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FOLLOWING FOR WICKS, PRIME MINISTER'S PARTY, FROM FLESHER, NO.10
SOVIET NUCLEAR ACCIDENT

FOLLOWING IS TEXT OF LETTER TO THE PRIME MINISTER FROM
LORD MARSHALL OF GORING, CHAIRMAN OF THE CEEGB.

QUOTE. YOU HAVE ASKED FOR MY COMMENTS ON THE RUSSIAN NUCLEAR
ACCIDENT AT CHERNOBYL. WITHOUT ANY DOUBT AT ALL, IT IS THE
BIGGEST DISASTER THE NUCLEAR INDUSTRY HAS HAD.

DESIGN AND SAFETY OF THE RUSSIAN REACTOR
THE PRECISE TECHNICAL DESCRIPTION OF THE RUSSIAN REACTORS AT
CHERNOBYL IS:

BOILING WATER, PRESSURE TUBE, GRAPHITE MODERATED.

IN EVERYDAY LANGUAGE IT CAN BE DESCRIBED AS THE CIVIL VERSION OF
THE REACTORS THE RUSSIANS USE IN THEIR WEAPONS PROGRAMME FOR
PRODUCING PLUTONIUM. THOSE ALSO HAVE FUEL COOLED BY WATER
INSIDE PRESSURE TUBES AND WITH A GRAPHITE MODERATOR OUTSIDE
THOSE TUBES. THIS REACTOR IS NOT USED ANYWHERE IN THE WEST
BECAUSE IT HAS A NUMBER OF INTRINSIC DISADVANTAGES. AS ITS NAME
IMPLIES, THE RUSSIAN REACTOR HAS SOME SIMILARITY TO THE BOILING
WATER REACTORS WHICH OPERATE IN AMERICA AND JAPAN, TO THE
PRESSURE TUBE REACTORS WHICH OPERATE IN CANADA, AND THE GRAPHITE
COOLED REACTORS WHICH OPERATE IN THE UNITED KINGDOM. THE
REACTOR IT LEAST RESEMBLES IS THE PWR WHICH WE ARE PROPOSING TO
BUILD AT SIZEWELL.

I CAN BEST GIVE YOU AN APPRECIATION OF THE SLACKNESS OF RUSSIAN
SAFETY WORK BY MAKING A DIRECT COMPARISON BETWEEN THE RUSSIAN
REACTOR AND THE STEAM GENERATING HEAVY WATER REACTOR WHICH WE
ATTEMPTED TO BUILD IN THIS COUNTRY ABOUT A DECADE AGO. THE
PROPER TECHNICAL DESCRIPTION OF THE STEAM GENERATING HEAVY WATER
REACTOR (SGHW) IS:

BOILING WATER, PRESSURE TUBE, HEAVY WATER MODERATED.

COMPARING THIS DESCRIPTION WITH THE RUSSIAN DESCRIPTION, YOU WILL
SEE IMMEDIATELY THAT THE BROAD CONCEPT OF THE REACTOR IS SIMILAR,
BUT WE HAD IN MIND TO USE HEAVY WATER INSTEAD OF GRAPHITE. TO
REMINDE YOU OF THE POLITICAL HISTORY, THE SGHW REACTOR WAS
PASSIONATELY ADVOCATED BY FRANK TOMBS AND THE SOUTH OF SCOTLAND
ELECTRICITY BOARD. THE MINISTER OF THE DAY WAS MR. VARLEY AND
HE ANNOUNCED A GOVERNMENT DECISION TO BUILD THAT REACTOR SUBJECT
TO A PROPER SAFETY REVIEW. THE CIRCUIT FOR THE SGHW REACTOR AND
FOR THE RUSSIAN REACTOR ARE VIRTUALLY IDENTICAL, EXCEPT THAT WE
PROPOSED TO USE HEAVY WATER WHERE THEY USE GRAPHITE. HOWEVER,
TECHNICAL STUDY OF THE TWO DESIGNS IMMEDIATELY DEMONSTRATES THAT
OUR HEAVY WATER REACTOR HAS BIG SAFETY ADVANTAGES OVER THE
GRAPHITE MODERATED REACTOR. INTRINSICALLY, THEREFORE, YOU WOULD
EXPECT THE HEAVY WATER REACTOR TO GET A SAFETY LICENCE MORE
EASILY THAN THE RUSSIAN GRAPHITE REACTOR. IN FACT, HOWEVER, THE
SGHW PROPOSAL FAILED TO PASS BRITISH SAFETY RULES AND AFTER TWO
YEARS EFFORT, JOHN HILL AND I RECOMMENDED TO THE GOVERNMENT OF
THE DAY THAT THE SGHW PROJECT BE ABANDONED. IN THE UK SYSTEM WE
SAID THERE WAS NO POSSIBILITY OF MAKING THE SGHW REACTOR MEET OUR
SAFETY RULES AND BE ECONOMIC AT THE SAME TIME.

THE MINISTER OF THE DAY WAS WEDGEWOOD BENN. HE HAD NO CHOICE BUT TO ACCEPT OUR RECOMMENDATION. IN THAT SAME REPORT, JOHN HILL AND I SAID THAT ONLY THE AGR AND THE PWR HAD A CHANCE TO MEET BRITISH SAFETY RULES AND BE ECONOMIC AT THE SAME TIME. THE LESSON TO BE DRAWN FROM THAT STORY IS VERY CLEAR. A VERY MUCH BETTER REACTOR CONCEPT FAILED TO GET SAFETY APPROVAL IN THE UNITED KINGDOM, BUT THE POORER RUSSIAN DESIGN GOT SAFETY APPROVAL IN RUSSIA AND 27 REACTORS OF THAT TYPE ARE NOW OPERATING IN RUSSIA. CLEARLY THE RUSSIANS MUST BE CONTENT WITH LOWER SAFETY STANDARDS. BUT THIS COMPARISON OF DESIGN MUST BE REINFORCED BY COMPARISON OF MANUFACTURING QUALITY AND MANAGEMENT EXCELLENCE WHERE, AGAIN, WE SUSPECT RUSSIAN STANDARDS DO NOT MEET OUR OWN.

THIS TYPE OF REACTOR PROVIDES THE BACKBONE OF RUSSIA'S PRESENT NUCLEAR ELECTRICITY. IT WOULD BE AN ECONOMIC DISASTER FOR THEM TO ABANDON THEIR USE, BUT THEY ALL RUN THE SAME RISK OF REPRODUCING THE CHERNOBYL ACCIDENT. THE POSITION IN RUSSIA IS PARTICULARLY DISTRESSING BECAUSE, ALMOST CERTAINLY, ONE OF THEIR WEAPONS REACTORS OF VERY SIMILAR DESIGN SUFFERED A SIMILAR DISASTER WITH A GRAPHITE FIRE AND LARGE CONTAMINATION SOME DECADES AGO AT A SITE IN THE URALS CALLED KYSHTYN. WHAT ACTUALLY HAPPENED IN THIS LATTER INCIDENT IS SHROUDED IN TOTAL SECRECY, BUT WE BELIEVE A VAST AREA OF RUSSIAN FOREST WAS CONTAMINATED AND ALL INHABITANTS WERE EVACUATED FROM IT. IF I AM CORRECT IN GUESSING THAT THIS NUCLEAR INCIDENT WAS DUE TO ONE OF THEIR WEAPONS REACTORS OF SIMILAR DESIGN, THEN SURELY THE RUSSIANS SHOULD HAVE LEARNED THEIR LESSON FROM THAT AND AVOIDED THE SCALE UP OF THESE REACTORS INTO BIG CIVIL VERSIONS LIKE THAT AT CHERNOBYL. IN PARALLEL WITH THE CONSTRUCTION OF THIS UNIQUE HYBRID RUSSIAN REACTOR, THE RUSSIANS HAVE NOW EMBARKED UPON THE CONSTRUCTION OF PWR REACTORS, JUST AS WE AND THE REST OF THE WORLD HAVE DONE. THAT, OF COURSE, HAS A BETTER INTRINSIC DESIGN, BUT WHETHER THEY ARE SAFE OR NOT BEGINS UNDERLINING IN RUSSIA CEASE UNDERLINING DEPENDS UPON THE MANUFACTURING STANDARDS AND THE MANAGEMENT EXCELLENCE WHICH THE RUSSIANS PUT INTO THE BUSINESS. OBVIOUSLY, I AM NERVOUS ABOUT THAT.

IMMEDIATE EFFECTS ON THE UNITED KINGDOM

I AM SORRY TO TELL YOU THAT, THIS MORNING, FOR THE FIRST TIME, WE DETECTED FALL-OUT FROM THE CHERNOBYL REACTOR WITH OUR MONITORING INSTRUMENTS IN KENT. WE INFORMED THE DEPARTMENT OF ENERGY OF THIS TWO HOURS AGO AND I ANTICIPATE THAT YOUR GOVERNMENT WILL FEEL OBLIGED TO MAKE A PUBLIC STATEMENT ON THE MATTER ALMOST IMMEDIATELY. THESE LEVELS OF CONTAMINATION ARE, OF COURSE, VERY LOW AND DO NOT POSE A HEALTH HAZARD TO THE POPULATION. THEIR PSYCHOLOGICAL EFFECT WILL, HOWEVER, BE LARGE.

CAN THE RUSSIANS BE HELPED AT CHERNOBYL?

YES. YESTERDAY, THE CEEGB RECEIVED SOME REQUESTS FOR INFORMATION AND HELP CHANNELLED THROUGH THE IAEA IN VIENNA. WE ASSURE THAT THE RUSSIANS ARE SEEKING HELP FROM OTHER COUNTRIES ALSO, BUT IF REQUESTED, WE WILL SEND PEOPLE AND/OR EQUIPMENT TO CHERNOBYL, BUT OF COURSE WE CAN DO NOTHING UNLESS THE RUSSIANS FORMALLY ASK US TO DO SO.

CAN THE RUSSIAN SAFETY STANDARDS BE IMPROVED?
THIS IS A MAJOR POLITICAL QUESTION WHICH BEGIN UNDERLINING ONLY
CEASE UNDERLINING A SUMMIT MEETING COULD ADDRESS. IT IS CLEARLY
WORRYING THAT THE RUSSIANS HAVE A FURTHER 27 REACTORS OF THIS
TYPE OPERATING AND THEY ARE JUST EMBARKING UPON A LARGE PWR
PROGRAMME. IF RUSSIA WAS A DEMOCRACY, THEN ITS GOVERNMENT WOULD
BE OBLIGED TO SEEK THE BEST HELP AND ADVICE INTERNATIONALLY IT
POSSIBLY COULD. AS IT IS, THE RUSSIANS WILL PROBABLY DO NOTHING.
IT IS JUST POSSIBLE THEY MIGHT AGREE TO AN QUOTE INTERNATIONAL
NUCLEAR SAFETY ADVISORY COMMISSION UNQUOTE PROVIDED IT WAS
ASSOCIATED WITH THE IAEA IN VIENNA. THIS SAME IDEA WAS FLOATED
IN INTERNATIONAL CIRCLES IMMEDIATELY AFTER THE TMI ACCIDENT, AND
AT THAT TIME I HEARD A VAGUE RUMOUR THAT THE GERMANS WERE
PROPOSING WALTER MARSHALL TO BE THE HEAD OF IT. IF YOUR SUMMIT
MEETING CONSIDERS THIS SUBJECT, MAY I RETURN THE COMPLIMENT AND
RECOMMEND TO YOU THE NAME OF DR. HAUNSCHILD. HE IS THE
PERMANENT SECRETARY (THE GERMANS CALL HIM PERMANENT MINISTER)
AT THE FEDERAL GERMAN GOVERNMENT DEPARTMENT OF SCIENCE AND
TECHNOLOGY. HE IS AN EXCELLENT MAN. HE WAS VERY INTERESTED IN
THE CONCEPT OF AN INTERNATIONAL NUCLEAR SAFETY COMMISSION AND
HE HAS DONE HIS PRESENT JOB FOR SO LONG AND WITH SUCH EMINENCE
THAT I BELIEVE HE WOULD WELCOME A NEW CHALLENGE. I SUSPECT,
HOWEVER, THAT YOU WILL BE ABLE TO DO NOTHING WHATEVER BECAUSE
THE RUSSIANS WOULD FIND IT UNACCEPTABLE TO SUBMIT THEIR
ENGINEERING, MANUFACTURING AND MANAGEMENT TO INTERNATIONAL
OVER-SIGHT AND CRITICISM.

LONG TERM IMPLICATIONS IN THE UK
CLEARLY THIS IS A BIG SETBACK FOR NUCLEAR POWER. IN MY PUBLIC
SPEECHES I AM STRESSING THE DIFFERENCE BETWEEN OUR SAFETY RULES VOLA
OUTLINED EARLIER IN THIS LETTER, TO DEMONSTRATE THAT MY ARGUMENTS
ARE NOT BASED SIMPLY ON ASSERTION BUT ARE BASED ON HISTORICAL
FACT, AND RECENT HISTORICAL FACT AT THAT. I HAVE BEEN PLEASD
WITH THE WAY PEOPLE HAVE RECEIVED MY ARGUMENTS. I BELIEVE
INFORMED COMMENTATORS AND OPINION FORMERS THINK IT IS
INTRINSICALLY PLAUSIBLE THAT THE RUSSIANS HAVE DIFFERENT AND
LOWER STANDARDS THAN OURSELVES. I AM THEREFORE HOPEFUL THAT A
MASSIVE PUBLIC PRESENTATION CAMPAIGN WITH THE SUPPORT OF
GOVERNMENT WILL RETAIN THE OVERALL TOLERANCE OF THE BRITISH
PUBLIC. HOWEVER, WE MUST EXPECT GREATER LOCAL RESISTANCE TO THE
SITING OF POWER STATIONS (THE QUOTE NOT IN MY BACKYARD UNQUOTE
SYNDROME) AND THAT, OF COURSE, WILL GIVE US CONSIDERABLE
DIFFICULTIES.

THERE IS ONE OTHER IMPORTANT TECHNICAL IMPLICATION WHICH I
ADVISE YOU ABOUT, IN CONFIDENCE, TO MAKE SURE YOU DO NOT SAY
ANYTHING UNWISE IN PUBLIC. THE RUSSIAN REACTOR IS REFUELLED ON-
LOAD WITHOUT CONTAINMENT JUST AS IS DONE IN OUR AGR AND MAGNOX
REACTORS. THE SAFETY IMPLICATIONS OF THAT ARE, IN MY OPINION,
IN NO WAY COMPARABLE IN DETAIL, BUT THEY ARE OBVIOUSLY
COMPARABLE IN CONCEPT. FROM A SAFETY POINT OF VIEW, IT IS THE
MOST DIFFICULT PART OF AGR TECHNOLOGY TO JUSTIFY AND THE NUCLEAR
INSPECTOR GIVES US SOME DIFFICULTIES ON IT. IT IS JUST POSSIBLE
THAT THE CHERNOBYL DISASTER WAS INITIATED BY AN ON-LOAD
REFUELLING INCIDENT. IF THAT TURNS OUT TO BE TRUE, IT WOULD
OBVIOUSLY GIVE US SERIOUS PUBLIC RELATIONS PROBLEMS FOR OUR OWN
GAS COOLED REACTORS, AND IT REINFORCES MY EXISTING OPINION THAT
IF WE EVER DO BUILD MORE AGRS, WE SHOULD REDESIGN THEM TO BE
REFUELLED OFF-LOAD.

I MUST STRESS THIS IS NOT A MATTER YOU SHOULD WORRY ABOUT. I
AM QUITE COMFORTABLE ABOUT OUR SAFETY POSITION AND CAN DEFEND IT
AND I CAN DEFEND A DIRECT COMPARISON OF RUSSIAN AND UK PRACTICES.
(SINCE SAFETY COMES FIRST IN THE UK, THE AGRS ARE DRIVEN TO LOW
AVAILABILITY - I.E. WE SACRIFICE ECONOMICS NOT SAFETY. IN
CONTRAST THE RUSSIANS ACHIEVE HIGH AVAILABILITY - PRESUMABLY
BY CUTTING CORNERS ON SAFETY). UNQUOTE

MIFT CONTAINS LAST PART OF LORD MARSHALL'S LETTER.

HOWE

DEMIAN 4525
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SAFETY RULES AND THAT OF THE RUSSIANS AND I AM
USING THE SQHWR STORY AS OUTLINED

SECRET

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Passed to PM Party in
Seoul on 2 May 1986
by telegram AR.

CENTRAL ELECTRICITY GENERATING BOARD

Sudbury House, 15 Newgate Street, London EC1A 7AU. Telephone 01-634 5111

From the Chairman

The Lord Marshall of Goring Kt, CBE, FRS

2 May, 1986

The Rt. Hon. Mrs Margaret Thatcher, MP
Prime Minister
10 Downing Street

PRIVATE AND CONFIDENTIAL

Dear Prime Minister,

You have asked for my comments on the Russian nuclear accident at Chernobyl. Without any doubt at all, it is the biggest disaster the nuclear industry has had.

Design and Safety of the Russian Reactor

The precise technical description of the Russian reactors at Chernobyl is:

"Boiling water, pressure tube, graphite moderated".

In everyday language it can be described as the civil version of the reactors the Russians use in their weapons programme for producing plutonium. Those, also, have fuel cooled by water inside pressure tubes and with a graphite moderator outside those tubes. This reactor is not used anywhere in the West because it has a number of intrinsic disadvantages. As its name implies, the Russian reactor has some similarity to the boiling water reactors which operate in America and Japan, to the pressure tube reactors which operate in Canada, and the graphite cooled reactors which operate in the United Kingdom. The reactor it least resembles is the PWR which we are proposing to build at Sizewell.

I can best give you an appreciation of the slackness of Russian safety work by making a direct comparison between the Russian reactor and the steam generating heavy water reactor which we attempted to build in this country about a decade ago. The proper technical description of the steam generating heavy water reactor (SGHW) is:

"Boiling water, pressure tube, heavy water moderated".

Comparing this description with the Russian description, you will see immediately that the broad concept of the reactor is similar, but we had in mind to use heavy water instead of graphite. To remind you of the political history, the SGHW reactor was passionately advocated by Frank Tombs and the South of Scotland Electricity Board. The Minister of the day was Mr Varley and he announced a Government decision to build that reactor subject to a proper

The Rt. Hon. Mrs Margaret Thatcher, Mp

2 May, 1986

safety review. The circuit for the SGHW reactor and for the Russian reactor are virtually identical, except that we proposed to use heavy water where they use graphite. However, technical study of the two designs immediately demonstrates that our heavy water reactor has big safety advantages over the graphite moderated reactor. Intrinsically, therefore, you would expect the heavy water reactor to get a safety licence more easily than the Russian graphite reactor. In fact, however, the SGHW proposal failed to pass British safety rules and after two years effort, John Hill and I recommended to the Government of the day that the SGHW project be abandoned. In the UK system we said there was no possibility of making the SGHW reactor meet our safety rules and be economic at the same time.

The Minister of the day was Wedgewood Benn. He had no choice but to accept our recommendation. In that same report, John Hill and I said that only the AGR and the PWR had a chance to meet British safety rules and be economic at the same time. The lesson to be drawn from that story is very clear. A very much better reactor concept failed to get safety approval in the United Kingdom, but the poorer Russian design got safety approval in Russia and 27 reactors of that type are now operating in Russia. Clearly the Russians must be content with lower safety standards. But this comparison of design must be reinforced by comparison of manufacturing quality and management excellence where, again, we suspect Russian standards do not meet our own.

This type of reactor provides the backbone of Russia's present nuclear electricity. It would be an economic disaster for them to abandon their use, but they all run the same risk of reproducing the Chernobyl accident. The position in Russia is particularly distressing because, almost certainly, one of their weapons reactors of very similar design suffered a similar disaster with a graphite fire and large contamination some decades ago at a site in the Urals called Kyshtyn. What actually happened in this latter incident is shrouded in total secrecy, but we believe a vast area of Russian forest was contaminated and all inhabitants were evacuated from it. If I am correct in guessing that this nuclear incident was due to one of their weapons reactors of similar design, then surely the Russians should have learned their lesson from that and avoided the scale up of these reactors into big civil versions like that at Chernobyl. In parallel with the construction of this unique hybrid Russian reactor, the Russians have now embarked upon the construction of PWR reactors, just as we and the rest of the world have done. That, of course, has a better intrinsic design; but whether they are safe or not in Russia depends upon the manufacturing standards and the management excellence which the Russians put into the business. Obviously, I am nervous about that.

Immediate Effects on the United Kingdom

I am sorry to tell you that, this morning, for the first time, we detected fall-out from the Chernobyl reactor with our monitoring instruments in Kent. We informed the Department of Energy of this two hours ago and I anticipate that your Government will feel obliged to make a public statement on the matter almost immediately. These levels of contamination are, of course, very low and do not pose a health hazard to the population. Their psychological effect will, however, be large.

The Rt. Hon. Mrs Margaret Thatcher, MP

2 May, 1986

Can the Russians be helped at Chernobyl?

Yes. Yesterday, the CEGB received some requests for information and help channelled through the IAEA in Vienna. We assume that the Russians are seeking help from other countries also, but if requested, we will send people and/or equipment to Chernobyl, but, of course, we can do nothing unless the Russians formally ask us to do so.

Can the Russian Safety Standards be Improved?

This is a major political question which only a summit meeting could address. It is clearly worrying that the Russians have a further 27 reactors of this type operating and they are just embarking upon a large PWR programme. If Russia was a democracy, then its Government would be obliged to seek the best help and advice internationally it possibly could. As it is, the Russians will probably do nothing. It is just possible they might agree to an "International Nuclear Safety Advisory Commission" provided it was associated with the IAEA in Vienna. This same idea was floated in international circles immediately after the TMI accident, and, at that time, I heard a vague rumour that the Germans were proposing Walter Marshall to be the head of it. If your summit meeting considers this subject, may I return the compliment and recommend to you the name of Dr Haunschild. He is the Permanent Secretary (the Germans call him Permanent Minister) at the Federal German Government Department of Science and Technology. He is an excellent man. He was very interested in the concept of an international nuclear safety commission and he has done his present job for so long and with such eminence, that I believe he would welcome a new challenge. I suspect, however, that you will be able to do nothing whatever because the Russians would find it unacceptable to submit their engineering, manufacturing and management to international over-sight and criticism.

Long Term Implications in the UK

Clearly this is a big setback for nuclear power. In my public speeches I am stressing the difference between our safety rules and that of the Russians and I am using the SGHWR story, as outlined earlier in this letter, to demonstrate that my arguments are not based simply on assertion but are based on historical fact, and recent historical fact at that. I have been pleased with the way people have received my arguments. I believe informed commentators and opinion formers think it is intrinsically plausible that the Russians have different and lower standards than ourselves. I am therefore hopeful that a massive public presentation campaign with the support of Government will retain the overall tolerance of the British public. However, we must expect greater local resistance to the siting of power stations (the "Not in my backyard" syndrome) and that, of course, will give us considerable difficulties.

The Rt. Hon. Mrs Margaret Thatcher, MP

2 May, 1986

There is one other important technical implication which I advise you about, in confidence, to make sure you do not say anything unwise in public. The Russian reactor is refuelled on-load without containment just as is done in our AGR and magnox reactors. The safety implications of that are, in my opinion, in no way comparable in detail, but they are obviously comparable in concept. From a safety point of view it is the most difficult part of AGR technology to justify and the nuclear inspector gives us some difficulties on it. It is just possible that the Chernobyl disaster was initiated by an on-load refuelling incident. If that turns out to be true, it would obviously give us serious public relations problems for our own gas cooled reactors, and it reinforces my existing opinion that if we ever do build more AGR's, we should redesign them to be refuelled off-load.

I must stress this is not a matter you should worry about. I am quite comfortable about our safety position and can defend it and I can defend a direct comparison of Russian and UK practices. (Since safety comes first in the UK, the AGR's are driven to low availability - i.e. we sacrifice economics not safety. In contrast the Russians achieve high availability - presumably by cutting corners on safety).

One final point you might bear in mind. If your summit discussions stimulated the concept of an international safety commission, the Americans themselves cannot greatly contribute to it, because their safety regulatory system is in disarray - it relies too much on written regulations and the intervention of lawyers - and the management of their nuclear regulatory commission and of some of their utilities has been shown to be so deficient, that increasingly the business of both regulation and management is being taken over by admirals retiring from the American nuclear submarine programme. Retired American admirals from Rickover's navy would not be acceptable to the Russians. Furthermore, an international safety commission is likely to look with considerable criticism at the Babcock and Wilcox design of PWR's in America. This is the one that gave trouble at Three Mile Island.

Obviously, there is no purpose to an international safety commission if the Russians do not join. I am not copying this letter to anyone.

Yours sincerely,



Marshall of Goring