor Baxter stated that the Australian team would be permitted to explore the nature of an agreement which might be entered into between Australian and the United States for the practical demonstration of nuclear explosives in Australia.

Yours sincerely,

*Confidential*

*Ian*

Ian J.W. Bisset  
Atomic Energy Attache



DEPARTMENT OF EXTERNAL AFFAIRS  
OUTWARD CABLEGRAM

FOLIO No.  
53

720/10/10

LJH.

O. 18031.

TO:

Sent: 16th August, 1963.

Australian Embassy,  
WASHINGTON.

1981. CONFIDENTIAL.

For Atomic Energy Attache from A.A.E.C.

Reference your 2084.

Top Secret. Please advise U.S.A.E.C. Pender and Carter cleared to

*Substantive*

*File* *70C*  
*Plowshare*

A.A.E.C.  
P.M.'s.

18th August, 1963.

CONFIDENTIAL

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720/10/70

FOLIO No.  
52



WASHINGTON

Secretary  
Department of External Affairs.

Attached document was  
referred to in my  
With the Compliments

of the

Australian Embassy.

Plowshare telegram  
despatched Thursday 5<sup>th</sup> Sept

John Bunt



*Dept of Internal Affairs  
HJB*

NOT FOR PUBLICATION UNTIL RELEASED  
BY THE SENATE FOREIGN RELATIONS COMMITTEE

August 14, 1963

STATEMENT BY GLENN T. SEABORG, CHAIRMAN  
U. S. ATOMIC ENERGY COMMISSION  
BEFORE THE SENATE COMMITTEE ON FOREIGN RELATIONS  
ON NUCLEAR TEST BAN TREATY

MR. CHAIRMAN AND SENATORS:

It is a pleasure to appear before you today to discuss the Treaty banning nuclear weapons tests in the atmosphere, in outer space, and underwater, and the impact which it would have, upon ratification, on atomic energy developments in the United States. There are two aspects to be considered, first, this country's defense posture and, second, the exploitation of nuclear explosives for peaceful purposes. Since these developments are quite different, they will be discussed separately.

First let me state that I support this Test Ban Treaty. The arguments presented by Secretaries Rusk and McNamara plus the factors which I wish to discuss with you today cause me to conclude that ratification of the Treaty is in the best interests of the United States.

The terms of the Treaty prohibit tests in the atmosphere, outer space, and underwater. It is recognized that testing can be carried out under certain conditions underground; a limitation has been placed upon delivery of radioactive debris outside of a nation's territorial limits. Thus, opportunity is available to each of the parties to carry out testing under defined conditions.



By statutory authority, the Atomic Energy Commission has the responsibility to develop atomic energy so as to make the maximum contributions to the common defense and security of the United States. We have discharged this responsibility faithfully in the past and will continue to do so in the future. In this connection, I wish to review with you, some of the actions which the Commission, and I as its Chairman, are taking or expect to take in the discharge of our responsibilities within the terms of the Treaty.

## I

The limited test ban will not in itself end the arms race nor eliminate the dangers we have faced in recent decades. It is thus essential that the US defense posture be maintained and that opportunities for its improvement be pursued under the Treaty. We will continue to vigorously support research and development in our weapons laboratories; the terms of the Treaty permit us to carry out an active underground testing program and we are doing so.

The intent of the Test Ban Treaty is to prohibit tests in the atmosphere, outer space or underwater, but to permit underground nuclear explosions. It is recognized that there may be venting to the atmosphere from some of these underground explosions, and a limitation has been set upon the delivery of radioactive debris outside the territorial limits of the state under whose jurisdiction or control such explosion is conducted. In those cases where venting does take place, no problems are presented if the effects are noticed solely within the United States. The Treaty would prohibit a test which resulted in a quantity of radioactive debris delivered outside of the country's territorial



limits in amounts sufficient to establish that such contamination resulted from a recent test within that country. We are in the process of developing guides for the use of those responsible for the carrying out of underground nuclear explosions so that there will be assurance that detectable and identifiable amounts of radioactive debris do not leave the territorial limits. There is nothing in the treaty to prohibit the kind of underground weapons testing we are conducting.

Before proceeding to discuss the benefits to be derived from further underground testing, I would like to take a minute to define a few terms relating to kinds of nuclear tests. The term "development test" refers to any test performed from the conception of the design through all the intermediate stages up to the final warhead or bomb design for a weapon. In development tests, devices, not weapons, are tested. The term "proof-test" includes warhead or bomb tests and systems tests. Proof-tests are conducted to determine whether or not the yields are as calculated, and thus usually involve warheads or systems which have entered or are about to enter a stockpile. "Effects tests" are aimed at determining, by either direct observation or by indirect means, practical results of nuclear detonations. They include: (a) Direct observation of the effects on such things as military equipment (including nuclear warheads) or installations and/or biological systems; (b) observation and measurement of the effects on the environment -- the ground, the atmosphere, the sea, etc. -- from which effects of practical importance can be calculated or inferred; and (c) measurements of the "outputs" of



the test device, e.g., neutron or gamma ray flux, X-ray intensity, light intensity, .etc., to be used in predicting results under (a) and (b) above. Effects tests are usually conducted using a warhead for which the yield has been previously confirmed by one or more proof tests.

It appears technically feasible to test underground up to several hundred kilotons, and perhaps with more experience and greater ingenuity, to even higher levels. This would permit a wide range of development including complete development and proof-test of warheads for battlefield, air defense, anti-missile, and anti-submarine use. Included could be more sophisticated weapons for both tactical and ABM purposes, and reduced fallout weapons for battlefield use at the highest yields required for such applications. A program to develop all-fusion devices could be pursued.

Continued progress could also be made on larger weapons for strategic purposes. It should be possible to develop fully and to proof-test the smaller weapons of this type. For those weapons whose yields are larger than the underground test limitations, full development of some designs by testing at yields considerably smaller than that finally desired is possible so that with some uncertainty in final yield it should be feasible to develop, though not proof-test, weapons into the range of several megatons.

Hence, it seems likely that in the weapons development area only the complete development of new types of very large weapons above several megatons in yield would be very difficult if possible at all. Progress would, of course, be slower in many



areas without atmospheric testing, especially at the larger yields where very deep holes and special precautions are necessary, but the ultimate results should be unchanged except in the high-yield range.

Weapons effects tests will continue to be conducted in the underground program. Radiation outputs of test devices and warheads can be studied. The vulnerability of warheads and other systems components can be examined for many effects associated with a nuclear explosion; however, complete studies involving blast and fireball as well as radiation effects directed at major weapons delivery systems would be impossible to carry out. Also, the study of those effects which are completely dependent on the atmosphere at operational altitudes would be essentially impossible and would thus limit the acquisition of new knowledge bearing on radar and communications. I agree with Secretary McNamara that progress will be forthcoming both from underground testing and from other improvements which can be made without need for nuclear testing.

Thus, we can foresee significant progress in our development program. Where there are limitations on our testing program, there are also limitations on the Soviets and on the other signatories.

## II

Our ability to maintain a vigorous, imaginative, and productive program including the development of the necessary scientific and technical "know-how" is dependent on the retention



of able scientists and engineers in our weapons laboratories and the attraction of new ones to the program. They must be challenged by new problems, work in a stimulating environment with adequate equipment, facilities and other support, and have maximum opportunities consistent with national policy to test the products of their laboratory experiments and calculations. We will strongly support these laboratories and will encourage the planning and execution of the programs, including allowed testing, necessary to meet our requirements. Public recognition of the need for strong laboratories and of the contributions made by the scientists is necessary.

### III

We must always remain alert to the fact that one side may try to acquire a superior advantage through violation or abrogation of the Treaty. The effect of such an action on the other parties is decidedly less where underground testing is permitted and where an active program of world-wide nuclear test detection is continued.

It does not seem possible to be forewarned against a surprise abrogation. Even if the three months notice period for any country planning to withdraw is given, it would possibly have been accompanied by an earlier period of preparation. Consequently, we will pursue the most promising directions of development permissible under the Treaty and will maintain a state of readiness for conducting tests in the atmosphere and other media. This readiness posture has been stated as national policy by the President.



To minimize the slowing down of scientific developments which would otherwise provide advantages to a nation considering withdrawal, we will continue vigorous programs of development and underground testing by the weapons laboratories with strong support by the government through the provision of necessary advanced facilities and equipment and adequate supporting staff. Under the Test Ban Treaty, the Nevada Test Site and possibly other continental sites will be maintained on a continuing operational basis in order to support the test program which must be carried out. The maintenance of a state of complete test readiness, however, cannot be satisfied by the maintenance of only underground test sites.

If another nation should abrogate, we would find it necessary to carry out promptly atmospheric and other tests -- first, proof-tests of warheads and systems, along with limited effects tests because they can be staged more quickly, then weapons development tests and the more complex weapons effects tests. The major difference between maintaining a readiness to conduct proof-tests and to conduct development tests lies in the fact that for the development tests the devices themselves must be developed to the state where a test serves the maximum purpose. This is the primary function of the weapons laboratories.

The simplest proof-test requires a safe detonation area which may be over either land or water, a vehicle for delivery of the warhead, means for determining yield, a rather large number of technically trained personnel, and logistical support. Similar



requirements exist for carrying out development tests in the atmosphere; however, in addition, more complex diagnostic instruments will usually be required as will a complex communication system both to provide for safety and to facilitate the collection of data. Additional technical personnel and greater logistical support are obviously required.

Thus, the readiness to resume a full-scale weapons development program after a surprise treaty abrogation involves two independent, though related aspects -- the development of devices and experiments to be used in tests and the maintenance of a capability to carry out tests. As I have previously stated, the weapons laboratories will play a major role in maintaining a state of readiness through their development of new devices. Maintaining a mechanical readiness to conduct field tests on relatively short notice is difficult. Retention of a high technical test capability, however, will be assisted to a considerable extent by the continuation of an intensive underground test program. Also, under the determined and vigorous policy, which we expect to follow, no nation will be able to gain more than a temporary advantage through surprise abrogation.

#### IV

There is a second aspect to the utilization of nuclear explosives, namely, their application for peaceful purposes. This work is carried out by the Commission under its Plowshare program. The fact that these applications fall under the Treaty results from the close similarity both of the explosive devices



used and the conditions under which they are tested to those of the weapons program. This is not a new situation. Ever since man's first use of explosives, he has successfully developed and utilized the energy from explosions for his economic and social well being as well as for his defense.

It might be helpful if I take a few minutes to remind you of the scope of the Flowshare program, in order that you will have an appreciation of the impact which implementation of the Treaty will have on this program.

There are two broad categories toward which we are directing our attention. In the field of direct application, one finds projects such as excavation, mining, the recovery of oil and gas, and water resources development. The type of undertakings under consideration are either too costly or just not feasible without the use of nuclear explosives. Let us take excavation as an example. Nuclear explosives can be used to move dirt and rocks in civil engineering projects such as digging canals, harbors, passes through mountains for transportation purposes and, in general, any application which requires moving vast amounts of material. The experimental program to date has indicated that large civil engineering projects can be carried out with nuclear explosives at a fraction of the cost that would be required for conventional methods. In many cases the difference is such that these projects would not be undertaken by conventional means. The experimental program has also shown that methods can be developed for doing such projects safely. Basically, this is accomplished by using nuclear explosives which produce very little



radioactivity and emplacing them underground in such a way that nearly all of the radioactivity is trapped underground. The small amount of radioactivity that is released will be deposited from the lower atmosphere close to or immediately downwind from the shot site.

The Commission has received literally dozens of suggestions for using nuclear explosives in excavation projects in the United States and elsewhere in the world. These include digging canals and harbors, clearing navigation obstructions, and cutting passes through mountains for land transportation. A new trans-Isthmian canal is an interesting example; however, it probably could not be done under the present Treaty limitations because of the short distances to territorial boundaries.

The second category is concerned more directly with scientific research. Here, nuclear explosives used in an underground environment constitute a new and unique laboratory in which scientists can carry out experiments. The tremendous number of neutrons produced by nuclear explosives, many orders of magnitude higher than that of any other neutron source, can be used, for example, to produce man-made isotopes of very heavy elements which cannot be made in any other way. Similarly, these neutrons can be used in experiments to get data on neutron spectroscopy, the fission processes, neutron-neutron reactions, and many other data essential to our understanding of nuclear physics that may not be possible by any other means. The combination of extremely high temperatures and pressure makes it possible to conduct investigations of basic chemical reactions which cannot be duplicated in laboratories.



The various applications envisaged require the development of nuclear explosives with specific characteristics. For example, excavation requires nuclear explosives especially designed to minimize the production and release of radioactive debris. This requires devices which utilize very little fission energy and in which precautions have been taken to greatly minimize induced activity. Devices which can be used in large-scale excavation projects should be available after two to three years of test explosion experimentation. Other applications require different devices. Even though these devices are being developed and tested specifically for Plowshare, they utilize the most sophisticated design principles we know. This device development can be carried out deep underground in the manner used for weapons testing.

A series of experiments has been planned to develop nuclear excavation technology. An important part of this program is to refine the techniques of entrapping radioactive debris underground. This program requires about two experiments per year. We expect that in four or five years both the devices and technology will be available to undertake almost any of the many worthwhile projects which have been suggested; selected projects may be undertaken earlier as part of the experimental program.

Device development and the program for scientific studies planned for the immediate Plowshare program can clearly proceed under the terms of the Treaty. This is also true of applications for mining and water resource developments which would be carried



out deep underground and involve the release of very little, if any, radioactivity. In the excavation application, however, some radioactivity will reach the atmosphere and a careful determination will have to be made that a given project is permissible. Guidelines similar to those which we are developing for the use in weapons testing will be applied here. Our present considerations lead us to believe that excavation experiments or projects which have a downwind distance of several hundred miles from the project site to a territorial limit probably can be conducted, and that these experiments will be sufficient to develop the excavation technology.

We believe that the Plowshare program has a great potential for the benefit of mankind. We believe that within the next few years this potential and the safety aspects can be demonstrated within the terms of the Treaty. At some future time when it is clearly demonstrated that these benefits can be realized through the use of nuclear explosives, I would hope that the parties would seek ways of modifying the Treaty so that the technology developed could be put to more widespread practical application.

V

I would like now to summarize.

(1) Weapons development activities will go forward under the Test Ban Treaty with the exception of investigations of certain weapons effects and the complete development of complex multi-megaton weapons. This situation applies to all of the



parties. The rate of progress in any country will be determined by its willingness to undertake extensive underground testing and its ingenuity in planning and in carrying out the program. The importance to a country both of future development of higher yield weapons and of future weapons effects tests prevented under the test ban will depend on the present state of advancement of that country's total weapons program. US progress is at least comparable, if not superior, to that of the USSR.

(2) The weapons development laboratories will be provided the support necessary to maintain strong programs, including test support activities. Attention will be given to the provision of equipment and facilities required for a modern effective research and development undertaking and for maintaining the confidence and morale of the associated scientists and other personnel. Continuation of Plowshare development in these laboratories will contribute to their viability.

(3) Systems to detect possible violation of the Treaty will be maintained and continually improved.

(4) A state of test readiness will be maintained and improved, including the overt preparations and maintenance required to achieve a readiness to conduct atmospheric nuclear tests at suitable off-continent locations and at continental test sites. Such preparations will include the maintenance in readiness of forces such as the Defense Atomic Support Agency and the nucleus of a Joint Task Force to plan and prepare for the conduct of off-continent tests.



(5) It is the national policy to maintain a continuing dynamic program of weapons development and a state of readiness to resume atmospheric testing should the Treaty be abrogated. This policy will achieve maximum effectiveness with the full support and understanding of the Congress and of the public.

(6) Promising applications of nuclear explosives for peaceful purposes will be developed and demonstrated under the Treaty. At such time as the benefits have been demonstrated, the parties may wish to modify the Treaty to permit extension of the technology and benefits to all.

\* \* \* \*

Mr. Chairman, this concludes my prepared testimony.



MINISTERIAL STATEMENT IN PARLIAMENT ON RATIFICATION BY  
AUSTRALIAN GOVERNMENT OF THE NUCLEAR TEST BAN TREATY

FOLIO No.  
51

*File 7/20/10/70*  
*House*

Introduction

On 5th August in Moscow the Foreign Ministers of Great Britain, the United States and the U.S.S.R. signed a treaty for the banning of a wide range of nuclear tests. In the eighteen years since the first nuclear explosion revolutionised modern warfare, the world has been seeking an agreement on measures which would make it possible to prohibit the use of nuclear weapons, and to dismantle existing stocks under safeguards and controls, all as part of an overall disarmament plan which would include "conventional" armaments. For over five years representatives of the U.S.S.R. and the Western Powers have engaged in protracted negotiations aimed at securing an agreement for the cessation of nuclear weapons tests to put a brake on new developments and to prevent further contamination of the atmosphere. The Moscow treaty represents the first fruits of the painstaking negotiations extending over all these years. It is a step, but only a step, in the general direction of the much discussed goal of general and complete disarmament with adequate inspection and control. This Government has consistently supported all steps towards that goal.

2. As Honourable Members will be aware, Australia was one of the first countries, apart from the three principals, to announce its intention to adhere to the treaty, and Australia signed the treaty in Washington, London and Moscow on 8th August, the day on which the treaty was first open to signature by other governments. I lay on the table the text of this treaty. The Government proposes to ratify this treaty when appropriate steps have been taken by the three principal signatories.

3. I will not attempt to speculate on the influences which led to the Soviet decision to engage in serious negotiations



on this partial test ban treaty at this time. The Western Powers had proposed a treaty along these lines on a number of occasions going back to 1959, as an alternative to a comprehensive test ban. In August last year in the Eighteen Nation Disarmament Committee in Geneva they tabled a draft which closely follows the wording of the present treaty. What is significant is that on this occasion the Soviet Union has realistically faced up to the dangers inherent in the continuation of competitive testing of more advanced and refined weapons by the highly industrialised powers of the communist and non-communist world.

4. The signing of the treaty by the three great nuclear powers is thus an occasion upon which we can pause to consider what has been achieved, and what has yet to be achieved. It is important that we should consider what the treaty will do, just as it is vital that we should not delude ourselves as to what the treaty cannot do.

#### A Partial Test Ban

5. The Treaty provides for only a ban on testing in part of man's environment, covering explosions in the atmosphere, under water and in space. It does not apply to underground tests. This Government, in common with most other countries, would have preferred a total ban on all nuclear weapons testing, including underground testing. However, it is essential that any agreement on a subject of such crucial importance to the defence postures of the major world powers must be capable of effective verification, so that each side will have grounds for confidence that the terms of the agreement are being fully respected. Whilst most nuclear test explosions can now be identified effectively by means of detection situated outside the country where the explosions occur, underground tests cannot always be identified with



certainty in this way. It is for this reason that the West has consistently maintained that any agreement covering underground testing must include provision for a limited but adequate number of on-site inspections. Although the Soviet Union has been prepared at times to agree to a small and inadequate number of on-site inspections, at the outset of the Moscow talks the Soviet Union made it clear that it was not prepared even to discuss this question. Thus, the Western powers accepted the partial test ban treaty and though its signature is an important achievement, the Government continues to hope that it will eventually be possible to conclude an agreement covering all nuclear testing. Only then will we be able to say that we have completely eliminated the consequences of secret testing of weapons underground.

Explosions underground for peaceful engineering purposes, conducted publicly with proper safeguards to health would still, of course, be possible, and might some day be of importance in the development of Australia.

Right of Withdrawal.

6. The test ban treaty is of unlimited duration; however, it contains an important reservation which may well determine whether the treaty is to endure. This is the provision that any party in exercising its national sovereignty shall have the right to withdraw from the treaty on three months notice, if it decides that extraordinary events, related to the subject matter of the treaty, have jeopardised its supreme interests. The three major nuclear powers, while pointing the way for the abandonment of nuclear testing by all countries, could not commit themselves to perpetual inactivity in the event that testing by other countries, not parties to the treaty, should threaten their security. Also, it has already been made clear by the Western Powers that breach by the Soviet of the terms of the treaty could lead to



Need for Universality

7. It is essential, if the treaty is to be completely effective, that all governments and regimes associate themselves with it. It should become a universal treaty. Australia's decision to sign immediately was a recognition of this fact. A large number of countries have now signed the treaty and altogether over a hundred countries have expressed favourable reactions to it. Australia hopes that the obligations of the treaty will be universally accepted, particularly by those countries which now aspire to develop their own nuclear capacity. I repeat that, only if this is done, can the treaty become fully effective and only in this way can its future be assured.

The French Attitude

8. Unfortunately not all countries have agreed to be bound by the treaty. The French Head of State, while welcoming the conclusion of the treaty, has indicated that France will not be bound by it in regard to her own test plans, and will not give up its goal of an independent nuclear deterrent unless there is an agreement on general disarmament. However, the experience of many years of disarmament negotiations has shown that we must proceed one step at a time. We have now taken the first step forward. If all the nuclear powers and potential nuclear powers take this step together it may be possible to generate an atmosphere of confidence that would make further steps possible. It is a matter for profound regret that France, by declining to become a party, has made the treaty less than fully effective and has provided a pretext for other countries which might similarly refuse to bind themselves not to test. Continuance of French testing could even serve as an excuse to one or more countries to exercise their right to withdraw from the treaty. It has also imposed an obstacle to the goal of putting an end to the possibility of danger of contamination of the atmosphere from radio active fall-out.



9. If the present French attitude is maintained they will presumably push ahead with their plans to carry out nuclear testing in the Pacific area. During my visit to Paris for the SEATO meeting last April I took the opportunity to express to the French Foreign Minister my "deep regret" at the decision which his Government was then about to take. The Government, in advising France of its intention to sign the test ban treaty, has also urged all countries including, of course, France, to adhere to it. Clearly our representations, and those of other countries, have not so far affected the French Government's attitude.

10. The French Government has, however, undertaken to inform Australia and other countries at the appropriate time of the safeguards which will be taken against any fall-out hazards from its proposed tests, and if necessary to discuss these precautions. A considerable time, possibly as much as two years might elapse before any French tests can be conducted at the Pacific site. Naturally, if the tests take place, the Government will take all possible steps to assure itself that the precautions taken by the French authorities will be such as to safeguard the Australian population against any possible fall-out hazards. The Government will also give consideration as to whether any further useful steps could or should be taken in this matter. Meanwhile, I would express our sincere hope that the French Government may see its way clear to put aside their plans to go on with the testing and developing of their own nuclear weapons, in response to the deepest wishes of mankind.

#### Chinese Communist Attitude

11. The Chinese Communists have categorically rejected the test ban treaty. An official statement issued in Peking on 31st July said that the treaty was "a big fraud to fool the people of the world" and that it ran "diametrically counter to



the wishes of the peace-loving people of the world". In essence, however, the Chinese Communist argument seemed to be that the treaty prevented "all peace-loving countries - including China - from increasing their defence capability", meaning, from having nuclear weapons. A few days earlier the President of the Chinese Academy of Sciences had hinted that Communist China's first explosion of a nuclear device could be imminent.

12. The Communist Chinese statement also set out a number of counter-proposals. In brief these were that :-

- (a) All countries should declare that they would prohibit and destroy nuclear weapons.
- (b) To this end they should adopt the following four measures :-
  - (i) dismantle all foreign military bases;
  - (ii) establish four nuclear free zones; these would be : the Asian and Pacific region (including the U.S., U.S.S.R., China and Japan); Central Europe; Africa; Latin America;
  - (iii) refrain from importing or exporting nuclear weapons and technical data for their manufacture;
  - (iv) stop all nuclear tests, including underground tests.
- (c) A conference of all Heads of Government should be convened to discuss this question.

13. Honourable Members will note that these proposals are directed only to doing away with nuclear weapons leaving, one must assume, conventional forces (of which Communist China maintains a vast array) unaffected. This in itself precludes serious consideration of the Chinese idea, since it would be



quite unacceptable for the West to surrender the nuclear weapons which constitute the major part of their deterrent capability without adequate arrangements for conventional disarmament. Further, they offer no suggestion of effective inspection and control.

14. The Chinese Communists would aim to bring about the establishment of some imprecisely defined and vast Asian-Pacific region in which all foreign military bases would be dismantled and into which nuclear weapons could not be brought. The implications of such a proposal for the security of Australia, whether or not we were taken as included in this area, are completely unacceptable. It would mean that our major ally in A.N.Z.U.S., the United States, on whose strength so much of our defensive arrangements are hinged, would be required not only to withdraw from its fixed positions in the Western Pacific but also to limit itself as to the weapons it might deploy as a deterrent in an area which could be, and I believe will be, of vital importance to the defence of Australia.

15. Australia and other countries in the Asian and Pacific area which genuinely seek peace would remain confronted by Communist China which is now able to mobilise a formidable force of about two and a half million men. Let us remind ourselves that the Communist Chinese were able to pour into Korea only some ten years ago over two hundred thousand men against the forces of the United Nations legitimately there in the defence of the Republic of Korea.

16. The timing and content of these Chinese proposals forces one to the conclusion that they are little more than a propaganda device to obscure their unwillingness to agree to the test ban treaty, so that they may preserve the right to go ahead with their own efforts to carry out a nuclear explosion. Such an explosion would not of course indicate that China is able to engage in nuclear warfare. Years of



time and effort - and denial to the people of the good things of life - would be necessary before a newly industrial state like China could mount a nuclear force similar to that of the U.S.S.R. A Chinese nuclear test would be a gesture of defiance to the peaceful hopes of humanity.

17. We can only hope that the force of world opinion will eventually cause the Chinese Communist leaders to reconsider their position. They owe it to their own people as well as to the people of every country. All peoples have an urgent and sincere desire to see an end to the dangers which nuclear tests produce. The present treaty offers new hope that these possible threats to mankind will be averted. Chinese leaders, by reconsidering their current rejection of the treaty, can contribute to this, and in so doing show that their expressed concern for the welfare of all people is sincere.

Non-Recognised Signatories

18. At this stage, I should make it clear that the Australian Government's position with regard to those regimes which it does not recognise is in no way affected by their accepting, in common with ourselves, the obligations expressed in the test ban treaty. We do not recognise the regime in East Germany, which has announced its intention of acceding to the treaty, and neither the fact that this regime has signed the same treaty as ourselves in Moscow, nor the language of the treaty conveys any implication of such recognition.

19. The important principle involved here is that of universality in matters relating to international peace and security. Means must be found, such as have been found in the case of this treaty, of bringing all governments and regimes within the scope of any further arrangements of a similar nature. The fact that all governments and regimes whether mutually recognised or not, can associate themselves with, and accept the



obligations of, this treaty demonstrates that non-recognition need not impede the attainment of universal international arrangements in this field.

Effect of Test Ban Treaty

20. I indicated earlier that it is important to recognise what has been achieved in this treaty - and it is equally important that we should clearly bear in mind what the treaty cannot do. I want for a few moments to consider these matters.

21. Firstly, let us remind ourselves cautiously what the treaty does not purport to do. A nuclear test ban treaty is not a treaty for disarmament. It is not even a partial measure of disarmament. As President Kennedy has pointed out, the treaty "will not reduce nuclear stockpiles; it will not halt the production of nuclear weapons; it will not restrict their use in time of war". He went on to warn that the treaty "will not resolve all conflicts, or cause the Communists to forego their ambitions, or eliminate the dangers of war. It will not reduce our need for allies or arms." This is an impressive, and succinct, statement of the negatives.

22. The Government is fully aware of the limitations of the treaty. It does not believe that its conclusion in any way affects the need for vigilance in the face of the threats which face us or that it should lead to any diminution in our resolve to resist such threats. The treaty can in no way affect the major importance which Australia attached to its defensive alliances. Nor can it affect the Government's attitude to proposals that possession of nuclear weapons should be forever foresworn, or that a "Nuclear Free Zone" should be created in the Southern Hemisphere. The impracticality and dangerous aspects of such a proposal have already been made plain. As Mr. Harriman made plain when he visited Australia last June at the time of the ANZUS conference, it would be impossible for the United States to defend Australia if a nuclear free zone existed here. The



Prime Minister has pointed out that to imagine otherwise would be suicidal folly. No amount of wishful thinking or euphoria emanating from Moscow can alter the hard realities, including the American nuclear deterrent, on which our future security depends.

23. The treaty does not resolve any of the deep political issues which divide East and West, or of itself eliminate the tensions generated by these divisions. The solution of these problems, and the genuine reduction of tension, still lies in the future. This is not to say that the treaty is without practical value. On the contrary, it has a number of most important effects :-

(i) Reduce Contamination of the Atmosphere

Firstly, the observance of the treaty will reduce contamination of the atmosphere by radio-active fall-out resulting from atmospheric tests. Thus the possible radiation hazards to the health of mankind will be significantly curtailed. Should it eventually be possible to include within the scope of the treaty all countries which are likely to test nuclear devices, it would be possible to eliminate entirely all potential hazards from this source.

(ii) Restraint on Armaments Race

Secondly, the treaty will have certain effects in restraining the armaments race insofar as it may limit the development of new ranges of weapons. The treaty may introduce a certain measure of stability into the armaments spiral, and a measure of sanity into the present unrestrained competition in the development of new and more terrifying weapons of mass destruction. This is an encouraging development. Its



conclusion undoubtedly owes much to the reluctance of the two major powers to incur the possibly astronomic costs of the next breed of weapons, and perhaps also to the Soviet realisation that further efforts to break the nuclear stalemate and attempt to establish a superiority over the West were unlikely to succeed and would involve the ruin of their plans for economic progress and development.

(iii) Could lead to Further Measures

Thirdly, it is our hope that the achievement of a partial test ban, modest though this step in itself may be, could lead the way to fruitful negotiations on other issues and open up broader areas of agreement. This first step away from an unbridled arms race will be a source of encouragement to those who have worked with patience and determination for many years to achieve a real measure of disarmament. However, we must realise that there is an extremely wide gap between ending atmospheric testing and genuine disarmament. The world must not expect overnight miracles, but all countries must work patiently, step by step, towards the goal of controlled and verified disarmament.

24. Certain concrete proposals have in fact been mentioned by Mr. Krushchev in the more recent negotiations in Moscow. These have included matters which have previously been suggested in connection with measures against surprise attack - the establishment of control posts at ports and railway centres and aerodromes; the limitation of military targets, and limitation on the level of forces. Mr. Krushchev has also proposed a non-aggression treaty between the countries of NATO and the Warsaw Pact.

25. These matters are under discussion between the Western countries directly involved, and I shall say nothing about them



here except that the Australian Government will follow the course of their discussion with close interest and concern, and with the hope that it may prove possible to find some agreement of benefit to both sides.

26. At the same time, I would like merely to mention one problem which cannot be forgotten in these negotiations - that of divided Germany. The existence of a divided Germany, half Communist, half free, is the central fact of the whole problem of East-West relations in Europe; it will govern to an important extent the course of these future negotiations, and will, I am sure, be very present in the minds of the negotiators.

#### Conclusion

27. In conclusion, may I say that the Nuclear Test Ban Treaty could represent a first step forward in a new period of East-West negotiations. The talks in Moscow were conducted in an atmosphere which made agreement possible and which we hope can be preserved for the pursuit of further discussions. The willingness of the Soviet Government to reach agreement on this issue followed a dramatic point of departure in Soviet and Chinese Communist policies. We have in this sense profited from the Moscow-Peking disagreement. But because of that it would be wrong to regard that disagreement as any general source of satisfaction to ourselves. The policies professed by the Peking regime have come to appear so dangerous that even their Communist-allies in Moscow cannot support them for fear of the consequences for themselves as well as for the rest of the world.

28. The treaty itself is a limited measure, but it is a beginning and is to be warmly welcomed. It represents at least the reversal of a trend which could lead, in the end, to nothing but mutual destruction. I repeat that the Government hopes that the obligations of the treaty will eventually be accepted



universally, particularly by those countries which aspire to develop their own nuclear capacity. It is a matter for concern that all have not already agreed to do this.

29. It is important to realise that the treaty in no way diminishes our need to safeguard our own security, which is so vitally dependent on the alliances we have entered into and the support we can expect from our allies in the face of any threat. Any move which would weaken or remove this shield would be the sheerest folly. There can be no slackening in our resolve to resist the threats which face Australia, now or in the future.

15th August, 1963.



OUR REFERENCE

YOUR REFERENCE

BOX 41, POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES: ATOMCOM. SYDNEY - TELEPHONE: 665-1221

C.63/204



13th August, 1963

Attention : Mr. Michael Wilson

Dear Sir,

In confirmation of our telephone conversation of this morning, would you please note that Dr. Carter, Mr. Pender and I will be arriving at your office at 11 a.m. on Wednesday, 21st. August 1963, for the discussions which you indicated your Department wishes to have with us.

Yours faithfully,

A.R.W. Wilson.

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

MR. PERCHEY

M. Wilson  
16/8

Is anyone giving their lunch?  
JW



INWARD CABLEGRAM

JW

I.20869

FROM:

DATED: 5TH AUGUST, 1963,  
2000  
REC'D: 6TH AUGUST, 1963,  
1541

AUSTRALIAN EMBASSY,  
WASHINGTON.

2084 CONFIDENTIAL.

FOR TIMBS, A.A.E.C. FROM BISSET.

PROJECT PLOWSHARE.

ON 5TH AUGUST U.S.A.E.C. DISCUSSED WITH PROFESSOR BAXTER AND CONFIRMED ARRANGEMENTS FOR WILSON, CARTER AND PENDER TO VISIT UNITED STATES COMMENCING WASHINGTON ON 2ND SEPTEMBER.  
U.S.A.E.C. URGENTLY REQUIRES WITHIN SEVEN DAYS ASSURANCE OF SECURITY CLEARANCE, FULL PERSONAL DETAILS AND RESUME OF TECHNICAL QUALIFICATIONS AND EXPERIENCE OF EACH MEMBER OF AUSTRALIAN PLOWSHARE GROUP.

-----

A.A.E.C. (T/T)  
E.A.  
P.M.'s DEPT  
P.M.'s

6TH AUGUST, 1963.

J

720/10/10

SEC FA/S (4) PACAM AMSP EAF&ME ER@

WILSON

CONFIDENTIAL



EXTERNAL AFFAIRS

720/10/10

FILE No.

FOLIO No.  
48

DATE

SUBJECT

Plumtree

Jill

FOR

~~Mr Mackey~~

The meeting is fixed  
for 11 AM, Wed, 21st August  
in our conference room.

This is acceptable to  
Mr Wilson & a note  
has been made in  
Messrs Shaw & Mackey's  
diary for that time.

noted

h  
16/8

Mt 16/8



EXTERNAL AFFAIRS

FOLIO No.  
47

FILE No. \_\_\_\_\_

DATE 8-8-63

SUBJECT

PLOUGHSHIRE

FOR ~~MR HARRY~~

~~Mr. Shaw~~!

I do think

This team should have a briefing. Perhaps it would also be salutary for me and for ER officers to attend!

Att

9/8

Mr Doig

if possible arrange for all concerned to get together

10/12/8

The team to go to us is  
Leader WILSON, AAEC, SYDNEY  
(HEALTH PHYSICIST)

CARTER BMR, CANBERRA  
(GEOLOGIST)

PENDER SMHA, COOMA  
(ENGINEER)

UN BRANCH THINKS IT MIGHT BE USEFUL TO HAVE THEM COME TO CANBIERRA (ER BRANCH CERTAINLY THINKS SO). IT WOULD BE MAINLY FOR UN TO DO - WE HAVE ALREADY ASKED THEM FOR APPRECIATION OF THE TEST BAN.

PERHAPS YOU MIGHT SUGGEST TO MR SHAW THAT THE 3 COME TO CANBERRA FOR A BRIEFING BY UN IN THE WEEK 19-23/8/63

*[Signature]*



Apr 20  
Apr 21  
or  
pm

10-11-12



INWARD CABLEGRAM

JW

I.20869

FROM:

DATED: 5TH AUGUST, 1963, 2000  
REC'D: 6TH AUGUST, 1963, 1541

AUSTRALIAN EMBASSY,  
WASHINGTON.

2084 CONFIDENTIAL.

FOR TIMBS, A.A.E.C. FROM BISSET.

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*Handwritten notes:*  
A.A.E.C. head office  
B.M.F. 2000  
S.M.A. engineers

*Handwritten:* 31/8/63

A.A.E.C. (T/T)  
E.A.  
P.M.'s DEPT  
P.M.'s

6TH AUGUST, 1963.

SEC FA/S (4) PACAM AMSP EAF&ME ER@

*Handwritten:* Mr Truelove :

*Handwritten:* Would it be worth while for us to see this group before it leaves for a briefing on political aspects of test ban, wider test ban, disarmament, Chinese progress, nuclear free zones etc. Please discuss with UN Branch R.H. 6/8

CONFIDENTIAL



AEC

UNITED STATES  
ATOMIC ENERGY COMMISSION  
Washington 25, D. C.

FOLIO No.  
45

No. F-153  
Tel. Hazelwood 7-7831  
Ext. 3446

FOR IMMEDIATE RELEASE  
(Thursday, August 1, 1963)

AEC'S PLOWSHARE PROJECT "COACH"  
WILL NOT TAKE PLACE IN 1963

*File 720/10/10*

Because of technical difficulties it will not be possible to execute Project Coach at the Atomic Energy Commission's Carlsbad, New Mexico, site during 1963.

Project Coach is a planned scientific experiment using a nuclear device to produce neutron-rich isotopes of known transplutonium elements and, possibly, elements heavier than those yet discovered. It is a part of the AEC's Plowshare program for the development of peaceful applications for nuclear explosives. The Coach experiment at the Carlsbad site is being developed on information gained from Project Gnome, a multi-purpose experiment conducted on the same site on December 10, 1961.

The technical difficulties in Project Coach are related to the development of the special nuclear explosive device required for this experiment. Work on this device has been under way since last fall and is continuing with device development tests being conducted at the Commission's Nevada Test Site.

Preliminary work at the Carlsbad site for Project Coach was begun in September 1962 and is essentially complete. Final work at the site will be undertaken when a date for the detonation is more definite. Consequently, after completion of some additional work on the Project Gnome cavity, the site and facilities for the Coach experiment will be placed on a standby basis and maintained with a minimum number of caretaker personnel.

- 30 -

(NOTE TO EDITORS AND CORRESPONDENTS: This announcement is being released simultaneously by AEC Operations Offices.)

8/1/63



UPI-3  
FOLIO No.  
44

BY JOSEPH L. MYLER

WASHINGTON, AUG. 1 (UPI)--AN UNDERGROUND NUCLEAR EXPERIMENT PLANNED FOR THIS YEAR HAS BEEN HELD UP BY DIFFICULTIES IN MAKING THE +SMALL H-BOMB+ WHICH THE TEST REQUIRES, IT WAS DISCLOSED TODAY.

THE ATOMIC ENERGY COMMISSION HAD PLANNED TO CONDUCT THE EXPERIMENT, KNOWN AS PROJECT COACH, IN A SALT BED NEAR CARLSBAD, NEW MEXICO. IN A FORMAL STATEMENT, THE AEC SAID THAT BECAUSE OF TECHNICAL DIFFICULTIES WITH THE EXPLOSIVE DEVICE, BEING TESTED AT THE NEVADA PROVING GROUND, COACH CANNOT BE CARRIED OUT IN 1963.

NO NEW DATE WAS SET.

THE COACH DELAY, OFFICIALS SAID, HAS NOTHING TO DO WITH THE MOSCOW TREATY TO BAN NUCLEAR EXPLOSIONS UNDER WATER, IN THE ATMOSPHERE, OR IN SPACE.

COACH IS PART OF THE COMMISSIONS PLOWSHARE PROGRAM TO DEMONSTRATE PEACEFUL SCIENTIFIC AND ENGINEERING USES OF NUCLEAR EXPLOSIVES. ONE OF THE MORE AMBITIOUS PROJECTS ENVISAGED FOR THE FUTURE WOULD BE THE DIGGING OF A NEW PANAMA CANAL BY MEANS OF NUCLEAR BLASTING.

THE COACH EXPERIMENT, WHEN IT IS HELD, WILL BE STAGED IN A TUNNEL DUG 1,200 FEET DEEP IN THE CARLSBAD SALT BED WHERE THE SOMEWHAT SIMILAR GNOME EXPERIMENT WAS CONDUCTED ON DEC. 10, 1961.

FINAL PREPARATIONS WILL BE UNDERTAKEN WHEN A DEFINITE SHOT DATE HAS BEEN SET. THE SITE IS BEING HELD ON A STANDBY BASIS. WORK ON THE COACH EXPLOSIVE, A SMALL HYDROGEN FUSION DEVICE, HAS BEEN UNDER WAY SINCE THE AUTUMN AND IS CONTINUING WITH TESTS IN NEVADA.

UNDERGROUND SHOTS IN WHICH ALL OR MOST OF THE RADIOACTIVITY IS CONTAINED WOULD BE PERMISSIBLE UNDER THE LIMITED TEST BAN TREATY IF THEY DID NOT CONTAMINATE THE ATMOSPHERE BEYOND THE BOUNDARIES OF THE TESTING COUNTRY.

DU3:43A

File

720/10/10

*Ch. W. ...*  
*Mr. McKeown*



CONFIDENTIAL

FOLIO No.  
43



AUSTRALIAN EMBASSY  
WASHINGTON, D. C.

AE2.12/63

The Secretary,  
Department of External Affairs,  
Canberra A.C.T.  
Australia.

440  
1 AUG 1968  
720/10/10  
DEPARTMENT OF EXTERNAL AFFAIRS  
CANBERRA

25th July, 1963

Dear Sir,

The following letter was received today by the Ambassador:-

"Dear Sir Howard,

Thank you for your letter of June 24, 1963, concerning possible collaboration between our countries in the use of nuclear explosives for peaceful purposes. As I indicated in my earlier letter, we would be prepared to pursue discussion of the subject with representatives of your Government on a more detailed basis. Accordingly, we would be pleased to receive the three Australian specialists mentioned in your letter and would endeavour to give them an appreciation of the scientific, engineering and safety aspects of our Plowshare program.

We have enclosed for your consideration a suggested itinerary for the Australian officials while they are in the United States. We look forward to receiving your comments on this proposal. In this connection, it is suggested that the Scientific Attache on your staff may wish to consult with Mr. A.A. Wells of the Division of International Affairs, and Mr. John S. Kelly of the Division of Peaceful Nuclear Explosives, to discuss further details of the visit.

*File*

Yours sincerely,

(Signed) Glenn T. Seaborg

Chairman.

SUGGESTED ITINERARY FOR VISIT OF THREE OFFICIALS  
OF AUSTRALIAN ATOMIC ENERGY IN RELATION  
TO THE PLOWSHARE PROGRAM

Week of September 2 (Start Sept. 3)

Washington, D.C., AEC Headquarters

Orientation and general introduction to Plowshare Program.

Meetings with officials of other concerned AEC Divisions and Government Agencies.

*Copy sent  
to AEC*



CONFIDENTIAL

2.

Week of September 9

Livermore, California

Introductory discussions on major technical aspects of Plowshare Program.

Week of September 15

Las Vegas, Nevada

Introductory discussions on operational safety aspects of the Plowshare Program.

Visits to Plowshare related project sites on Nevada Test Site.

Weeks of September 23, 30 and October 7.

Livermore, California

Lectures and detailed discussions on theory and design of experiments.

Week of October 14

Las Vegas, Nevada

Detailed discussions on operational safety, engineering and support for Plowshare experiments.

Weeks of October 21, 28 and November 4

Livermore, California

Conclude technical discussions.

Visits to sites of other activities according to interest, such as Carlsbad, New Mexico (Gnome) and Hattiesburg, Mississippi (Dribble).

Week of November 11

Washington, D.C.

Review of visit and discussions with pertinent Washington officials."

---

A draft reply, submitted to the Ambassador, reads as follows:-

"Dear Mr. Seaborg,

Thank you very much for your letter of July 22nd, 1963, offering to receive three Australian specialists who will review the Plowshare programme in company with your scientists.

I hereby notify you that the proposals set out in your letter are acceptable to my Government. As suggested in your letter, I have instructed my Atomic Energy Attache to communicate further with Mr. Wells and Mr. Kelly on the matter.

The Australian Government is most appreciative of your offer.  
Yours sincerely,

Howard Beale."

/3.



CONFIDENTIAL

3.

We await your further advice.

Yours faithfully,

*Ian J. W. Bisset*  
*per W. Bisset*

Ian J. W. Bisset  
Atomic Energy Attache

IJWB:mr

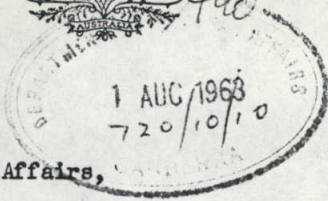




AUSTRALIAN EMBASSY  
WASHINGTON, D. C.

AE2.12/63

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Canberra A.C.T.  
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The Australian Government is most appreciative of your offer.  
Yours sincerely,

Howard Beale."

/3.



CONFIDENTIAL

3.

We await your further advice.

Yours faithfully,

*Ian J. W. Bisset*  
*per W. G. B.*

Ian J. W. Bisset  
Atomic Energy Attache

IJWB:mr



## 3RD LEAD TREATY (UPI-71)

BY WARREN DUFFEE

WASHINGTON, JULY 30 (UPI)--THE FOLKS BACK HOME MAY PLAY A BIG PART IN DETERMINING WHETHER THE SENATE RATIFIES THE THREE-NATION NUCLEAR TEST BAN TREATY.

THIS BECAME EVIDENT TODAY AS MORE AND MORE SENATORS INDICATED THEY WERE KEEPING AN OPEN MIND ON THE AGREEMENT REACHED IN MOSCOW BY THE UNITED STATES, BRITAIN AND RUSSIA.

MANY SENATORS SAID PRIVATELY THEY WERE WAITING TO TEST THE SENTIMENT AMONG VOTERS BACK HOME.

AS A RESULT, RATIFICATION OF THE TREATY BY THE REQUIRED TWO-THIRDS VOTE SHAPED UP AS NO SURE THING DESPITE OPTIMISTIC PREDICTIONS OF ITS ARDENT BACKERS. ONE VETERAN SENATOR NOTED THAT IT IS HARD TO GET TWO-THIRDS SUPPORT FOR ANYTHING IN THE SENATE.

UNDERSECRETARY OF STATE W. AVERELL HARRIMAN, WHO INITIALED THE AGREEMENT FOR THE UNITED STATES, AND DISARMAMENT CHIEF WILLIAM C. FOSTER FACED A BOMBARDMENT OF SEARCHING QUESTIONS AT A THREE-HOUR CLOSED SESSION YESTERDAY WITH MEMBERS OF THREE POWERFUL SENATE COMMITTEES.

THEY WON GENERAL PRAISE FOR THEIR PERFORMANCE AND THE ANNOUNCED SUPPORT OF TWO OF THE COMMITTEE CHAIRMEN. BUT MORE THAN HALF OF THE SENATORS INTERVIEWED LATER BY NEWSMEN SAID THEIR MINDS WERE NOT YET MADE UP.

CHAIRMAN J. WILLIAM FULBRIGHT, DEMOCRAT-ARKANSAS, OF THE FOREIGN RELATIONS COMMITTEE AND SEN. JOHN O. PASTORE, DEMOCRAT-RHODE ISLAND, OF THE SENATE-HOUSE ATOMIC ENERGY COMMITTEE SAID THEY INTENDED TO SUPPORT THE TREATY IN ITS PRESENT FORM.

BUT CHAIRMAN RICHARD B. RUSSELL, DEMOCRAT-GEORGIA, OF THE ARMED SERVICES COMMITTEE WAS NON-COMMITTAL.

THE PREPAREDNESS SUBCOMMITTEE OF RUSSELLS GROUP WILL RESUME HEARINGS THURSDAY ON THE MILITARY ASPECTS OF THE TREATY, WITH THE HEADS OF TWO MAJOR U.S. NUCLEAR WAPONS LABORATORIES SCHEDULED TO TESTIFY.

MORE

MG803P

UPI-265

ADD 3RD LEAD TREATY, WASHINGTON X X X TESTIFY.

CHAIRMAN JOHN STENNIS, DEMOCRAT-MISSISSIPPI, SAID THE WITNESSES WOULD BE DR. JOHN FOSTER, DIRECTOR OF THE LAWRENCE RADIATION LABORATORY, LIVERMORE, CALIFORNIA, AND DR. NORRIS E. BRADBURY, DIRECTOR OF THE LOS ALAMOS, NEW MEXICO, SCIENTIFIC LABORATORY.

+THESE RESPECTED SCIENTISTS WILL BE THE FIRST OF A NUMBER OF SCIENTIFIC AND TECHNICAL WITNESSES WHICH WE WILL HEAR IN THE NEXT FEW WEEKS,+ STENNIS SAID.

ONE QUESTION TROUBLING MANY SENATORS, NOTABLY REPUBLICAN LEADER EVERETT M. DIRKSEN, ILLINOIS, IS THE PACTS +VETO+ PROVISION, WHICH FORBIDS ANY AMENDMENT TO THE TREATY EXCEPT BY UNANIMOUS AGREEMENT OF THE THREE ORIGINAL SIGNERS.

ANOTHER IS THE EXACT MEANING OF ITS +WITHDRAWAL CLAUSE,+ WHICH WOULD ALLOW ANY MEMBER NATION TO PULL OUT OF THE AGREEMENT IN CASE OF A VIOLATION. A THIRD POINT IS THE POSSIBLE RESTRICTION ON USE OF NUCLEAR BLASTS FOR PURELY PEACETIME USES, SUCH AS EXCAVATION FOR CONSTRUCTION.

MG807P

FOLIO No.  
42

7/20/10/100

Mr. McKeown



DEPARTMENT OF EXTERNAL AFFAIRS.

**OUTWARD TELETYPE MESSAGE.**

FOLIO No. 41

TO DR A R WILSON A A E C 373  
FROM WILSON E A CANBERRA.

I HAVE SENT YOU TODAY COPIES OF TEXT OF TEST BAN TREATY AND OUR  
MINISTER'S STATEMENT. YOU MIGHT LIKE TO HAVE THESE PAPERS  
WITH YOU IN U.S. AND YOU MIGHT CARE TO GIVE COPIES TO OTHER  
MEMBERS OF YOUR TEAM.

CFM (373 )

ENDS 021415 AEST

EX COMMS BRANCH

1953 AUG 2 PM 2:35

*Wilson*

*Mr Wilson*



EXTERNAL AFFAIRS

FOLIO No. 40

CONFIDENTIAL

FILE No 720/10/10.

DATE

SUBJECT

"Plowshare"

FOR Mr. ~~Love~~

3/17

File 720

I have spoken to Dr Wilson <sup>(AAFC)</sup> who will lead team to US & UN Branch.

"Plowshare", is by definition "peaceful nuclear explosion" & most of its applications have been underground.

To that extent they are permitted under the Test Ban Treaty, though IBS the problem of radioactive debris outside territorial limits must have to be watched.

- 4) We must consider:
  - (a) a briefing for his Delegation; &
  - (b) getting the Commission's formal views on the effect of the treaty on Plowshare.

NW 30/7

2. Explosions under the seabed within territorial limits are prohibited.

To that extent "Plowshare" would be confined to affected, if a such an explosion was planned eg. for a harbour.

3. I have ~~sent~~ <sup>am sending</sup> Wilson a copy of his treaty & of his Hamelin's statement.



FOLIO N  
39

DEPARTMENT OF EXTERNAL AFFAIRS  
**INWARD CABLEGRAM**

**C O N F I D E N T I A L**

JW

I.20190

FROM:

Dated: 29th July, 1963,  
1815  
Rec'd: 30th July, 1963,  
0600

Australian Embassy,  
PRETORIA.

51 CONFIDENTIAL.

Savingram London, Washington, New York and Moscow.

Your AP51.

Nuclear Test Ban Treaty.

According to the Foreign Affairs Department accession by South Africa is out of the question until the United Kingdom, United States and the Soviet Union, have ratified and until it is seen what de Gaulle has to say. Meanwhile they have asked :-

- (a) The United Kingdom and the United States whether either can throw any light on Khrushchev's proposal for a Nuclear Free Zone in Africa (conception which South Africa favours) and;
- (b) United Kingdom to elucidate meaning of "or other nuclear explosion" in Article No. 1 of the Treaty.

Kevin.

MIN. & DEPT E.A.  
A/MIN. & DEPT DEFENCE  
MIN. & DEPT SUPPLY  
P.M.'s DEPT  
P.M.'s

30th July, 1963.

*Mr WILSON*  
Please advise  
30/7

SEC FA/S 1,2,4, A/S(3) A/S(JIC) LA M&I M DL INT UN PACAM  
AMSP EA EAF&ME E AFME INF ER

ACCRA BONN CAIRO DAR ES SALAAM GENEVA KARACHI LAGOS  
NEW YORK(UN) OTTAWA PARIS ROME TEL AVIV TOKYO WASHINGTON  
WELLINGTON

*Note sent to Mr Harvey 30/7*

*Mr. Tristone: Please look at the Treaty & tell me whether it affects PLOWHARE 30/7*

**C O N F I D E N T I A L**



DR RR NILSON AAEC  
NILSON EA CBA

I HAVE SENT YOU TODAY COPIES OF TEXT OF  
TEST BAN TREATY AND OUR MINISTERS STATEMENT.

YOU MIGHT LIKE TO HAVE THESE PAPERS WITH  
YOU IN U.S. AND YOU MIGHT CARE TO GIVE COPIES  
TO OTHER MEMBERS OF YOUR TEAM.

Jelle  
7/20/10

M. Johnson

ER



TEXT: Communique on Test Ban Talks

Following is the text of the Communique which the United States, Great Britain and the Soviet Union issued after the initialing of a partial nuclear test ban treaty in Moscow:

TEXT

The Special Representatives of the President of the United States of America and of the Prime Minister of the United Kingdom, W. A. Harriman, Under Secretary of State for Political Affairs of the United States, and Lord Hailsham, Lord President of the Council of Minister of Science for the United Kingdom, visited Moscow together with their Advisers on July 14. Mr. Harriman and Lord Hailsham were received by the Chairman of the Council of Ministers of the Union of Soviet Socialist Republics, N. S. Khrushchev, who presided on July 15 at the first of a series of meetings to discuss questions relating to the discontinuance of nuclear tests, and other questions of mutual interest. Discussions were continued from July 16 to July 25 with A. A. Gromyko, Minister of Foreign Affairs of the Union of Soviet Socialist Republics. During these discussions each principal was assisted by his Advisers.

The discussions took place in a businesslike, cordial atmosphere. Agreement was reached on the text of a treaty banning nuclear weapons tests in the atmosphere, in outer space and under water. This text is being published separately and simultaneously with this communique. It was initialed on July 25 by A. A. Gromyko, Mr. Harriman and Lord Hailsham.

Mr. Harriman and Lord Hailsham together with their Advisers will leave Moscow shortly to report and bring back the initialed texts to their respective Governments. Signature of the Treaty is expected to take place in the near future in Moscow.

The heads of the three Delegations agreed that the test ban treaty constituted an important first step toward the reduction of international tension and the strengthening of peace, and they look forward to further progress in this direction.

Plowshare  
File

7/20/50



The heads of the three delegations discussed the Soviet proposal relating to a pact of non-aggression between the participants in the North Atlantic Treaty Organization and the participants in the Warsaw Treaty.

The three Governments have agreed fully to inform their respective allies in the two organizations concerning these talks and to consult with them about continuing discussion on this question with the purpose of achieving agreement satisfactory to all participants. A brief exchange of views also took place with regard to other measures, directed at a relaxation of tension. END OF TEXT.



TEXT: Tripartite Treaty To Ban Nuclear Weapons Tests.

WASHINGTON: Following is the text of the accord on the nuclear weapons test ban reached July 25 in Moscow between the United States, Great Britain and the Soviet Union:

TITLE: Treaty Banning Nuclear Weapons in Atmosphere, in Outer Space and Underwater.

The Governments of the United States of America, The United Kingdom of Great Britain and Northern Ireland, and The Union of Soviet Socialist Republics, hereinafter referred to as the original parties, proclaiming as their principal aim the speediest possible achievement of an Agreement on general and complete disarmament under strict international control in accordance with the objectives of the United Nations which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons.

Seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, determined to continue negotiations to this end, and desiring to put an end to the contamination of man's environment by radio-active substances, have agreed as follows:

ARTICLE 1.

(1) Each of the parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapon tests explosions, or any other nuclear explosion at any place under its jurisdiction or control:

(a) In the atmosphere, beyond its limits, including outer space, or underwater, including territorial waters or high seas, or

(b) In any other environment if such explosion causes radio-active debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted. It is understood in this connection that the provisions of this subparagraph are without prejudice to the conclusion of a Treaty resulting in the permanent banning of all nuclear test explosions, including all such explosions underground, the conclusions of which, as the parties have stated in the preamble to this Treaty, they seek to achieve.

(2) Each of the parties to this Treaty undertakes furthermore to refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosions, or any other nuclear explosion, anywhere which would take place in any of the environments described, or have the effect referred to in Paragraph 1 of this Article.



ARTICLE 11.

(1) Any party may propose amendments to this Treaty. The text of any proposed amendments shall be submitted to the depositary Governments which shall circulate it to all parties to this Treaty, thereafter, if requested to do so by one-third or more of the parties, the depositary Governments shall convene a conference, to which they shall invite all the parties, to consider such amendment.

(2) Any amendment to this Treaty, must be approved by a majority of the votes of all the parties to this Treaty, including the votes of all of the original parties. The amendment shall enter into force for all parties upon the deposit of instruments of ratification by a majority of all the parties, including the instruments of ratification of all of the original parties.

ARTICLE 111

(1) This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

(2) This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the original parties -- The United States of America, The United Kingdom of Great Britain and Northern Ireland, and The Union of Soviet Socialist Republics -- which are hereby designated the depositary Governments.

(3) This Treaty shall enter into force after its ratification by all the original parties and the deposit of their instruments of ratification.

(4) For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

(5) The depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Treaty, the date of its entry into force, and the date of receipt of any requests for conferences or other notices.



(6) This Treaty shall be registered by the depositary Governments pursuant to Article 102 of the Charter of the United Nations.

ARTICLE IV.

This Treaty shall be of unlimited duration.

Each party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other parties of the Treaty three months in advance.

ARTICLE V

This Treaty, of which the English and Russian texts are equally authentic, shall be deposited in the archives of the depositary Governments, duly certified copies of this Treaty shall be transmitted by the depositary Governments to the Governments of the signatory and acceding States.

Done in triplicate at Moscow, this 25th Day of July,  
One Thousand Nine-Hundred and Sixty-three.



EXTERNAL AFFAIRS

FOLIO No.  
36

FILE No. \_\_\_\_\_

DATE 31-7-63

SUBJECT PLOWSHARE & THE NUCLEAR TEST BAN

FOR Mr HARRY

Mr Truelove

Thanks - I have  
Kept the text.

My

The Test Ban Treaty (text attached)  
does not ban nuclear explosions  
underground provided radioactive  
debris from such explosions do not  
fall outside the territorial limits  
of the state setting off the explosion.  
A PLOWSHARE EXPLOSION FALLING  
WITHIN THE LIMITS ABOVE WOULD  
NOT THEREFORE BE AFFECTED

*[Signature]*

→ Mr WILSON

*[Signature]*



INWARD CABLEGRAM

CONFIDENTIAL

JT

I.19927

FROM:

DATED: 25TH JULY, 1963.  
2113  
REC'D: 26TH JULY, 1963.  
1810

AUSTRALIAN EMBASSY,  
WASHINGTON.

1970 CONFIDENTIAL.

FOR A.A.E.C. FROM BISSET.

PLOWSHARE.

U.S.A.E.C. HAS AGREED TO ATTACHMENT OF THREE AUSTRALIANS TO  
PLOWSHARE PROGRAMME AS FROM SEPTEMBER 3RD.  
LETTER FOLLOWS.

MIN. I/C A.A.E.C.  
A.A.E.C. (T/T)  
E.A.  
P.M'S

26TH JULY, 1963.

*Ch. Wilson (E.A. Board)  
No objection to plowshare  
team going ahead on underground  
test. Wilson 20/7*

→ Mr. McKern (UN Ber)  
Wld you confer with.  
You have no objection to this  
team? *Mr. Wilson*

SEC FAS(1,2,4) DL PACAM AMSP ER *Mr. Inelove* 29/7 MW

*How would this look now? OK I think,  
since there is no agreement on underground tests. 29/7*

CONFIDENTIAL



EXTERNAL AFFAIRS

FOLIO No. 34

FILE No 720/10/10

DATE File

SUBJECT

Planshare

FOR Mr. Truestone

MR HARRY

WITH REF. TO YOUR QUERY ON THE CABLE BELOW, WE HAVE NOT YET SEEN LETTER REFERRED TO (COPY IS NOW COMING TO US) BY MR WILSON OBTAINED INFORMATION IN HIS NOTE BY TELEPHONE

11/7

MR WILSON

Mr. Truestone

As long as the letter was about details of itinerary I am satisfied

11/7

This AAEC letter to Washington said:

(1) Team would consist of Dr AR Wilson, AAEC (leader), Carter (BWR) & PENDER (S.M.A)

(2) AAEC would distribute reports etc of team to interested desks;

(3) Team would like to visit an experiment site, before departure after an explanation for would USAEC agree?

(4) would USAEC receive the group?

(5) Timing of visit: end of August would suit team;

(6) They assume team would spend most time at Livermore (Calif?) but Dr Wilson would like to spend time in Washington. [AAEC are sending USA copy]

11/7



INWARD CABLEGRAM

RB

I.18337

FROM:

DATED: 9TH JULY, 1963  
2039

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 10TH JULY, 1963  
1405

1761. CONFIDENTIAL.

FOR TIMBS, A.A.E.C.

PROJECT PLOUGHSHARE.

U.S.A.E.C. ADVISED 9TH JULY THAT A REPLY TO THE AMBASSADOR'S LETTER TO DR. SEABORG (WHICH WAS SENT ON 24TH JUNE) IS BEING PREPARED AND SHOULD ARRIVE AT THE EMBASSY AT THE END OF THIS WEEK OR EARLY NEXT WEEK.

ALTHOUGH THE TERMS OF THE REPLY HAVE YET TO BE CLEARED AT HIGH LEVEL, WE WERE ADVISED THAT THE DRAFT CONTAINS AGREEMENT TO THE PROPOSAL THAT A THREE-MAN AUSTRALIAN TEAM VISIT THE UNITED STATES.

2. WE HAVE PASSED TO THE U.S.A.E.C. THE POINTS MADE IN YOUR LETTER C62/142 OF THE 5TH JULY TO BISSET.

(INCIDENTALLY THIS LETTER CAME BY ORDINARY AIRMAIL).

THESE WILL BE TAKEN INTO ACCOUNT IN THE REPLY TO THE AMBASSADOR'S LETTER.

WE UNDERSTAND THAT THE DRAFT ITINERARY DRAWN UP FOR THE TEAM PROPOSES AN ELEVEN WEEKS VISIT COMMENCING ON SEPTEMBER 3RD IN WASHINGTON AND INCLUDING VISITS TO LIVERMORE, LAS VEGAS AND THE NEVADA TEST SITE.

IT IS POSSIBLE, HOWEVER, THAT TIMING MAY HAVE TO BE ADJUSTED IN THE LIGHT OF YOUR REQUEST FOR THE VISIT TO OVERLAP AN EXPERIMENT.

WE WILL ADVISE FURTHER ON THIS POINT AS SOON AS POSSIBLE.

MIN. I/C A.A.E.C.  
A.A.E.C.  
E.A.  
P.M.'s DEPT  
P.M.'s.

10TH JULY, 1963.

SEC A/Ss LA ER@ PAC&AM AM&SP

CONFIDENTIAL

Mr. Trudglove 11/7  
What were those points? 11/7



INWARD CABLEGRAM

RB

I.18337

FROM:

DATED: 9TH JULY, 1963  
2039

AUSTRALIAN EMBASSY,  
WASHINGTON.

REC'D: 10TH JULY, 1963  
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WE WILL ADVISE FURTHER ON THIS POINT AS SOON AS POSSIBLE.

MIN. I/C A.A.E.C.  
A.A.E.C.  
E.A.  
P.M.'s DEPT  
P.M.'s.

10TH JULY, 1963.

SEC A/Ss LA ER@ PAC&AM AM&SP

*Peaceful nuclear explosions, underground  
to create holes for dams, harbours etc. Ministers  
have approved an investigation of US nuclear etc. Mr Wilson*

WHAT IS THE OPERATION PLOUGHSHARE PLEASE?

*11/7*

CONFIDENTIAL

CONFIDENTIAL



C.62/142

5th July, 1963

720/10/10

Dear Mr. Bisset,

On 6th June 1963 we sent you a copy of the letter relating to "Plowshare" to be forwarded through the Australian Ambassador in Washington to the Chairman of the United States Atomic Energy Commission. If you are able to confirm that this has gone forward, it would be helpful if you could follow it up discretely at official level.

It has now been decided that the team to study "Plowshare" will be made up of Dr. A.R.W. Wilson from the Commission; Mr. K. Carter from the Bureau of Mineral Resources, and Mr. E.B. Pender from the Snowy Mountains Authority. Dr. Wilson will act as leader of the team and all communications from the group in relation to the investigation will be forwarded through the leader to the A.A.E.C. for distribution to interested parties.

It will be the team's responsibility to collect from reports, discussions and inspections, all possible information on the scientific, engineering and safety aspects of "Plowshare" applications. This information will be used at a later date for an evaluation of the advantages and hazards of the possible use of nuclear explosives for peaceful purposes in Australia. It will not be the team's function to carry out such an evaluation, either with reference to a specific location or situation in Australia nor, for that matter, generally.

The Commission feels that the team would be able to extract the maximum benefit from its visit if this could be made to cover a period prior and subsequent to an excavation experiment. The team would then have an opportunity to observe both the activities which go into mounting such an experiment and the evaluation stage.

On the assumption that a favourable reply will be forthcoming from the U.S.A.E.C., it would be helpful if you could confirm that it is unlikely that difficulties will arise which might prevent the officers concerned visiting the

.../2

I.J.W. Bisset, Esq.,  
Atomic Energy Attache',  
C/- Australian Embassy,  
1700 Massachusetts Avenue,  
WASHINGTON, D.C.6, U.S.A.

File  
a Plowshare  
720/2

aw 12/7



test sites. You will recollect that this seemed to pose problems for the U.S.A.E.C. in relation to Dr. Wilson's recent visit.

You might also ascertain the views of those most directly concerned in relation to the following aspects, viz:-

(i) the earliest date when it might be possible for the U.S.A.E.C. to receive the group, bearing in mind the suggestion above that it would be preferable for the visit to overlap an experiment. The Commission is currently thinking in terms of the team leaving Australia towards the end of August and it would be helpful to have as much notice as possible as to whether this would be feasible and appropriate;

(ii) the most suitable places of attachment. It is assumed that a major part of the time of all three officers should be spent at Livermore and the test sites. However, it may be that Dr. Wilson, in particular, should spend some time with Dr. Kelly's group in Washington;

(iii) suggestions concerning the manner in which the officers concerned might gain, within the time available, the best insight into the "Plowshare" work.

You might also enquire whether there are any particular points to which the U.S.A.E.C. feels we should give our attention. Dr. Wilson is, of course, cleared to "Top Secret" and we will take steps to obtain similar clearances for Messrs. Carter and Pender.

Yours sincerely,

*A.K.W.D.*

*for* M. C. Timbs  
A/g. Executive Member.



CONFIDENTIAL

FOLIO No.  
30

720/10/10

18th June, 1963.

496

The Australian Embassy,  
WASHINGTON.

PEACEFUL USES OF NUCLEAR EXPLOSIVES.

Please refer to your memorandum No.123 of 31st October, 1962, enclosing a letter to the Ambassador from Dr. Seaborg, Chairman, United States Atomic Energy Commission. Dr. Seaborg's letter has been considered by Ministers and we should be glad if the attached reply could be sent to him.

For your information, the visit by the technical officers will be sponsored by the A.A.E.C. and the group will be led by the Commission's nominee, Dr. A.R.W. Wilson. It is expected that the other two members of the group will be an engineering geologist nominated by the Department of National Development and a civil engineer jointly nominated by the Department of Works and the Snowy Mountains Hydro-Electric Authority,

*R*

(R. A. PEACHEY) -  
For the Secretary

CONFIDENTIAL



Australian Atomic Energy Commission



FOLIO No. 29

BOX 41, POST OFFICE, COOGEE, N.S.W., AUSTRALIA  
CABLES: ATOMCOM, SYDNEY — TELEPHONE: 665-1221

OUR REFERENCE

YOUR REFERENCE

C.62/142

6th. June, 1963.

CONFIDENTIAL

720/10/10

~~720/15/2/1~~

Dear Sir,

As you are aware Cabinet, by Decision No. 722 of 7th. May, 1963, approved a proposal that a group of technical officers should examine, in the United States, the evidence relating to the use of underground nuclear explosions for peaceful purposes, for the purpose of assessing the advantages and hazards of their possible use in Australia. Accordingly, the Commission now desires to seek the agreement of the United States Atomic Energy Commission to a visit of approximately three months' duration by three technical officers.

I would be grateful, therefore, if you would arrange for a letter in the form of the attached draft to be forwarded through the Australian Ambassador in Washington to the Chairman of the United States Atomic Energy Commission, Dr. Glenn T. Seaborg.

*For your information*

*by the technical officers*

*A.A.E.C.*

The visit will be sponsored by the Commission and the group will be led by the Commission's nominee, Dr. A.R.W. Wilson. It is expected that the other two members of the group will be an engineering geologist nominated by the Department of National Development and a civil engineer jointly nominated by the Department of Works and the Snowy Mountains Hydro-Electric Authority.

Yours faithfully,

*[Signature]*  
M. C. Timbs  
A/g. Executive Member.

*J*

The Secretary,  
Department of External Affairs,  
CANBERRA. A.C.T.

Encl.

CONFIDENTIAL

*DE*

*Mr [Signature]*

*Mr. H. Wilson (A.R.)*

*Rego's*  
*Pls R/S this*  
*happy with file*  
*Household file*  
*11/6*



AUSTRALIAN ATOMIC ENERGY COMMISSION

DRAFT

CONFIDENTIAL

Dr. Glenn T. Seaborg,  
Chairman,  
United States Atomic Energy Commission,  
1901 Constitutional Avenue,  
WASHINGTON 25, D.C. U.S.A.

Dear Dr. Seaborg,

On 25th. October, 1962 you wrote to me concerning the growing Australian interest in your Commission's "Plowshare" programme and the possibility of developing that interest in a more concrete form.

Since then the Australian Government has given careful consideration to the implications of collaboration between our two countries in the use of nuclear explosives for peaceful purposes. It has concluded that before it can give consideration to whether or not it would be possible to develop an experimental programme in Australia it should have before it an appreciation by Australian scientists and engineers of the scientific, engineering and safety aspects of the use of nuclear explosives for peaceful purposes with a view to assessing the advantages and hazards of their possible use in Australia.

Accordingly, I will be grateful to learn whether your Commission would be willing to afford a small group of Australian technical officers an opportunity to review these aspects at first hand with your scientists. The group would consist of three specialists led by a health physicist from the Australian Atomic Energy Commission, and would include an engineering geologist and a civil engineer. Subject to your own view, it is suggested that the group might spend an initial period of about three months in the United States.

The Australian Government is most appreciative of your willingness to develop collaboration in the peaceful uses of nuclear explosives and hopes that you will be able to agree to the procedure suggested.

Yours sincerely,

CONFIDENTIAL



**CONFIDENTIAL**  
**EXTERNAL AFFAIRS**

FOLIO No.  
28

*Put under cabinet papers 20/4*

FILE No .....

DATE 11th April, 1963

SUBJECT

Peaceful Use of Nuclear Explosives

FOR ~~The Acting~~  
The Minister

*RM*

The Minister for National Development in submission 625 discusses (a) an invitation by the Chairman of the U.S. Atomic Energy Commission to discuss in detail the possibility of a mutual United States - Australian experimental programme of nuclear excavation and (b) a proposal by the Assistant for Atomic Energy to the U.S. Secretary of Defence to visit Australia in February, 1964 to inspect possible project sites.

2. Sir William Spooner suggests that our first step should be to gain a full and first hand appreciation of the scientific engineering and safety aspects. He recommends that an experienced scientist from the A.A.E.C. with a geologist and a civil engineer visit the United States to assess the advantages and hazards attaching to the possible use of underground nuclear explosions in Australia.

Views of Department of External Affairs.

3. On 20th August, 1962, we informed the Secretary, Department of National Development that there would seem to be no present reason for Australia not to explore the possibilities of nuclear explosions in respect of important development projects. At the same time we said we considered it desirable for the Government to be completely frank about its intentions and, once a decision is taken to go ahead with the project, to permit international experts to inspect the experiments and devices, observe the explosions, measure the fallout and assess the peaceful value of the experiments in economic terms.

4. Dr. Raggatt agreed at the time that a paragraph similar to paragraph 3 above should be included in the draft submission, and he subsequently accepted a form of words proposed. However, no reference to external policy considerations appears in submission 625. These (which at this stage involve questions of international and domestic public relations rather than defence or safety issues) are restated briefly below.

External Policy Considerations.

5. We have more than once drawn the attention of the Department of National Development to the fact that even fact-finding missions relating to underground nuclear explosions can have external repercussions. When negotiations for a ban on nuclear tests are at a critical stage, any action which might be interpreted or could be represented

*RM 12/6*  
*Mr Peasley*  
*12/6*

**CONFIDENTIAL**



**CONFIDENTIAL**

- 2 -

by the U.S.S.R., or by international opinion an an attempt to evade international controls could have an effect on the success or failure of negotiations.

6. However innocent our motives in investigating the economics and safety of underground nuclear explosions, it may be suspected or alleged that the Americans plan to use Australia (as the U.S.S.R. used to be suspected of using the remote areas of China) to continue testing its weapons under the guise of mining or harbour-blasting. Even although the United States agreed in March, 1961 to international inspection of all nuclear devices to be used in peaceful explosions the U.S.S.R. alleged on 20th August, 1961 that proposals for such explosions were a cloak for attempts to establish a loop-hole in a test ban treaty.

7. The United States will no doubt wish to place any inspection of peaceful explosions on a strictly reciprocal basis viz if U.S. peaceful explosions in Australia are to be inspected then similar Russian explosions should likewise be checked. Even if there is in fact no hazard our Asian neighbours and other countries would be likely to protest at the use of nuclear explosives without international supervision and inspection.

Recommendation.

8. It is recommended (a) that Cabinet note that current drafts of an international agreement on a test ban call for international inspection of nuclear explosions and that even if an agreement has not been concluded, it may be desirable to permit such inspection ;

(b) that at the time the technical mission is sent to the United States, an announcement be made that should a programme be eventually approved it would be open to international inspection, whether or not Australia had accepted this as a legal obligation.

  
(R. L. Harry)

First Assistant Secretary  
Division IV

**CONFIDENTIAL**





720/10/10.

FOLIO No. 27  
*[Signature]*

COMMONWEALTH OF AUSTRALIA.

*Howe*

CANBERRA.

720/10/10? 3 MAY 1963

With the Compliments  
of the  
Secretary to Cabinet.

Sir Arthur Tange, C.B.E.,  
Secretary,  
Department of External Affairs,  
CANBERRA.

*Recd 13/5/63*

1. ~~Requesting~~ *S. J. Bennett*  
2. ~~Mr Shaw~~ *AD 13/5.*  
*Mr Peasley* *Mr Peasley. F.*



CONFIDENTIAL



PRIME MINISTER'S DEPARTMENT.

CANBERRA.

13 MAY 1967

*In reply quote No.*

Dear Dr. Raggatt,

... I attach a copy of the Cabinet decision which relates to Cabinet Submission No. 625 by the Minister for National Development on the subject of the peaceful use of nuclear explosives.

During the course of the discussion the Minister for External Affairs expressed a view to the effect that the Government might make it clear from the outset that should a programme involving nuclear explosion in Australia be agreed upon, it will be open to international inspection. The Cabinet did not dissent from the proposition of inspection. On the contrary, it gave support. But since no programme was in contemplation at this stage - on this point see the decision - it was felt that there was no call to make any announcement about inspection. However, it was agreed that the Minister for National Development would, in handling any issues which arise, be sensitive to the point made by the Minister for External Affairs.

Yours sincerely,

(E.J. Bunting)  
Secretary.

Dr. H.G. Raggatt, C.B.E.,  
Secretary,  
Department of National Development  
CANBERRA. A.C.T.



C O N F I D E N T I A L

COPY No. 25

C A B I N E T M I N U T E

Canberra, 7th May, 1963.

-----  
Decision No. 772  
-----

Submission No. 625 - Peaceful Use of Nuclear Explosives.

The Cabinet approved the proposal that a group of technical officers should examine in the United States the evidence relating to the use of underground nuclear exploration for peaceful purposes, for the purpose of assessing the advantages and hazards to their possible use in Australia.

2. The Cabinet indicated that it regarded the proposal as one limited to seeking a first-hand appreciation of the scientific, engineering and safety aspects of the use of nuclear explosives without any suggestion at this stage that Australia's interest will be extended further.

Certified true copy

*S. J. Brenting*

Secretary to Cabinet.



OUTWARD CABLEGRAM

720/10/10.

FOLIO No. 26

IM

0.9436

TO:

Sent: 8th May, 1963.  
2200

Australian Embassy,  
WASHINGTON...1073 (For Bisset)

Repeated:

Australian Migration Office,  
VIENNA...59 (For Wilson)

CONFIDENTIAL.

*re Bisset*

From A.A.E.C.

Your 1160 to Wilson re Plowshare visit.

View U.S.A.E.C. decisions please cancel Plowshare visit altogether and arrange Wilson's earlier return to Australia accordingly.

2. For Wilson.

Glad if you would note Commission's decision above and re-arrange itinerary direct with Bisset.

*720/10/10*

MIN. I/C A.A.E.C.  
A.A.E.C.  
A.A.E.C.R.L.  
E.A.  
SUPPLY  
P.M'S DEPT  
P.M'S

9th May, 1963.

SEC A/Ss ER PAC&AM AM&SP DL

CONFIDENTIAL

CONFIDENTIAL



LIO No.  
25

INWARD CABLEGRAM

SRG

I. 11518

DATED: 2ND MAY, 1963  
1830

FROM:

REC'D: 3RD MAY, 1963  
1823

AUSTRALIAN EMBASSY,  
WASHINGTON:

720/10/10

1160. CONFIDENTIAL.

FOR WILSON AT VIENNA, NUCLEAR HAZARDS CONFERENCE,  
FROM BISSET.

PLEASE PASS COPY TO TIMBS, A.A.E.C.

PROJECT PLOWSHARE VISIT.

*to Wilson*

U.S.A.E.C. INFORMED US ON 2ND MAY THAT UNDER PRESENT CIRCUMSTANCES  
YOUR PLOWSHARE VISIT WOULD BE LIMITED TO UNCLASSIFIED DISCUSSION  
WITH HIGGINS AT LIVERMORE ON MONDAY, 27TH MAY.

U.S.A.E.C. HAS NOT APPROVED YOUR PROPOSED VISIT  
TO PLOWSHARE SITE IN NEVADA, THEREFORE SUGGEST YOU NOW VISIT  
DESALINATION PLANT AT SAN DIEGO FRIDAY, 24TH.  
PLEASE ADVISE.

? u

-----

*File  
720/??*

MIN. I/C A.A.E.C.  
A.A.E.C. (S) (T.T.)  
E.A.  
SUPPLY  
P.M.'s DEPT  
P.M.'s

3RD MAY, 1963

SEC A/S'S ER PAC&AM AM&SP DL

CONFIDENTIAL



FOLIO No. 24

OUTWARD TELETYPE MESSAGE

FOR TIMBS ATOMCOM SYDNEY 195.  
FROM PEACHEY E A CANBERRA.

CONFIDENTIAL URGENT.

*Adams* 29/4

1963 APR 26 PM 4:05

EX COMM BRANCH

YOU WERE ENQUIRING THIS MORNING ABOUT OUR ATTITUDE TO THE  
SUBMISSION ON " PLOUGHSHARE ". WE HAVE SENT SIR GARFIELD  
BARWICK A NOTE DRAWING TO HIS ATTENTION THE EXTERNAL POLICY  
VIEWS WE HAD EXPRESSED ON PREVIOUS DRAFTS OF THIS SUBMISSION,  
WHICH HAD BEEN IN CORPORATED IN THE TEXT OF LAST NOVEMBER. NO  
REFERENCE TO THEM APPEARS IN THIS SUBMISSION.

2. IN RESPECT OF THIS SUBMISSION THE POLICY CONSIDERATIONS OF  
CONCERN TO THIS DEPARTMENT CAN BE SUBMMARISED AS FOLLOWS:-

*File*  
*7/21/63*

(A) EVEN FACT FINDING MISSIONS RELATING TO UNDERGROUND NUCLEAR  
EXPLOSIONS CAN HAVE EXTERNAL REPERCUSSIONS E.G. ON NEGOTIATIONS  
FOR A BAN NUCLEAR WEAPONS TESTS.

(B) WE COULD BE SUSPECTED (IN SUCH FACT FINDING INVESTIGATIONS)  
OF ALLOWING THE U.S. TO CONTINUE TESTING WEAPONS UNDER THE  
GUISE OF MINING OR HARBOUR BLASTING,

(C) ASIAN AND OTHER COUNTRIES WOULD PROTEST IF NUCLEAR EXPLOSIVES  
WERE USED WITHOUT INTERNATIONAL INSPECTION.

3. WE HAVE SUGGESTED THAT MINISTERS NOTE (A) THAT CURRENT  
DRAFTS OF AN AGREEMENT ON TESTS CALLS FOR INTERNATIONAL INSPECTION  
OF PEACEFUL NUCLEAR EXPLOSIONS AND THAT EVEN IF AN AGREEMENT HAS NOT  
BEEN CONCLUDED IT MAY BE DESIRABLE TO PERMIT SUCH INSPECTION,  
AND

(B) THAT WHEN THE PROPOSED TECHNICAL MISSION IS SENT TO THE  
U.S., AND ANNOUNCEMENT BE MADE THAT SHOULD SUCH A PROGRAMME  
BE EVENTUALLY APPROVED IT WOULD BE OPEN TO INTERNATIONAL INSPECTION.

CFM 195 ENDS

26/4/63 1546AEST GJH



# TELETYPE MESSAGE

Registration

No. ....

CLASSIFICATION .....

FOR Timbs, Atomcom Sydney

FROM Plachy EA CBA.

FOLIO No.  
23

~~I believe~~ you were enquiring this morning about our attitude to the submission on "Ploughshare". We have sent ~~to~~ Sir Garfield Barwick a note drawing to his attention <sup>(EXTERNAL POLICY)</sup> the views ~~which~~ we had expressed on previous drafts of the submission, ~~and~~ which had been incorporated in the text of last November. No reference to them <sup>is</sup> appears in the submission.

2. The policy considerations of concern to this department can be summarised as follows:—

APPROVED BY ..... BRANCH OR SECTION ..... FILE ..... DATE .....



# TELETYPE MESSAGE

Registration

N.....

CLASSIFICATION.....

FOR.....

FROM.....

(4)

IT WOULD BE OPEN TO INTERNATIONAL INSPECTION.

APPROVED BY..... BRANCH OR SECTION..... FILE..... DATE.....



# TELETYPE MESSAGE

Registration

No. ....

CLASSIFICATION .....

FOR .....

FROM .....

(2)

(a) EVEN FACT FINDING MISSIONS RELATING TO UNDERGROUND NUCLEAR EXPLOSIONS CAN HAVE EXTERNAL REPERCUSSIONS. EG ON NEGOTIATIONS FOR A BAN NUCLEAR WEAPONS TESTS. ~~THEY~~  
~~COULD BE~~

(b) WE COULD BE SUSPECTED ( IN SUCH <sup>FACT FINDING</sup> INVESTIGATIONS ) OF ALLOWING THE U.S. TO CONTINUE TESTING WEAPONS UNDER THE GUISE OF MINING or HARBOUR-BLASTING;

(c) ARIAN AND OTHER COUNTRIES WOULD PROTEST IF NUCLEAR EXPLOSIVES ~~WITHOUT~~ WERE USED WITHOUT INTERNATIONAL INSPECTION.



TELETYPE MESSAGE

Registration

No. ....

CLASSIFICATION .....

FOR .....

FROM .....

(3)

3. WE HAVE SUGGESTED THAT ~~THE~~ <sup>OF</sup> MINISTERS  
NOTE <sup>(a)</sup> THAT CURRENT DRAFTS OF ~~THE~~ AN  
AGREEMENT ON TESTS CALLS FOR  
INTERNATIONAL INSPECTION OF PEACEFUL  
NUCLEAR EXPLOSIVES AND THAT EVEN  
IF AN AGREEMENT HAS NOT BEEN CONCLUDED  
IT MAY BE DESIRABLE TO PERMIT SUCH INSPECTION;  
AND

(b) THAT WHEN THE PROPOSED TECHNICAL  
MISSION IS SENT TO THE US, AN  
ANNOUNCEMENT BE MADE THAT SHOULD  
SUCH A PROGRAMME BE EVENTUALLY APPROVED

APPROVED BY ..... BRANCH OR SECTION ..... FILE ..... DATE .....



FOR THE ACTING MINISTER.PEACEFUL USE OF NUCLEAR EXPLOSIVES.

The Minister for National Development in submission 625 discusses (a) an invitation by the Chairman of the U.S. Atomic Energy Commission to discuss in detail the possibility of a mutual United States - Australian experimental program of nuclear excavation and (b) a proposal by the Assistant for Atomic Energy to the U.S.

Secretary of Defence to visit Australia in February, 1964.  
to inspect possible project sites.

2. (Sir William?) Senator Spooner suggests that our first step should be to gain a full and first hand appreciation of the scientific engineering and safety aspects. He recommends that an experienced scientist from the A.A.E.C. with a geologist and a civil engineer visit the United States to assess the advantages and hazards attaching to the possible use of underground nuclear explosions in Australia.

Views of Department of External Affairs.

3. On 20th August, 1962, we informed the Secretary, Department of National Development that there would seem to be no present reason for Australia not to explore the possibilities of nuclear explosions in respect of important development projects. At the same time we said we considered it desirable for the Government to be completely frank about its intentions and, once a decision is taken to go ahead with the project, to permit inspection of the experiments and devices, observation of the explosions, measurement of the fallout and assessment of the peaceful value of the experiments in economic terms by international experts.

4. Dr. Raggatt agreed at the time that a paragraph similar to paragraph 3 above should be included in the draft submission, and he subsequently accepted a form of words proposed. However no reference to external policy considerations appears in submission 625. These (which at this stage involve questions of international and domestic public relations rather than defence or safety issues) are restated briefly below.



CONFIDENTIAL

External Policy Considerations.

5. We have more than once drawn the attention of the Department of National Development to the fact that even fact-finding missions relating to underground nuclear explosions, can have external repercussions. When negotiations for a ban on nuclear tests are at a critical stage, any action which might be interpreted by the U.S.S.R., or by international opinion, as an attempt to evade international controls could have an effect on the success or failure of negotiations.

6. However innocent our motives in investigating the economic and safety of underground nuclear explosions, it may be suspected or alleged that the Americans plan to use Australia (as the U.S.S.R. used to be suspected of using the remote areas of China) to continue testing its weapons under the guise of mining or harbour-blasting. Even although the United States agreed in March 1961 to international inspection of all nuclear devices to be used in peaceful explosions, on 20th August 1961 the U.S.S.R. alleged that proposals for such explosions were a cloak for attempts to establish a loop-hole in a test ban treaty.

7. The United States will no doubt wish to <sup>place</sup> ~~use~~ any inspection of peaceful explosions on a strictly reciprocal basis. However, our Asian neighbours <sup>and many</sup> other countries (even <sup>and if only for</sup> if there is in fact no hazard) would be likely to protest at the use of nuclear explosives without safeguards.

Recommendation.

8. It is <sup>(a)</sup> recommended that ~~before deciding to accept the proposal of the Minister for National Development Cabinet note~~ that current drafts of an international agreement on test bans calls for international inspection of <sup>peaceful</sup> nuclear explosions and that even if an agreement has not been concluded it may be desirable to permit such inspection, ~~In any event it would seem desirable to~~ <sup>(b) That</sup> ~~announce,~~ at the time the technical mission is sent to the United States, <sup>an announcement be made</sup> that should a programme be eventually approved it would be

CONFIDENTIAL



CONFIDENTIAL

3.

open to international inspection, whether or not Australia had accepted this as a legal obligation or not.

(R.L. Harry)  
First Assistant Secretary,  
Division IV.

CONFIDENTIAL



## OUTWARD CABLEGRAM

ED.

O.7401.

Dated: 10th April, 1963.  
1800.

TO:

Australian Embassy,  
PARIS.662. SECRET. IMMEDIATE.Parliamentary Business - Nuclear-Free Zone and Related Questions.For Minister from Tange.

1. Our immediately following telegram contains text of further question on notice regarding French testing addressed to Prime Minister by Mr. Ward on 10th April.
2. I am disposed to recommend to Mr. Holt that he write to Mr. Haylen (reference exchange in our telegram 651) drawing attention to two questions on notice paper on same subject, saying that you will be discussing matter with French Government during your current visit, and indicating that replies you or Acting Minister (see below) make to Messrs. Einfield and Ward will, no doubt, cover all matters in his question. Would this be agreeable?
3. Meanwhile, Mr. Holt has told me that he will discuss with Prime Minister (who returns to Sydney from sea trip on Monday) possible presentation during next week of a resolution on A.L.P. nuclear-free southern hemisphere proposal. Notice might be given by Prime Minister on Tuesday.
4. Mr. Holt has asked that all relevant material (antecedents of this particular proposal, other proposed zones, defence aspects, Australian Government statements, etc.) by assembled by Monday as matter of urgency. Although it might be preferable if French testing site could be treated as separate issue, I am inclined to think it will have to be included. It would be very helpful, therefore, if you could let us have a cabled report of any discussions you may have on this matter with French Ministers. Perhaps Acting Minister might want to answer Einfield and Ward questions without delay.

A/MIN. & DEPT E.A.  
MIN. & DEPT DEFENCE.  
P.M'S.

11th April, 1963.

SEC	A/Ss	LA	UN	ER	PAC&AM	AM&SP	S&SEA
SEA	EAF&ME	E	INF	DL	IC.		



FO  
20



Revised  
mail to  
Mr. G. Wilson  
Legal Affairs

With the Compliments  
of the

Australian Atomic Energy  
Commission

Michael

Copy as requested  
Andrew Thomas  
9-4-63

45 Beach Street, Coogee, N.S.W., Australia  
POST OFFICE, COOGEE, N.S.W.  
Rayman  
Follow!



CONFIDENTIAL

FOR CABINET:

PEACEFUL USE OF NUCLEAR EXPLOSIVES

Experiments carried out in the United States and Russia suggest that nuclear explosions may be used to effect large reductions in the cost of fracturing and/or removing large quantities of earth and rock. From the Australian point of view this appears to have particular significance in -

- (a) civil engineering projects such as earth-fill dams, large excavations for water storage and the construction of harbours;
- (b) the fracturing of large low-grade orebodies.

2. The programme of experimentation in the peaceful use of nuclear explosions in the United States (known as Project Plowshare) appears to have achieved a considerable measure of success and some of the basic data required to assess the effectiveness of the technique is now available. A large amount of information is also available which suggests that the radiation hazards associated with underground explosions are very much less than those associated with above-ground explosions; so much so that it appears that the radiological hazards will not constitute a major bar to practical applications of the technique. Evidence available also suggests that the seismic and air blast effects even with large explosions can be accurately predicted and in any case are restricted to a relatively small area immediately surrounding the explosion.

3. The cost advantage of nuclear explosion techniques over conventional methods, especially where the



fracturing or removal of very large quantities of earth or rock are involved, appears to be so great that there are grounds for believing that these techniques may provide the answer to the construction of works or development of resources which otherwise would be regarded as impracticable because of capital requirements or because of marginal economics.

4. The Australian continent is well situated to take advantage of these methods. Extensive areas are sparsely settled and there are large stretches of coastline without natural harbours. We foresee the exploration of our mineral resources as a means of attracting overseas investment and promoting decentralisation. We are not well endowed with water resources and there will be a continuing requirement for large water storages, particularly if these can be constructed in a manner which will minimise evaporation. Nuclear explosives give promise of enabling this kind of storage to be made, both for deep storage facilities and in the construction of conventional type dams.

5. With the above possibilities in mind, the A.A.E.C. invited the U.S.A.E.C. to send an expert to Australia to discuss development of the "Plowshare" operation, the results achieved to date, and the potential of the methods employed. Dr. Gary Higgins, Director of the Plowshare Division at the Lawrence Radiation Laboratory, California, visited Australia in March 1962 and discussed the work of his Division with the Government officials and other interested persons. Lawrence Radiation Laboratory is operated for the U.S.A.E.C. by the University of California.

6. On 25th October, 1962, Dr. Glenn Seaborg, Chairman of the U.S.A.E.C., wrote to the Australian Embassy in Washington indicating the willingness of the Commission



to send a small mission to Australia for the purpose of determining whether the undertaking of an excavation experiment in Australia "is desirable from our respective standpoints." (A copy of this letter is attached).

7. On 12th February, 1963, a cable was received from the Embassy stating that Dr. Gerald Johnson, Assistant to the Secretary of Defence for Atomic Energy visited the Embassy on the 11th February to ascertain the response to Dr. Seaborg's letter of 25th October. Johnson also indicated that he would like to make a visit to Australia in February, 1964, "in the course of which he would like to visit possible sites for plowshare experimental or plowshare applications".

8. Clearly we are not in a position to take up the suggestion put forward in Dr. Seaborg's letter, and equally clearly it would be premature to encourage a visit such as proposed by Dr. Johnson. The Australian position is I suggest that our professional advisers see great possibilities in the use of nuclear explosives in Australia and believe that they can be used with minimal hazards. These conclusions however are based on evidence which our own experts have not had an opportunity to examine critically for themselves. Having in mind the potential use of this new technique, our first step should be to gain a full and first hand appreciation of the scientific, engineering and safety aspects. Only when these are available will we be in a position to consider whether our interest should be extended any further.

9. I recommend that the A.A.E.C. should be authorised to inform the U.S.A.E.C. in terms of the foregoing paragraph and, in continuation of its interest in the matter, to arrange with the U.S.A.E.C. for a group of not more than three technical officers to examine, in the



United States, all the evidence relating to the use of underground nuclear exploration for peaceful purposes, and to assess the advantages and hazards attaching to their possible use in Australia. It needs an experienced scientist from the A.A.E.C. plus a geologist and a civil engineer to make the examination.

10. If this recommendation is approved, the A.A.E.C., in consultation with the Department of National Development, would seek the assistance of other Commonwealth Departments and Authorities in selecting the technical experts and would ensure that all interested Commonwealth Departments and Authorities were kept fully informed so that they could, in due course, make their own contribution to any further consideration of this matter that might result from the proposed technical examination.

W.H. SPOONER

MINISTER FOR NATIONAL DEVELOPMENT



COPY

UNITED STATES ATOMIC ENERGY COMMISSION

WASHINGTON 25, D.C.

October 25, 1962.

Dear Sir Howard:

During the last two years members of the United States Atomic Energy Commission staff and the staff of our laboratory at Livermore, California, which is operated by the University of California, have had numerous conversations with Australian representatives regarding our Plowshare Program and, in particular, the feasibility and desirability of conducting nuclear excavation experiments in Australia. On the basis of these discussions, particularly those with Dr. Gary Higgins on his visit to Australia in March 1962, we have the preliminary impression that there may be projects in Australia that could be conducted in a manner to provide valuable technical data and at the same time accomplish excavation which might have potential value to Australia. Further, as a result of recent conversations, we understand that the Australian Atomic Energy Commission would appreciate receiving our general reaction as to whether it might be feasible for the United States and Australia to collaborate in the development and execution of any nuclear excavation experiments in Australia.

Although, as I am sure you appreciate, the Commission cannot commit itself to undertaking any specific experiment without further study, we would be fully prepared, should your Government so desire, to pursue discussions with your representatives on a more detailed basis. In these discussions the type of experimental program that might be of mutual interest could be explored. We would also be pleased to discuss other pertinent aspects of the problem including the nature of inter-governmental agreement that would be required, should our Governments decide to proceed in earnest on this matter, and how the responsibilities for health and safety might be allocated. These discussions should enable us to determine whether the undertaking of an excavation experiment is desirable from our respective standpoints.

Accordingly, should your Government wish to proceed further in developing this subject you may be sure that the matter will receive our most sympathetic and earnest attention.

If you have further questions on this subject please do not hesitate to let me know.

Sincerely yours,

(Sgd.) Glenn T. Seaborg

Chairman

His Excellency  
The Honorable Sir Howard Beale  
K.B.E., Q.C., Ambassador  
Embassy of Australia  
1700 Massachusetts Ave., N.W.  
Washington 6, D.C.



OUTWARD CABLEGRAM

:GS

0.3134

TO:

Sent: 15th February, 1963  
1800

Australian Embassy,  
WASHINGTON.

*720/10/10*

349. CONFIDENTIAL.

Plowshare.

*←* *in by letter* *file*

Your 395.

(1) Discussions arising out of Dr. Seaborg's letter are still proceeding at Ministerial level and an early indication of the Australian Government's position is expected. Until then it is most important that possible Australian interest in Plowshare experiments should not be the subject of any public disclosure or press comment.

(2) In particular there should not be any public reference to a suggested visit by Dr. Johnson or any other Plowshare expert in advance of the Australian Government's reply.

(3) Grateful if you would seek United States co-operation in this respect.

MIN. & DEPT E.A.  
MIN. I/C A.A.E.C.  
A.A.E.C.  
P.M.'s DEPT  
SUPPLY  
NATIONAL DEVELOPMENT  
P.M.'s

15th February, 1963

A/Ss ER@ PAC&AM AM&SP S&SEA EAF&ME E INF

CONFIDENTIAL





COMMONWEALTH OF AUSTRALIA.

FOLIO No.  
18

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS: NATDEV, CANBERRA.  
TELEPHONE: M 9.

IN REPLY QUOTE: 62/1911(3)

DEPARTMENT OF NATIONAL DEVELOPMENT,

PARKES,

CANBERRA, A.C.T.

13th February, 1963.



CONFIDENTIAL:

The Secretary,  
Department of External Affairs,  
CANBERRA. . . . . A.C.T.

PROJECT PLOWSHARE

Referring to cables from the Australian Embassy, Washington, Nos. 338 and 395, the position is that I have cleared a draft Cabinet Submission with the Australian Atomic Energy Commission, the Snowy Mountains Hydro-Electric Authority, and all interested Departments but that the Minister still has reservations about the recommendations in the draft Submission. The Chairman and I are to have a discussion with the Minister on the subject on Friday, 22nd February, and there is little doubt that a Submission will be filed in the week following.

2. In the circumstances I suggest that an interim reply to the two cables referred to above might be made on the following terms :

"It is expected that the proposal outlined in Seaborg's letter of 25th October, 1962, regarding co-operation on Project Plowshare will come before Cabinet shortly and a reply will be sent as soon as possible thereafter."

3. My own opinion on the proposal that Dr. Johnson should visit Australia in February, 1964, is that it is highly improbable that the visit could usefully be made at that time. Even assuming the Cabinet Submission were filed and approved in its present form, it would not be possible, in the time available, for the necessary ground work to be done in the selection of "possible sites for plowshare experiments or plowshare applications."

4. However any observations on these lines may be left over for further consideration after Cabinet has considered the matter.

5. A copy has been forwarded to the Prime Minister's Department, the Atomic Energy Commission, and the Department of Supply.

*H. G. Raggatt*  
(H. G. RAGGATT)  
Secretary



## INWARD CABLEGRAM

ED.

I.3868.

DATED. 11TH FEBRUARY, 1963.  
1810.REC'D. 12TH FEBRUARY, 1963.  
2030.

FROM.

AUSTRALIAN EMBASSY,  
WASHINGTON.395. CONFIDENTIAL.

FOR A.A.E.C. .

PROJECT PLOWSHARE.

FURTHER TO OUR 338, DR. GERALD JOHNSON, ASSISTANT TO THE SECRETARY OF DEFENSE FOR ATOMIC ENERGY, VISITED THIS EMBASSY ON 11TH FEBRUARY TO ASCERTAIN RESPONSE TO DR. SEABORG'S LETTER OF OCTOBER 25TH.

2. JOHNSON WAS INFORMED THAT A PROPOSAL FOR UNITED STATES-AUSTRALIAN COOPERATION IN PROJECT PLOWSHARE HAD BEEN THE SUBJECT OF CONSIDERABLE INTER-DEPARTMENTAL STUDY IN AUSTRALIA AND THAT RECOMMENDATIONS HAD BEEN MADE WHICH NOW REACHED THE MINISTERIAL LEVEL.

3. JOHNSON, WHO WAS FORMERLY DIRECTOR OF PROJECT PLOWSHARE AT LIVERMORE, STATED THAT HE WAS PROPOSING (SUBJECT TO AUSTRALIAN CONVENIENCE) IN FEBRUARY 1964 TO MAKE A VISIT TO AUSTRALIA OF SEVERAL WEEKS' DURATION, IN THE COURSE OF WHICH HE WOULD LIKE TO VISIT POSSIBLE SITES FOR PLOWSHARE EXPERIMENTS OR PLOWSHARE APPLICATIONS. JOHNSON EMPHASIZED THAT A GREAT DEAL OF PLANNING WOULD BE NEEDED BEFORE ANY EXPERIMENT COULD BE CARRIED OUT. THIS PLANNING WOULD COVER ENGINEERING, ECONOMICS, ENVIRONMENTAL AND HAZARDS ANALYSES.

4. JOHNSON STATED THAT THE GREATEST POTENTIAL FOR NUCLEAR EXPLOSIVES APPEARED TO BE FOR EXCAVATION AND DAM-BUILDING PURPOSES AND HE LINKED THIS WITH AUSTRALIA'S NEED FOR EXTENDING ITS WATER STORAGE CAPABILITIES.

MIN. & DEPT E.A.  
MIN I/C A.A.E.C.  
A.A.E.C.  
P.M'S DEPT.  
SUPPLY.  
NATIONAL DEVELOPMENT.  
P.M'S.

12TH FEBRUARY, 1963.

A/Ss  
IC.

ER@

PAC&amp;AM

AM&amp;SP

S&amp;SEA

EAF&amp;ME

INF

CONFIDENTIAL  
CONFIDENTIAL



FLOWERSHARE

Mr Peacher  
/

Sargeant said Arkaday  
Kazgatt is seeing Thosner  
on Monday with his draft  
Cabinet Submission. He will  
Markon V.S. enquiry. Sargeant  
suggested we hold any  
reply until Tuesday. I  
agreed.

MW 7/2



INWARD TELETYPE MESSAGE.

EXTERNAL AFFAIRS CANBERRA  
FOR HARRY  
FROM TIMBS ATMCOM SYDEY

EX COMMS BRANCH

1963 FEB 6 PM 3:56

C O N F I D E N T I A L

PROJECT PLOWSHARE

PLEASE SEE CABLE 338 FROM WASHINGTON ABOUT PLOWSHARE STP I ASSUME  
THAT YOU AVE DISCUSSED THE MATTER WITH DR RAGGATT AND THAT YOU  
HA ARE AWARE OF THE DIFFICULTIES IN GETTING AN EARLY REPLY STP  
PROFESSOR BAXTER AND DR RAGGATT HAVE REQUESTED AN INTERVIEW  
WITH THE MINISTER WITH A VIEW TO ARRAGING FOR EARLY CONSIDERATION  
OF THE MATTER BY CABINET STOP WE ARE HOPEFUL THAT WE WILL BE  
ABLE TO SEND A REPLY TO DR SEABORG,S LETER WITHIN A MONTH STOP  
GRATEFUL IF YOU WOULD ARRANOMMRV

PLPLPLPLPLPL

FROM GRATEFUL KF+ IF YOU WOULD PLS  
SEC

IN PLN OK

GRAEFUL IF YOU WOULD ARRANGE FOR ONE OF YOUR OFFICERS TO DRAFT  
A SUITABLE REPLY STOP REGARDS  
(CNFRM 338)

*Robertson*  
*For draft pls*

*th*



DEPARTMENT OF EXTERNAL AFFAIRS.

Dly

FOLIO No.  
14

INWARD TELETYPE MESSAGE.

1963 FEB 6 6 PH 3:44

COMMS BRANCH

MX 158

CONFIDENTIAL ROUTINE R 44.2.5

FM SUPDEP MELB (LADE)

TO E A CANBERRA

M1796

REFERECE NMESSAGE 338 FROM WASHINGTON, REPEATED SUPPLY AS  
XM 163.

THIS DEPARTMENTS COMMENTS ON SEABORG 'S P LOWSHARE LETTER  
WERE DESPATCHED TO YOU ON 3RD DECEMBER LAST. ASSUME YOU  
WILL REPLY TO WASHINGTON.

TIME MELB 1545 6.2.63 DC

Sargeant (ND)  
will give you  
as a reply for Washington

6/2

rus

1963 FEB 6

EX COMMS BR



INWARD CABLEGRAM

MT

I.3207

FROM:

Dated: 4th February, 1963  
1805  
Rec'd: 5th February, 1963  
1031

Australian Embassy,  
WASHINGTON.

338. CONFIDENTIAL.

Repeated Timbs A.A.E.C.

Project Plowshare.

*M. G. Sullivan*

On 4th February State Department and U.S.A.E.C. enquired when they might expect Australian reply to Seaborg's (U.S.A.E.C. chairman) letter of 25th October, 1962, regarding Project Plowshare co-operation.

Please advise.

MIN. & DEPT E.A.  
MIN. I/C A.A.E.C.  
A.A.E.C. (T/T S)  
P.M.'s DEPT  
P.M.'s

5th February, 1963

CONFIDENTIAL



GA/NMW



FOLIO No.  
12

720/10/10

4th January, 1963.

Dear Sir,

UNITED STATES ATOMIC ENERGY COMMISSION : PROJECT  
FLOWSHARE REPORTS.

Further to our memorandum 720/10/10

...

of 6th December, 1962, please find enclosed a copy of  
UCRL 5679 as requested by the Department of Public Works,  
Perth.

2,                      This publication completes the order  
requested by that Department.

*[Signature]*  
(M. J. Wilson)  
for the Secretary.

The Under-Secretary,  
The Premier's Department,  
PERTH,                      W.A.





AUSTRALIAN EMBASSY  
WASHINGTON, D. C.

FOLIO No.  
11

Memorandum No. 1419/62

28th. December, 1962



The Secretary,  
Department of External Affairs,  
CANBERRA, A.C.T.

→ ~~ER~~ Branch

UNITED STATES ATOMIC ENERGY COMMISSION: PROJECT PLOWSHARE REPORTS.

Further to our memorandum 1168/62 of 12th. October, we enclose  
UCRL 5675 for the Premier's Department, Perth.

- 2. This publication completes the order contained in your memorandum  
No.730, 852/10/4/13, of 12th. September.

*E.C.L. Catling*

E.C.L. CATLING  
LIBRARIAN

*The ~~order~~ where is this?*

*Copy despatched 4/1/63*





PREMIER'S DEPARTMENT  
PERTH




14th December, 1962.

Dear Sir,

Your letter dated 6th instant, reference No. 720/10/10 duly received.

We are passing on to the Under Secretary, Department of Public Works, Perth, the booklet Part V in the Plowshare Series, and we thank you for your courtesy in forwarding this publication.

Yours faithfully,

  
DIRECTOR,  
CIVIL EMERGENCY SERVICE.

ACTING SECRETARY,  
DEPARTMENT OF EXTERNAL AFFAIRS,  
CANBERRA.

MR. WILSON



CONFIDENTIAL



BOX 10, G.P.O., CANBERRA.  
TELEGRAMS: NATDEV; CANBERRA.  
TELEPHONE: M 9.

IN REPLY QUOTE: 62/1911

DEPARTMENT OF NATIONAL DEVELOPMENT,  
PARKES,  
CANBERRA, A.C.T.

10 DEC 1962

The Secretary,  
Department of External Affairs,  
Canberra .. A.C.T.

OPERATION PLOWSHARE

Thank you for the comments contained in your memorandum 720/10/10 of 3rd December 1962.

2. I propose to adopt your suggested rewording of paragraph 21 with the exception of the last sentence, which I feel is a matter to be considered if and when the engineering side is shown to be feasible and acceptable to the Government. In other words, such questions would be considered initially by the policy committee mentioned in para.23 of the draft submission.

*H.G. Raggatt*  
(H.G. Raggatt)  
Secretary

*Mr. Kealey*

*For Mr. Wilson*

*7*

*Mr. Wilson*

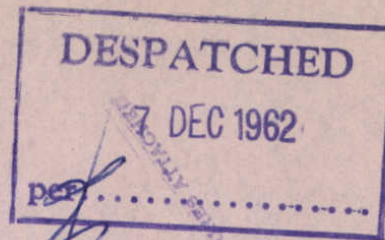
*This seems reasonable; it is consistent with N.D.'s cautious approach to the subject & concern that ~~the~~ official recommendations should not be over-optimistic or assume that ~~that~~ ~~the~~ a project will be carried out here. We are in any event on the policy side involved.*

*11/12*



CR/AH

FOLIO No.  
8



720/10/10

6th December, 1962.

Dear Sir,

... Further to our memorandum No. 852/10/4/13 of 22nd October, 1962, please find enclosed a copy of UCRL 5679 as requested by the Department of Public Works, Perth.

*M. J. Wilson*  
(M. J. Wilson)  
for the Acting Secretary

The Under-Secretary,  
The Premier's Department,  
PERTH. W.A.



CONFIDENTIAL

FOLIO No.  
7

720/10/10.

December 3, 1962.

The Secretary,  
Department of National Development,  
CANBERRA, A.C.T.

Operation Flowshare.

1. I refer to your memoranda of 19th and 29th November forwarding for my comment a revised draft of a Cabinet submission and some minor amendments thereto. I note that the revised draft proposed that the reply to Dr. Seaborg of the U.S.A.E.C. should be sent through the Ambassador in Washington.

2. I do not think paragraph 21 of the submission adequately reflects the considerations raised previously by this Department and I suggest the following redraft:

"These scientific and economic considerations aside, the Department of External Affairs advises quite rightly that in certain circumstances political arguments could be of over-riding importance. The Department of External Affairs points out that the history of negotiations for a treaty suspending nuclear weapons tests has shown that on some occasions the Soviet Union has chosen to argue that proposals for peaceful nuclear explosions are merely a cloak for attempts to establish a loop-hole in a test ban treaty. Because of past Soviet reactions, therefore, the Department of External Affairs advises that consideration of proposals for co-operation in Project "Flowshare" should not overlook the necessity of paying close attention to the position reached at the time on the nuclear test ban question. That Department also considers that, if a decision is taken to go ahead with the project, the Government should permit inter alia inspection of the explosion and the devices, measurement of the fall-out and assessment of the peaceful value of the experiments in economic terms by international experts at the invitation of the Australian Government."

3. With this revision, the submission would be acceptable to this Department.

(R.L. Harry),  
Acting Secretary.

*It may be necessary  
to accept international  
inspection of the  
explosive and of the  
explosion incident,  
its seismic effects*

12/9/62

CONFIDENTIAL



TELEPHONE: 32 0261

TELEGRAMS:

"DEP," MELBOURNE.  
POSTAL ADDRESS: BOX 2288U.  
G.P.O., MELBOURNE.



CONFIDENTIAL

FOLIO No.  
6

In Reply

Quote: R. 44/2/5.

COMMONWEALTH OF AUSTRALIA  
DEPARTMENT OF SUPPLY



339 SWANSTON STREET,  
MELBOURNE, C.1.

30th November, 1962.

Secretary,  
Department of External Affairs,  
CANBERRA. A. C. T.

NUCLEAR EXPLOSIONS FOR LARGE ENGINEERING WORKS -  
"OPERATION PLOWSHARE".

The letter from Dr. Seaborg, enclosed with your memorandum of 8th November, has been examined, and the following comments are offered.

The possibilities raised by Dr. Seaborg are, in effect, the same as those already encompassed by the draft Cabinet Submission recently prepared by the Department of National Development, and which was submitted to this Department for comment. Our comments on Dr. Seaborg's proposals are therefore the same as those given to the Department of National Development, and for your information copies of the relevant correspondence are attached.

In general, we would be interested in participating in any discussions which might be held on the type of experimental programme to be adopted, and we would be particularly interested in the Health Physics and Safety aspects of any proposed work. In these latter areas, as pointed out in the attached papers, the experience of the Atomic Weapons Tests Safety Committee which at present advises the Minister for Supply on such matters could possibly be of value.

This Department is not in a position to comment on the desirability or otherwise of the type of project so briefly outlined by Dr. Seaborg; this is a matter for the Department of National Development. No scientific or technical information has as yet been adduced which would enable an assessment on these bases to be made, but should such information become available this Department would be prepared to offer comments if requested.

*J. L. Knott*  
(J. L. KNOTT)  
SECRETARY

*Mr. [unclear]*  
*[unclear]*

*[unclear]*  
*[unclear]*

CONFIDENTIAL



R44/2/5

30 NOV 1962

Dear Dr. Raggatt,

NUCLEAR EXPLOSIONS FOR LARGE ENGINEERING  
WORKS

---

Thank you for your letter 62/1911(2) 5th October, in which you refer to the possible roles of the National Radiation Advisory Committee and the Atomic Weapons Tests Safety Committee in the conduct of nuclear explosions for large engineering works.

In accordance with the principles underlying accepted safety practice, it is essential that the authorities responsible for the approval of safety criteria, and for the supervision of their implementation, should be independent of those responsible for the conduct and success of any works or experiments. I believe that the National Radiation Advisory Committee, as the senior body advising the Government on the effects of ionising radiation, should have the responsibility for approving or perhaps laying down the overall safety criteria to be met in any proposed works or experiments in this programme; following its establishment in 1957, the Committee fulfilled such a function in respect of nuclear weapon tests carried out by the United Kingdom in Australia.

For a number of reasons it would not be proper to require this senior authority actually to ensure in detail that the safety criteria are being met. There is a requirement for another independent and authoritative body to take part at the operational level and ensure that the criteria are being implemented. Such a role was played by the Atomic Weapons Tests Safety Committee in respect of nuclear weapon tests in Australia. I believe that we should take advantage of the experience and knowledge accumulated by this Committee and provide for it to carry out similar functions in the proposed experiments. Accordingly, I suggest the draft Cabinet submission should be amended by the insertion of the following paragraphs immediately preceding paragraph 20 :

"The overall safety criteria to be met in any proposed experiment would be subject to the fullest consultation with and prior endorsement by the National Radiation Advisory Committee, a body appointed to advise the Government, through the Prime Minister, on matters concerning the effects of ionizing radiation on the Australian community.



CONFIDENTIAL

2.

In the conduct of an actual experiment, the Atomic Weapons Tests Safety Committee would be called upon to ensure that the agreed safety criteria are being met. This Committee has accumulated much expert knowledge in this specialised field in exercising its responsibility for the health and safety of the Australian community in nuclear weapon explosions in this country carried out by the United Kingdom."

I trust that you will be helped by this elaboration of my earlier suggestion.

Yours sincerely,

(Sgd.) J. L. KNOTT

(J.L. KNOTT)

Secretary

Dr. H.G. Raggatt, C.B.E.,  
Secretary,  
Department of National Development,  
PARKES, A.C.T.

CONFIDENTIAL





COMMONWEALTH OF AUSTRALIA.

2627

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS : NATDEV, CANBERRA.  
TELEPHONE : M 9.

DEPARTMENT OF NATIONAL DEVELOPMENT.

PARKES,

CANBERRA, A.C.T.  
5th October, 1962.

IN REPLY QUOTE : 62/1911(2)



CONFIDENTIAL:

Dear Mr. Knott,

Nuclear Explosions for Large Engineering Works.

In your letter of the 14th September, you refer to the Atomic Weapons Tests Safety Committee and suggest that if we get to the point of planning an actual experiment this Committee might be called upon for advice.

Whilst not wishing at this stage to reject this suggestion it would seem to me that as the functions of the Safety Committee relate to Atomic Weapons Tests and not generally to nuclear explosions, the proper Committee whose advice should be sought is the National Radiation Advisory Committee. In any case I assume that if reference were made to the National Radiation Advisory Committee it would be within the competence of that Committee to seek the co-operation of the Atomic Weapons Tests Safety Committee.

With this thought in mind and after consultation with the Atomic Energy Commission, the following sentence has been added immediately preceding paragraph 20 of the draft submission which has now been sent to the Minister for National Development for his consideration.

"The safety aspects of any proposed experiment would be subject to the fullest consultation with and prior endorsement by the National Radiation Advisory Committee, a body appointed to advise the Government through the Prime Minister on matters concerning the effects of ionising radiation on the Australian community."

I trust you will find this a satisfactory addition.

The incorrect reference to Woomera has been amended.

Yours sincerely,

H. G. Raggatt  
(H. G. RAGGATT)  
Secretary

J. L. Knott, Esq., C.B.E.,  
Secretary,  
Department of Supply,  
339 Swanston Street,  
MELBOURNE, C.1. VIC.

2627

*Handwritten notes:*  
See by 9/5  
to Ladd  
P.S. show to R. R. R.  
O.H. 8/10



CONFIDENTIAL

*Department* *14/9/64*  
*WT*

14th September, 1962.

Dear Dr. Raggatt,

NUCLEAR EXPLOSIONS  
FOR LARGE ENGINEERING WORKS

Sorry for the delay in replying.

An examination has now been made of the draft Cabinet Submission forwarded under cover of your letter of 25th July, relating to the possible employment of Nuclear Explosions for Large Engineering Works. (Your reference is 62/1911(2)).

This Department supports the recommendation contained in paragraph 22(a) of your draft submission, that interest be expressed in the planning, etc., of a "Plowshare" experiment. However, there are one or two matters of procedure which call for comment.

Firstly, this Department would certainly be prepared to provide representation on the "Technical" Committee which you propose should assess the advantages and disadvantages of proceeding further with the Project - indeed, through the scientific knowledge and resources of this Department, I feel we could contribute significantly to the success of any Project along the lines proposed.

While we are not unfamiliar with the major issues of international and national policy which might arise, this has been in the Defence sphere and it is probably appropriate that we should not be represented directly on the smaller "Policy" Committee. However, you may be assured of our readiness to assist this Committee in every way.

I would point out that, in the conduct of Atomic Weapons Tests in Australia, the Minister for Supply set up a special Committee (The Atomic Weapons Tests Safety Committee), to advise him on Safety aspects of conducting trials involving nuclear explosions. This Committee, which is still active, and of which the present Chairman is Professor Titterton, also had the responsibility of clearing or refusing clearance for each explosion, and in the exercise of its functions.

Dr. H. G. Raggatt, C. B. E.,  
Secretary,  
Department of National Development,  
CANBERRA.

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has built up a very high level of expert knowledge in this specialised field. I therefore suggest that, if matters proceed to the point of planning an actual experiment, the Safety Committee might be called upon for similar services to this Project.

One final comment involves a matter of fact - in line 3 of paragraph 4 of the draft submission reference is made to Woomera as the site of aboveground nuclear explosions. Although for security reasons we have not been anxious to stress the difference between the two places, the reference should be to Maralinga, not Woomera.

Yours sincerely,

(Sgd.) J. L. KNOTT

(J. L. Knott)  
Secretary.

CONFIDENTIAL





In reply quote No.

AUSTRALIAN EMBASSY,  
WASHINGTON, D.C.

Memorandum No. 1322/62

27th. November, 1962



The Secretary,  
Department of External Affairs,  
CANBERRA, A.C.T.

UNITED STATES ATOMIC ENERGY COMMISSION: PROJECT PLOWSHARE REPORTS

Further to our memorandum 1168/62 of 12th. October, we  
enclose UCRL 5679 for the Premier's Department, Perth.

*R. Rogers*  
*As send on*  
*Sent 5/12.*

*E.C.L. Catling*

E.C.L. Catling  
Librarian





FOLIO No.  
4

COMMONWEALTH OF AUSTRALIA.

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS: NATDEV, CANBERRA.  
TELEPHONE: M 9.

IN REPLY QUOTE: 62/1911



PARKES,  
CANBERRA, A.C.T.  
29th November, 1962.

CONFIDENTIAL:

The Secretary,  
Department of External Affairs,  
PARKES. . . . . A. C. T.

OPERATION PLOWSHARE

On 19th November, 1962, I sent you a revised draft of the proposed Cabinet Submission on this subject.

2. I have received some comments on this draft from the Australian Atomic Energy Commission which are not only acceptable to me but which I think you will agree improve the presentation from your point of view. The relevant comments are -

Paragraph 19, line 7, replace "guarantee" with "satisfy itself concerning".

Paragraph 2 of the draft letter to the Australian Ambassador, replace with the following - "The Australian Government has considered this matter and notes that nuclear explosions appear to have promising practical applications and that there appear to be localities in Australia where worthwhile projects could be developed and where radiation and blast hazards would be minimal.

Last paragraph of the draft letter to the Australian Ambassador, amend line 6 to read - "aspects of the use of nuclear explosions for peaceful purposes and thus ....."

3. I would be grateful if you would expedite your comments on the draft Submission.

*Regatta*  
*Plowshare*  
*hart*

*H. G. Raggatt*  
(H. G. RAGGATT)  
Secretary

*m. h. p. sen*  
30/11

*ms sh*



EXTERNAL AFFAIRS

FOLIO No.

3

Mr Wilson

Para. 21. is, in Mr Border's words, "so terse as to be almost meaningless". A suggested re-draft is attached, summarizing the points in Mr Harry's memorandum of 20th August — it has been approved by Mr Doig.

R.H.R.

26/11.



EXTERNAL AFFAIRS

FOLIO No. 2

CONFIDENTIAL

FILE No. ....

DATE .....

SUBJECT

"Flow Share"

FOR

~~UN Sec~~  
+  
D.L.  
+  
PAC/Am

National Development's draft  
Cabinet submission has been revised  
to take account of letter from  
Chairman USAID <sup>(A)</sup> concerning  
possibility of discussions on staging  
such projects. The draft takes  
account also (Paragraph 21) of EA view  
on political significance <sup>(B)</sup> but not  
of point referred in Rasgati's letter  
of 13.9.62 (C).

Glad any further comments per  
Mayhane.

M/W 21/11

↓  
~~to Rasgati~~  
in ~~reply~~  
Para 21 is so far as  
as to be almost  
meaningless. Pl. drop  
new para spelling out  
some of the considerations.  
20/11.  
Assess Rasgati's  
points in ~~light~~ when  
completed. A.





720/10/10-25

FOLIO No. 1

CONFIDENTIAL

COMMONWEALTH OF AUSTRALIA.

BOX 10, G.P.O., CANBERRA.  
TELEGRAMS : NATDEV; CANBERRA.  
TELEPHONE : M 9.

DEPARTMENT OF NATIONAL DEVELOPMENT,  
PARKES,  
CANBERRA, A.C.T.

IN REPLY QUOTE : 62/1911



19 NOV 1962

The Secretary,  
Department of External Affairs,  
Canberra .. A.C.T.

OPERATION "PLOWSHARE"

... Further to my memorandum of 12th November 1962 on this subject, attached is a revised draft of the Submission. As you will see, the draft now makes reference to the letter from the Chairman of the U.S.A.E.C.

2. I would appreciate your early comments.

*H.G. Raggatt*  
(H.G. Raggatt)  
Secretary

*M. Wilson.*



DRAFT

FOR CABINET:

CONFIDENTIAL

NUCLEAR EXPLOSIONS FOR LARGE ENGINEERING  
PROJECTS

---

Introduction:

The purpose of this submission is to direct the Government's attention to a technique being developed both in the United States and Russia for applying nuclear explosions to large-scale engineering projects. Its relevance to Australia is defined and recommendations are made concerning measures which might be adopted to ensure that Australia is kept abreast of developments.

Project "Plowshare"

2. In 1957 the United States Atomic Energy Commission initiated a scientific programme known as Project "Plowshare" to explore possible civil uses of nuclear explosions. Possible applications are :-

- (a) civil engineering projects requiring the removal of earth and rock on a large scale;
- (b) the fracturing of large low-grade ore bodies;
- (c) electricity generation using either the energy of the explosion or geothermal heat made available as a result of the explosion;
- (d) recovery of oil from oil-bearing shales and from tar-sands;
- (e) a variety of scientific studies.

3. The programme has achieved a considerable measure of success and much of the basic data required for application to practical excavation projects is now available. A large amount of experience with the technique has been amassed from underground nuclear explosions carried out primarily for weapons testing purposes and from a more recent explosion planned solely for the purposes of the Programme. The head of the research project considers that large excavation projects will be feasible within three to five years.



Safety Considerations:

4. While substantial radiation hazards are associated with aboveground nuclear explosions, such as have been carried out at Maralinga, these are very greatly reduced in the case of underground explosions. In addition to the flash radiation hazard being removed, the radio-active debris is largely or completely contained in the earth materials in such a way as to be essentially unavailable to flowing water or to plants and animals. In addition, attempts are being made, with considerable success, to produce explosives specifically designed to reduce the amounts of residual radio-activity. As a result of both these factors the residual radio-activity should be low enough to allow access to the crater within a few days of its formation. It seems that the radiological hazards will not constitute a major bar to practical applications of the technique.

5. Other causes of concern are the seismic and air blast waves and these are likely to be most important in assessing the feasibility of proceeding with a given project. As research continues it should be possible to predict the effects of seismic and air blast waves with accuracy, but in the first instance it would be desirable to confine projects to <sup>ie. uninhabited</sup> unsettled areas. Indications are that even with an explosion as large as 10 megatons damage to structures and windows will be negligible beyond about 20 miles radius.

Costs:

6. On very large projects excavation costs using nuclear explosives will probably be of the order of one-tenth of the costs using conventional methods. Estimates for the duplication of the Panama Canal indicate construction cost of \$1,850 million by conventional means against \$130 million using nuclear energy.

7. Nuclear explosives have application to engineering projects mainly in cases where the works require the removal of very large quantities of earth or rock. The method is more costly for smaller works and will not replace conventional methods in these cases. The significance of what is meant by "smaller" and "very large" in this context may be gauged by reference to two works of the Snowy Mountains Scheme. Tooma Dam has a volume of earth and rock of about 1 million cubic yards; the Eucumbene Dam has a volume of 9 million cubic yards.



To excavate 200,000 cubic yards by nuclear methods would cost about £2.10.0 per cubic yard, which would be twice the cost of normal methods. The cost of excavating 10 million cubic yards by nuclear methods would generally be less than by conventional methods. For very large excavations of the order of 100 million cubic yards nuclear costs would be as low as 4d. per cubic yard. It is confidently expected that this method will provide the answer to the construction of works or the exploitation of resources which would otherwise be regarded as impracticable because of capital requirements or because of marginal economy.

Significance to Australia:

8. It is the project which could not be contemplated (physically or financially) under normal circumstances which might be of great advantage in the development of remote areas of Australia. Possible applications are in the excavation of a harbour (for the shipment of minerals), the fracturing of large orebodies, the construction of a dam or the excavation of a water storage.
9. The Australian continent is well suited to take advantage of these methods. Extensive areas are sparsely settled and there are large stretches of coastline without natural harbours. Our isolation makes our economy closely allied to shipping and we foresee the exploitation of our mineral resources as a means of attracting overseas investors and promoting decentralisation. We are not well endowed with water resources and there will be a continuing call for large water storages, particularly if these can be constructed in a manner which will minimise evaporation. Nuclear explosives give promise of enabling this kind of storage to be made.
10. Since in populated areas applications of the method are likely to be limited by the seismic and air blast damage to buildings, projects can be contemplated in unsettled areas which must be ruled out once appreciable settlement has occurred.
11. Australia could have much to gain from having the earliest possible access to use of the technique.



Recent Visit by Director of Plowshare:

12. The U.S. "Plowshare" programme is unclassified and the U.S.A.E.C. has expressed its willingness to make available all information to the A.A.E.C. However, the subject is not only intrinsically highly technical but its application involves considerable prior work in a number of fields such as geology, meteorology, biology, etc. Also, requirements are different from one type of application to another and from one location to another.
13. With the above in mind, the A.A.E.C. invited the U.S.A.E.C. to send an expert to visit Australia to discuss development of the "Plowshare" operation, the results achieved to date, and the potential of the methods employed. Dr. Gary Higgins, Director of the "Plowshare" Division at the Lawrence Radiation Laboratory, Livermore, California, visited Australia in March 1962 and discussed the work of his Division with Government officials and other interested persons. The Lawrence Radiation Laboratory is operated for the U.S.A.E.C. by the University of California.
14. Dr. Higgins said that criticism had been directed at the "Plowshare" budget on the grounds that there was no scope or need to apply nuclear explosion excavation techniques within the United States. He admitted that this criticism was partly justified, at least on a short-term basis. However, he felt that Australia appeared to be a country which could make almost immediate worthwhile use of the nuclear explosion excavation technique.
15. The opportunity was taken to explore with Dr. Higgins means which might be adopted to ensure that Australia is kept abreast of developments in Operation "Plowshare" because of their possible relevance to Australia. It was generally felt that the most effective method would be to develop an arrangement whereby Australia could be given the opportunity to examine at first hand the Plowshare work in U.S.A. and to consider, in the light of such examination, whether or not there was scope for the technique and its application in this country. If we were satisfied as to the political, technical, safety and economic outcome, then we might consider arranging with the U.S.A. authorities to carry out an explosion in Australia.



16. Nuclear explosion excavation technology is now far enough advanced to guarantee that the excavation resulting from an experimental explosion will be usable for the purpose for which it was designed even though it may not be possible to forecast its exact shape and dimensions.

17. If an excavation project were to be carried out in Australia by the United States under the Plowshare programme both Australia and the United States would stand to benefit. Australia would gain invaluable technical experience from its association with the work and would be left with a usable asset. The United States would further its scientific knowledge - this being the aim of the Plowshare programme - and at the same time would achieve its desire to produce works of practical value. From the U.S.A. viewpoint such a project might have the third advantage of being adjudged satisfactory under the stringent requirements of a foreign country. The corollary is that U.S.A. might take even more care than Australia to ensure the complete success of the work.

18. Although a harbour excavation would seem to be the most appropriate and most effective initial work, enthusiasm could well develop for a large water storage or minerals project. Harbour sites which would be worthy of investigation would be Scott River (sponge iron) in W.A.; a port - possibly on the W.A. coast between Cape Preston and Onslow - to serve the extensive iron ore deposits of Hamersley Range; Bayley Point on the Gulf of Carpentaria to serve the Constance Range iron ore deposits in Queensland.

19. Australian association with a works project, assuming prior examination and investigation of all preliminary aspects proved satisfactory, could take several forms. A satisfactory one, in so far as the objectives outlined above go, might be for the United States to be given, under its Plowshare programme, responsibility for the planning, financing and execution of the work with Australia participating to the extent necessary to guarantee feasibility, safety and success. The Australian contribution would rely upon the use of existing Australian scientific and technical organizations.



20. It is necessary to appreciate, however, that the interest of the United States would probably not continue beyond the stage of the creation of a rough excavation. The work would need to be completed by Australia and this might involve committal to substantial expenditure particularly if, in the case of a port in a State, there was a call for berthing and wharf facilities. In other words, if the Commonwealth accepted the responsibility for a project of this nature in a State there might be pressure for the Commonwealth to complete the project to the stage of a workable asset.

21. With regard to nuclear test ban negotiations, the Department of External Affairs advises quite rightly that in certain circumstances political arguments could outweigh the economic and scientific advantages which could be derived from Flowshare. However that Department has also expressed the view that there would seem to be no present reason for Australia not to explore the possibilities in respect of important development projects.

Not clear ...

^ ^

Letter from U.S.A.E.C.

22. On 25th October 1962 Dr. Glenn Seaborg, Chairman of the U.S.A.E.C., wrote to the Australian Ambassador, Washington. He referred to background discussions, particularly those with Dr. Gary Higgins, concerning Flowshare and its possible value to Australia. He stated "We have the preliminary impression that there may be projects in Australia that could be conducted in a manner to provide valuable technical data and at the same time accomplish excavation which might have potential value to Australia". Dr. Seaborg went on to say:

"Although, as I am sure you appreciate, the Commission cannot commit itself to undertaking any specific experiment without further study, we would be fully prepared, should your Government so desire, to pursue discussions with your representatives on a more detailed basis. In these discussions the type of experimental program that might be of mutual interest could be explored. We would also be pleased to discuss other pertinent aspects of the problem including the nature of inter-governmental agreement that would be required, should our Governments decide to proceed in earnest on this



matter, and how the responsibilities for health and safety might be allocated. These discussions should enable us to determine whether the undertaking of an excavation experiment is desirable from our respective standpoints.

Accordingly, should your Government wish to proceed further in developing this subject you may be sure that the matter will receive our most sympathetic and earnest attention".

Possible Action to Develop a Working Arrangement with U.S.A.E.C.:

23. Before arriving at any conclusions in this matter it might be useful to set down the manner in which an arrangement might be developed and operated. The principal requirement of any arrangement from our point of view would be that we did not become committed to the whole until we were satisfied about each phase. We would firstly wish to gain a full and first hand appreciation of the scientific, engineering, safety and international relationship aspects. If we were satisfied about these we might then consider an actual project. Accordingly there could be four stages as follows :

Stage 1 The U.S.A.E.C. might be invited to accept the attachment of up to three technical officers to the "Flowshare" operation. These experts would be required to assess at first hand the advantages claimed for the technique and report on factors such as the hazards involved; detail required and timing of the necessary data-gathering surveys; site selection criteria; engineering and scientific control; etc. They would report to a technical committee constituted as follows :-

Department of National Development (Convenor)  
Atomic Energy Commission  
Department of Works  
Department of Supply  
Department of the Treasury  
Department of Health  
Snowy Mountains Hydro-Electric Authority  
C.S.I.R.O.



Bureau of Meteorology.

This Committee would be able to prepare an assessment (probably after the return of the two officers) of the advantages and disadvantages of proceeding towards a project in Australia.

If, after examination, the scientific and technical aspects showed promise the report of the technical committee would be referred to a small committee consisting of those departments which would be concerned with the major issues of international and national policy which would arise, viz :-

Department of National Development  
The Prime Minister's Department  
Department of External Affairs  
Department of Treasury

X  
Stage II Consideration by Cabinet of the assessment prepared under Stage I followed, if Cabinet agrees, by consultation with and the development of a close working arrangement with one or more of the States.

Stage III Assuming Stages I and II are completed satisfactorily, consideration by Cabinet of the basis of a proposal to be submitted to the United States Government.

Stage IV Consideration by Cabinet of a Submission evaluating all aspects of the project on the basis of the pre-explosion surveys and seeking authority for the detonation.

24. It might take 12 months to carry out the initial evaluation and perhaps three years before an actual project could proceed.

Recommendations:

25. I recommend that -

- (a) the procedure outlined in paragraph 23 be adopted and arrangements for action in relation to it be the joint responsibility of the Department of National Development and the Australian Atomic Energy Commission.



CONFIDENTIAL

9.

(b) we reply to the letter from the Chairman,  
U.S.A.E.C. (through the Australian Ambassador  
in Washington) in terms of the attached draft.

(W. H. SPOONER)



REPLY TO LETTER FROM CHAIRMAN, U.S.A.E.C., TO AUSTRALIAN  
AMBASSADOR WASHINGTON.

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The information available about the U.S.A.E.C. "Plowshare" Project has aroused the interest of Australian engineers and scientists in the possibility of using nuclear explosions for large engineering projects and especially for certain types of projects which are not economically practicable, using conventional engineering methods and explosives. This interest was greatly stimulated by the visit to Australia, in March this year, of Dr. Gary Higgins.

The Australian Government has considered this matter and agrees with the conclusions of its advisers that nuclear explosives appear to have promising practical applications and that Australia, being sparsely populated, offers the possibility of developing a project in a locality where blast and radiation hazards would be minimal.

Nevertheless, because of the social and international aspects of nuclear explosions, it is essential, as we believe the U.S.A.E.C. will appreciate, that we satisfy ourselves that every step towards the possibility of carrying out a "Plowshare" Project should be carefully considered. Therefore whilst it is premature to consider whether it might be feasible for the U.S.A. and Australia to collaborate in a nuclear excavation experiment in Australia, we would welcome the initiation of arrangements which would have that possibility in view.

We believe the first step requires that our own technical officers should satisfy themselves by first hand observations on all aspects of nuclear explosives. Clearly the only way of doing this would be by working for some time with your "Plowshare" group. If this could be arranged we could then proceed to the next step of considering whether it is desirable and practicable to embark upon a detailed investigation of a specific nuclear excavation experiment in Australia.

We greatly appreciate the initiative taken by the U.S.A.E.C. in this matter and regret that we are not in a position to receive it quite in the manner they have suggested but hope that they will welcome the suggestion that a small group of Australian experts might be associated with the "Plowshare" group so that they may become familiar with all aspects of nuclear explosions and thus enable the Australian Government to assess the desirability and practicability of the United States and Australia collaborating in the development and execution of nuclear excavation experiments in Australia.