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547

ID	Doc Type	Document Description	No of Pages	Doc Date	Restrictions
211270	MEMO	CLARK TO SEC SHULTZ RE RENEWAL OF AGREEMENT ***R 6/3/2019 M725/1***	1	6/23/1983	B1
211275	MEMO	SAME AS 211270 ***R 6/3/2019 M725/1***	1	6/23/1983	B1
211271	MEMO	CLARK TO THE PRESIDENT RE RENEWAL OF US-SOVIET ATOMIC ENERGY AGREEMENT ***R 6/3/2019 M725/1***	2	ND	B1
211272	MEMO	LENCZOWSKI TO CLARK RE RENEWAL OF US-USSR ATOMIC ENERGY AGREEMENT ***R 4/11/2023 M725/1***	3	6/20/1983	B1
211273	MEMO	CHARLES HILL, STATE DEPT, TO CLARK RE RENEWAL OF US-USSR AGREEMENT ON SCIENTIFIC AND TECHNICAL COOPERATION IN THE FIELD OF PEACEFUL USES OF ATOMIC ENERGY (INCLUDES ATTACHED REPORT) ***R 3/23/2022 M725/1***	8	6/16/1983	B1
211274	MEMO	JOHN MARCUM, OSTP, TO UNDERSEC WILLIAM SCHNEIDER, STATE DEPT, RE US-USSR ATOMIC ENERGY AGREEMENT	1	6/16/1983	B1

The above documents were not referred for declassification review at time of processing

Freedom of Information Act - [5 U.S.C. 552(b)]

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RECEIVED 16 JUN 83 17

TO CLARK FROM HILL, C DOCDATE 16 JUN 83

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as 9/8/17

KEYWORDS: USSR NUCLEAR ENERGY
TECHNOLOGY TRANSFERS SCIENTIFIC
TREATIES

SUBJECT: RENEWAL OF AGREEMENT RE SCIENTIFIC & TECHNICAL COOPERATION IN PEACEFUL USES OF ATOMIC ENERGY

ACTION: PREPARE MEMO FOR CLARK DUE: 18 JUN 83 STATUS S FILES

FOR ACTION: LENCZOWSKI, POLLOCK, WEISS

FOR CONCURRENCE: Bill MARTIN

FOR INFO: MYER, SOMMER, RYE, DEGRAFFENREID, DOBRIANSKY

mtlock

COMMENTS

REF# 8318466 LOG NSCIFID (J /)

ACTION OFFICER (S)	ASSIGNED	ACTION REQUIRED	DUE	COPIES TO
Hall	X	fwd to Pres for decision	6/22	
	C	6/23 Clark sgd memo		JC, UM, MA, JO, GO Index

DISPATCH 6/23 W/ATTCH FILE (PA) (C)

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THE WHITE HOUSE

WASHINGTON

~~SECRET~~

June 23, 1983

MEMORANDUM FOR THE HONORABLE GEORGE P. SHULTZ
The Secretary of State

SUBJECT: Renewal of U.S.-USSR Atomic Energy Agreement (C)

The President concurs with your recommendation to renew the U.S.-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy, and to make a demarche to the Soviets on Sakharov. He also shares the concerns of the intelligence community that all proper safeguards against technology transfer be implemented. He recommends therefore, that each exchange be carefully reviewed by an interagency group to ensure that sensitive technologies be properly protected. Finally, he has expressed concern that in conformity with NSDD-75, appropriate measures be developed to ensure substantive and ideological reciprocity, especially in the context of private exchanges that may be an outgrowth of the official exchanges that result from this agreement. (S)

FOR THE PRESIDENT:

William P. Clark

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BY RW NARA DATE 6/3/09

WASHFAX RECEIPT

THE WHITE HOUSE

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URGENT

MESSAGE NO. 394 CLASSIFICATION SECRET PAGES 1

FROM NSC/S

(NAME) (EXTENSION) (ROOM NUMBER)

MESSAGE DESCRIPTION

TO (AGENCY)	DELIVER TO:	DEPT/ROOM NO.	EXTENSION
B.	Secretariat		

REMARKS: S, SK, S/S-S

4170

211275

THE WHITE HOUSE

WASHINGTON

~~SECRET~~

June 23, 1983

MEMORANDUM FOR THE HONORABLE GEORGE P. SHULTZ
The Secretary of State

SUBJECT: Renewal of U.S.-USSR Atomic Energy Agreement (C)

The President concurs with your recommendation to renew the U.S.-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy, and to make a demarche to the Soviets on Sakharov. He also shares the concerns of the intelligence community that all proper safeguards against technology transfer be implemented. He recommends therefore, that each exchange be carefully reviewed by an interagency group to ensure that sensitive technologies be properly protected. Finally, he has expressed concern that in conformity with NSDD-75, appropriate measures be developed to ensure substantive and ideological reciprocity, especially in the context of private exchanges that may be an outgrowth of the official exchanges that result from this agreement. (S)

FOR THE PRESIDENT:

William P. Clark

~~SECRET~~
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NLRR M725 #211275
BY RW NARA DATE 6/3/19

211271

4170

MEMORANDUM

THE WHITE HOUSE

WASHINGTON

~~SECRET~~

ACTION

MEMORANDUM FOR THE PRESIDENT

FROM: William P. Clark

SUBJECT: Renewal of U.S.-Soviet Atomic Energy Agreement

Issue: Whether to renew the U.S.-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy and to accompany it with a demarche to the Soviets urging that Sakharov be moved to Moscow for humanitarian reasons.

Facts: This agreement is one of several U.S.-Soviet agreements that are up for renewal this year. Pursuant to your directive, NSDD-75, which recommends maintaining an ideological component to U.S.-Soviet relations to help the process of evolutionary change in the USSR and directs that existing exchanges not be further dismantled, State is recommending that we renew this agreement (Tab A). The intelligence community, however, recommends that it be restricted to theoretical investigations and data analysis so as to avoid the dangers of technology transfer.

Discussion: There are various costs and benefits in renewing this agreement. The benefits are scientific and political. Not only can you show the world your willingness to engage in mutually beneficial cooperation with the Soviets, but we can use such exchanges to expose the USSR to alternative political and ideological influences.

The costs, however, involve the dangers of technology transfer, the risks of an increased hostile intelligence and disinformation presence in the U.S., and the appearance of a return to detente-style business as usual and the lifting of a Poland sanction.

On balance, renewing the agreement would appear to be the most advantageous course, so long as the full letter and spirit of your directive NSDD-75 are met: specifically its requirement to protect against technology transfer, to utilize the exchanges for ideological influence and to ensure full reciprocity -- especially in any "spillover" private exchanges that grow out of the official exchanges.

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NLRRM725 #211271
BY AW NARA DATE 6/3/19

Currently our capability to ensure reciprocity in private exchanges is severely handicapped by our lack of a more effective visa control system. Although this is not the place to make conclusions on this issue, it is a problem that needs further work and decisionmaking. The process of renewing such agreements as this and the transportation cooperation agreement provide a helpful context for stimulating fresh thinking on possible ways -- such as visa control -- to ensure full reciprocity.

RECOMMENDATIONS

OK	No	
✓		1. That you authorize me to convey your concurrence with State Department's recommendation to renew the U.S.-Soviet Atomic Energy agreement with the appropriate safeguards against technology transfer, and to accompany this with a demarche urging that Sakharov be moved to Moscow for humanitarian reasons.
✓		2. That you authorize me to convey your concern that effective measures be developed to ensure full compliance with NSDD-75's requirement for full reciprocity in private exchanges.

Amb. Matlock briefed President and President approved both recommendations at 0930 6/22/83

Attachments:

Tab A State's memorandum, June 16, 1983
Tab B OSTP's memorandum, June 16, 1983

211272 MU

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MEMORANDUM

NATIONAL SECURITY COUNCIL

~~SECRET~~

June 20, 1983

ACTION

MEMORANDUM FOR WILLIAM P. CLARK

FROM: JOHN LENCZOWSKI JL

SUBJECT: Renewal of U.S.-USSR Atomic Energy Exchange Agreement

The State Department has transmitted to you a recommendation that we renew the U.S.-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy that expires June 21 (Tab A). On the basis of an interagency review of the costs and benefits of the agreement, which has been in effect since 1973, State recommends that the agreement be extended for three years with a further automatic extension (with termination option) for an additional two years. Because exchanges conducted under this agreement have provided U.S. scientists the opportunity to raise with the Soviets the plight of Andrei Sakharov and the repression of many Soviet scientists, State also recommends that renewal of this agreement be accompanied by a demarche to the Soviets to urge that Sakharov be returned to Moscow for humanitarian reasons.

Scientific-Technical Costs and Benefits

The Department of Energy has been the primary promoter of this agreement based on its assessment that it has resulted in substantial benefits to American scientific advancement. Its report on these benefits is attached at Tab A-2. The National Science Foundation concurs with DOE.

There are, however, reservations to DOE's sanguine analysis. The Office of Science and Technology Policy (OSTP) has expressed concern that the adverse effects of this agreement have not been adequately aired (see Tab B). Specifically it is concerned about how exchanges conducted under this agreement provide a significant conduit for technology transfer. OSTP also questions the scientific value we have gained from these exchanges.

The intelligence community is also concerned about the technology transfer problem and has recommended that all future activities under this agreement be restricted to theoretical investigations and data analysis. On this score, the State Department concurs.

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NLRR M725 #211272
BY RW NARA DATE 4/11/2023

Political Costs and Benefits

State says that the key political benefit in renewal of this agreement is that it would serve our political interests by affording us the flexibility to relax or tighten our exchanges policy according to shifts in the political situation.

A year and a half ago, non-renewal of such exchange agreements was one of the Polish martial law sanctions against the USSR. NSDD-75 effectively revised this sanctions policy by directing that exchanges not be further dismantled. The logic behind this directive was that such exchanges serve as a vehicle of ideological influence in the USSR and thus as a means of promoting evolutionary change in the Soviet system. State does address this ideological dimension in referring to the human rights appeals made by U.S. scientists. However, the NSDD also refers to the necessity of "full reciprocity" in such exchanges and the desirability of using exchange agreements as a way of precluding private exchanges that auger mostly to the benefit of the USSR.

Here is where problems may arise. The fact is that the signing or renewal of any exchange agreement results in "spillover" effects that extend beyond the boundaries of the agreement itself. Primary among these effects are the whole range of private exchanges that grow out of the official ones -- ostensibly the very private exchanges that we hope to control. So far State has not come up with any means of either controlling these, assuring full reciprocity or even addressing the question of the hostile intelligence presence that is invariably involved.

Such an agreement also amounts to an encouragement of other segments of the private sector to conduct their own exchanges with the Soviets. Thus, although it may not make front-page news, it still serves as a signal of a revival of detente-style relations with Moscow. Needless to say, the interests of most of these groups are not the same as those the NSDD seeks to serve -- namely to "maintain a strong ideological component" in U.S.-Soviet relations.

In conclusion, if the framework of exchanges, of which the Atomic Energy agreement is a part, is to serve the letter and spirit of the President's directive and not the "interdependence" logic of the detente period which Secretary Shultz just rejected in his SFRC testimony, then State should come up with some kind of mechanism whereby the detente-style "spillover" effects of such agreements are mitigated and controlled. Some form of visa control would be the best method. Today, we have no effective way of keeping KGB agents, disinformation agents and propagandists out of our country. It is this handicap that is the chief source of our inability to maintain the kind of ideological and substantive reciprocity that the NSDD seeks to ensure.

We already have a law on the books to exercise this kind of visa control -- the Baker Amendement. As USIA Director Wick has recommended, this should be invoked to be able to begin visa controls. To do so, all that is necessary is for the Secretary of State to consider that the Soviets are "not in substantial compliance" with the Helsinki Accords. Although, ideally I would like to see that renewal of the Atomic Energy agreement be made conditional on some sort of visa control, I recognize that such a move should be part of a much broader set of decisions on U.S.-Soviet relations. Nevertheless, until such decisions are made, I feel that the near-automatic extension of agreements that not only produce detente-type effects but help to confer legitimacy on the Soviet regime does not serve the long-term security interests of the United States.

At Tab I is a memorandum from you to the President recommending that he concur with State's recommendation to renew the Atomic Energy agreement. It also recommends that he authorize you to express concern to State that effective measures be developed to ensure full reciprocity in private exchanges.

At Tab II is a memorandum to George Shultz concurring with State's recommendation to renew the Atomic Energy agreement. The memo emphasizes that the President shares the technology transfer concerns of the intelligence community and encourages that all proper safeguards be implemented. It reminds State of the intent of the NSDD to ensure full reciprocity and the limitation of unreciprocal private exchanges that may grow out of the official exchanges, and recommends that State explore ways of ensuring that this intent be fully satisfied.
JL for WM JL for JM JL for RP JL for GW
Martin, Matlock, Pollock and Weiss concur.

RECOMMENDATIONS

1. That you sign the memorandum at Tab I to the President.

Approve_____ Disapprove_____

2. That, conditional on the President's concurrence, you sign the memorandum at Tab II to Secretary of State Shultz.

Approve_____ Disapprove_____

Attachments:

Tab I Memorandum to the President

Tab A State's memorandum, June 16, 1983
Tab B OSTP memorandum, June 16, 1983

Tab II Proposed memorandum, Clark to Shultz

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DEPARTMENT OF STATE

Washington, D.C. 20520

June 16, 1983

~~CONFIDENTIAL~~

MEMORANDUM FOR MR. WILLIAM P. CLARK
THE WHITE HOUSE

SUBJECT: Renewal of US-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy

The 1973 US-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy will expire automatically on June 21, 1983. A new agreement extending or amending the current agreement will be required if we are to continue cooperation in this area.

BACKGROUND

Official science and technology exchange activities with the Soviet Union have been cut back substantially on two occasions - in 1980 at the time of the Soviet invasion of Afghanistan and in December 1981 when, as part of the sanctions taken against the Soviet Union for its actions in Poland, the President announced that three agreements (space, energy, and science and technology) would be allowed to expire in 1982. Since then, consistent with our policy (made explicit in NSDD-75) not to dismantle further the framework of exchanges, the USG decided in December 1982 to allow the automatic renewal of the Agriculture Agreement to take place.

As the attached report indicates, it is the assessment of the U.S. Department of Energy (DOE) that the Atomic Energy Agreement has resulted in tangible benefits to the U.S. and should be extended. The intelligence community continues to see possibilities for substantial U.S. intelligence gain through cooperative activities. At the same time, the community considers that there exists a potential for the "loss" of U.S. technology through Soviet access to equipment and diagnostics. To allay this concern, the intelligence community recommends that the agreement be renewed for three years with an option for a two-year extension and that the exchanges be limited to theoretical investigations and data analysis.

~~CONFIDENTIAL~~
DECL: OADR

DECLASSIFIED
NLRR M725 # 21273
BY RW NARA DATE 3/23/2022

STATE'S VIEWS

The exchange program carried out by the Department of Energy is the third most active area of scientific and technical exchange with the Soviet Union (the two most active being environmental protection and health). State concurs in DOE's assessment that the U.S. benefits from these activities scientifically and that, from a technical perspective, they should continue.

Given the controls which can be exercised under a Government exchange program, we consider that technology transfer concerns can be adequately addressed through existing procedures. All activities would continue to be subject to a case-by-case review on an interagency basis, which assures that the intelligence community and FBI have opportunities to make their views known.

Since allowing three exchange agreements (space, energy, and science and technology) to lapse in 1982, as part of the sanctions against the Soviet Union for its heavy and direct responsibility for repression in Poland, in December 1982, the NSC (acting on the Department's recommendation) decided that the Agriculture Agreement would be allowed to extend automatically. This was in line with the policy formally enunciated in NSDD-75 in January 1983. On political grounds, consistent with the policy of NSDD-75 that the "U.S. should not further dismantle the framework of exchanges," it also would be in the U.S. interest to extend the Atomic Energy Agreement.

In terms of our overall relationship with the Soviet Union, an extension of the agreement would provide us some flexibility to adjust the tightening or relaxing of our exchanges policy to future shifts in the political situation. We follow this approach under other agreements where we are continuing with certain routine exchanges, particularly in areas relating to health, pollution control, and safety.

For their part, the Soviets have indicated at senior levels a clear interest in extending the agreement -- most recently the Soviet Minister-Counselor at a meeting at State's Office of Soviet Union Affairs and earlier this spring, a high official

of the USSR State Committee for Atomic Energy during a meeting with Ambasador-at-Large Kennedy. These approaches are in line with the importance the Soviets attach to cooperation with the U.S. in the nuclear field and with their view of the exchanges framework as an important aspect of our overall bilateral relationship.

As in our other science and technology exchange programs, the activities conducted pursuant to the Atomic Energy Agreement afford our visiting American specialists with opportunities not otherwise possible to gain access to Soviet scientists and facilities and to keep abreast of Soviet developments and efforts in this key scientific area. This is of clear benefit scientifically to the U.S. The agreement's framework also provides opportunities for our visiting scientists to engage in informal dialog with their Soviet colleagues on U.S. positions on a wide range of topics, paramount among them the American displeasure at the continuing repression of many Soviet scientists.

In this regard, the access provided under the Atomic Energy Agreement has provided unique opportunities for visiting American physicists to raise the plight of Andrei Sakharov with their Soviet collegues. Sakharov's wife, in a recent conversation with officers from our Embassy in Moscow, urged that the agreement be extended so that U.S. physicists can continue to voice their concerns in the context of their exchange visits. Indeed, this would be a valuable use of the agreement, particularly in light of the President's personal concern with the case and his recent proclamation of National Sakharov Day. We would plan to pair our informing the Soviets of our decision to extend the agreement with a demarche to the Soviets to allow Sakharov to return to Moscow for humanitarian reasons.

Although DOE recommends a five-year extension term, State considers that a shorter period affords us more flexibility to review the agreement in the context of the overall political situation. Accordingly, we would prefer an exchange of notes providing for an extension for an initial three-year period and, unless we choose to exercise a termination option at that time, a subsequent automatic two-year renewal. This

arrangement would provide a mechanism for reviewing the agreement at the end of three years and again two years later in light of the overall political situation.

STATE'S RECOMMENDATION

State recommends that we propose to the Soviets that the agreement be extended by an exchange of notes for a three-year period with a further automatic extension (with termination option) at that time for an additional two year period. In informing the Soviets of our decision, State also recommends we make a demarche to the Soviets to allow Sakharov to return to Moscow for humanitarian reasons.

Charles Hill
Executive Secretary

Attachments:

1. EUR/IG Report on the Extension of the US/USSR Agreement on Scientific and Technical Cooperation on Peaceful Uses of Atomic Energy
2. DOE Evaluation
3. US-USSR Agreement on Scientific and Technical Cooperation on Peaceful Uses of Atomic Energy

EUR/IG REPORT ON THE EXTENSION OF THE US-USSR AGREEMENT ON COOPERATION FOR PEACEFUL USES OF ATOMIC ENERGY

The 1973 US-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy will expire automatically on June 21, 1983. A new agreement extending or amending the current agreement will be required if we are to continue cooperation in this area.

The Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy was signed in Washington by President Nixon and Soviet President Brezhnev during the Nixon-Brezhnev Summit. It was one of the eleven such agreements concluded at three summits between 1972 and 1974. Of the others, five have been renewed successively for five year terms, and two others for reduced terms. Three agreements, (space, energy, and science and technology) were allowed to expire in 1982 in accordance with the President's December 1981 announcement of sanctions against the Soviet Union.

Over the life of the agreement, activities have taken place under the Atomic Energy Agreement in the following areas:

1. Controlled Thermonuclear Fusion - to demonstrate jointly the scientific and technical feasibility of fusion through the eventual development of prototype and demonstration-scale thermonuclear reactors.

2. Fundamental Properties of Matter - to conduct joint theoretical and experimental studies on mutually-agreed subjects with emphasis on high, medium, and low energy physics.

3. Fast Breeder Reactors - to find solutions to mutually agreed basic and applied problems connected with the design, development, construction and operation of nuclear power stations utilizing fast breeder reactors.

As one of the sanctions imposed on the Soviet Union following their invasion of Afghanistan in 1979, support and funding for exchange activities under all eleven science and technology agreements were reduced significantly. While activities under the Atomic Energy Agreement also declined to a low level (with cooperation in Fast Breeder Reactors ceasing entirely), exchanges continued and the framework of cooperation in this area remained intact.

The Soviets clearly are interested in the access the agreement gives them to U.S. developments in atomic energy research. DOE and other USG elements believe the cooperation is carried out with proper safeguards on the transfer of critical technology. However, the intelligence community has recommended that should the agreement be extended, exchanges in this area be limited to to theoretical investigations and data analysis.

SUMMARY CONCLUSIONS AND AGENCY RECOMMENDATIONS

DOE's evaluation comments indicated:

--The three areas of cooperation under the agreement have also been recognized by this Administration as the special responsibility of the Federal Government to develop. Fiscal Year 1984 budget requests total approximately a half billion dollars for each of these programs, which are tackling some of the most difficult scientific challenges ever undertaken.

--The activities carried out pursuant to the agreement have been vital to achieving the objectives of gaining better access to the scarce scientific talent necessary for progress in these areas, to see first-hand heretofore-inaccessible Soviet facilities and to understand better the Soviet scientific system and its institutions.

--The agreement provides a highly effective channel for the views of the American scientific community to be expressed to leaders of the Soviet scientific establishment and a window to monitor the state-of-the-art of key Soviet technologies with potential military applications.

DOE, as set forth in its report (attached), recommends the agreeement be renewed for a period of five years, with an automatic renewal (with termination option) for an additional five year period. DOE does not recommend any modification in the existing language of the agreement to change implementation of cooperative activities under it.

State recommends proposing an exchange of notes with the Soviets providing for a three-year extension with a further automatic extension (with termination option) at that time for

an additional two year period. State agrees with DOE that there is no need to modify otherwise the existing language of the Atomic Energy Agreement.

Consistent with the policy directive in NSDD-75, State believes that while we should continue to limit and monitor the overall level of exchanges in response to Soviet actions, we should not further dismantle the framework of exchanges which now exists. As in our other science and technology exchange programs, the activities conducted pursuant to the Atomic Energy Agreement afford our visiting American specialists with opportunities not otherwise possible to gain access to Soviet scientists and facilities and to keep abreast of Soviet developments and efforts in this key scientific area. This is of clear benefit scientifically to the U.S. The agreement's framework also provides opportunities for our visiting scientists to engage in informal dialog with their Soviet colleagues on U.S. positions on a wide range of topics, paramount among them the American displeasure at the continuing repression of many Soviet scientists.

In this regard, the access provided under the Atomic Energy Agreement has provided unique opportunities for visiting American physicists to raise the plight of Andrei Sakharov with their Soviet collegues. Sakharov's wife, in a recent conversation with officers from our Embassy in Moscow, urged that the agreement be extended so that U.S. physicists can continue to voice their concerns in the context of their exchange visits. Indeed, this would be a valuable use of the agreement, particularly in light of the President's personal concern with the case and his recent proclamation of National Sakharov Day. State recommends that we pair our informing the Soviets of our decision to extend the agreement with a demarche to the Soviets to allow Sakharov to return to Moscow for humanitarian reasons.

In favoring the extension of the agreement, State agrees with the assessment from the intelligence community that activities be restricted to theoretical investigations and data analysis so as to minimize the loss of important U.S. technology.

DOD made no recommendation on the extension of the agreement.

Committee on Exchanges (COMEX) concurs in DOE's recommendation to extend the agreement, but favors a three-year renewal followed by an optional two-year extension. COMEX also recommends that activities in the future be restricted to theoretical investigations and data analysis, so as to minimize the transfer of technology.

National Science Foundation concurs in DOE's recommendation and commented that DOE had prepared a balanced assessment and convincing argument for continuing activities in this area.

Other Agencies offered no comment.

CONFIDENTIAL

Department of Energy
Washington, D.C. 20585

June 10, 1983

MEMORANDUM FOR Richard Burt
Chairman, Interagency Coordinating
Committee for US-Soviet Affairs
Department of State

FROM: Special Assistant to the Secretary
for Policy and Programs

SUBJECT: Renewal of the US-USSR Agreement on
Cooperation in the Peaceful Uses of
Atomic Energy

The three areas specified for cooperation under the US-USSR Agreement on Cooperation in the Peaceful Uses of Atomic Energy have also been recognized by this Administration as the special responsibility of the Federal Government to develop; they are Magnetic Fusion, High Energy and Nuclear Physics, and Fast Breeder Reactors. The Administration has requested FY 84 budgets of approximately a half billion dollars for each of these programs which are tackling some of the most difficult scientific challenges ever undertaken. A US objective in establishing the Atomic Energy Agreement was to gain better access to the scarce scientific talent necessary for progress in these areas, particularly in magnetic fusion and high energy and nuclear physics, to see first-hand heretofore inaccessible Soviet facilities to better evaluate Soviet scientific claims and achievements, and to understand better the Soviet scientific system and its institutions. The Agreement has been vital to achieving these objectives for the three high priority programs of the Department of Energy (DOE).

During the early years of the Agreement, DOE explored many topics for possible cooperation and some proved to be much more beneficial than others. Through this experience, DOE has learned to maximize the benefits for the US from the exchanges with the Soviets. Particularly in the areas of magnetic fusion and high energy and nuclear physics, the benefits have been primarily in the form of innovation in both theoretical and experimental physics; the resulting advances in the US programs have more than paid for the costs of the exchanges. While the Soviets do publish their scientific results, the publications are generally delayed and are of poor quality. Therefore, the scientist-to-scientist contacts are often crucial for transferring information. The Agreement has been particularly helpful in gaining access to some of the Soviet laboratories, allowing US scientists to examine personally Soviet research experiments and technology.

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Authority NLC-153-109-10-7-3
BY GL NARA DATE 9/8/17

NATIONAL SECURITY INFORMATION
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Originally Classified by: Harold Jaffe
(Name)
Acting DAS for IEC/NNP
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CONFIDENTIAL

While cooperation in Fast Breeder Reactors is currently dormant, DOE is interested in reviving a small level of activity to help it monitor more effectively Soviet progress in operating two of the world's largest Fast Breeder Reactors, the BN-350 and the BN-600.

With or without the Agreement, DOE's Visitor Access and Control system would control access to US facilities for Soviet visitors as for other nationalities. However, the Agreement enables us to better coordinate and centralize control over Soviet visitors and to better monitor both Soviet and DOE-contractor travel to each other's organizations, to better ensure that US technology is not being inadvertently transferred to the Soviets, and to press the Soviets for access to their facilities, experimental results and personnel as required to meet program objectives.

The Department of Energy recognizes that the renewal will be made at a high level within the context of overall US-USSR relationships and that US foreign and national security policy needs are the primary factors in the decision. However, it should be noted that DOE can always constrict the level of activity under the Agreement. For its part, DOE recommends that the US-USSR Agreement on Cooperation in the Peaceful Uses of Atomic Energy be renewed. While many experimental projects in the area of Fundamental Properties of Matter require years to organize, build, operate and analyze results, renewal for another ten years would appear to be appropriate from a technical point of view. However, at this time, DOE recommends that the renewal be for only five years to provide for more frequent, senior level examination of activities and relations.

The Department of Energy has found no reason to modify the existing language of the Agreement to improve implementation of cooperative activities under it. Although the Agreement calls for a Joint Coordinating Committee to meet annually, the Committee has not met since 1978, and the cooperative activities have continued successfully without it. The Department does not foresee any reason for the Joint Coordinating Committee, composed of senior members of the Department, to meet to resolve programmatic and implementation issues. The Soviets, who have been represented by the State Committee for the Utilization of Atomic Energy, have not pressed over the past five years for the Joint Coordinating Committee to meet.

In consideration of renewal of the Agreement, it should be kept in mind that the cooperative activities provide a highly effective channel for the views of the American scientific community to be expressed to leaders of the Soviet scientific establishment, and a window to monitor the state-of-the-art of key Soviet technologies with potential military applications. If the Agreement is not to be extended, DOE urges that other mechanisms be established to ensure that this valuable window on Soviet activities remains open.

Attached is a summary review and assessment of the activities under the Agreement which support the Department's recommendation of renewal, and separate, more detailed appendices by the DOE Program organizations. We will be happy to provide any additional information you may require.

Earl Gjelde

Attachment

Review and Assessment of The US-USSR Agreement in The Peaceful Uses of Atomic Energy

Background

The US-USSR Agreement on Cooperation in the Peaceful Uses of Atomic Energy was signed by President Nixon and General Secretary Brezhnev on June 21, 1973, and is one of 11 bilateral cooperative agreements concluded with the USSR in the early 1970's. The Agreement was preceded by a one-year Memorandum of Understanding between the U.S. Atomic Energy Commission and the USSR State Committee for the Utilization of Atomic Energy, signed September 28, 1972.

The Agreement is in force from June 1973 to June 1983 and may be modified or extended by mutual agreement. Cooperation is to be carried out under the Agreement on the basis of equality, mutual benefit, and reciprocity. Termination of the Agreement would not necessarily affect the validity of active implementing protocols and contracts as the Agreement allows these to be carried to completion.

The Agreement provides for cooperation in three major areas: 1) Controlled Thermonuclear Fusion, 2) Fast Breeder Reactors, and 3) Research in the Fundamental Properties of Matter.

The purpose of cooperation in Controlled Thermonuclear Fusion, is to demonstrate jointly the scientific and technical feasibility of fusion through the eventual development of prototype and demonstration-scale thermonuclear reactors.

The purpose of cooperation in Fundamental Properties of Matter is to conduct joint theoretical and experimental studies on mutually agreed subjects with emphasis on high, medium, and low energy physics.

Cooperation in Fast Breeder Reactors is directed toward finding solutions to mutually agreed basic and applied problems connected with the design, development, construction and operation of nuclear power stations utilizing fast breeder reactors.

A Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy was established in February 1974 to review annually past cooperation, approve new proposals, and address important issues as they arose. The Joint Committee has met five times, in February 1974, October 1974, December 1975, December 1976 and April 1978. Prior to the establishment of the Department of Energy, the U.S. side of the Joint Committee was headed by the Administrator of the Energy Research and Development Administration (ERDA). The last meeting was chaired by the US side by the Deputy Secretary of Energy. The DOE Office of International Affairs serves as the Executive Secretary for the Agreement.

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Magnetic Fusion

Program Description

Activities conducted under the Magnetic Fusion exchange program are joint meetings, workshops, symposia, etc., and long-term assignments of scientists to each other's facilities.

The topics under the Magnetic Fusion exchange originally covered all aspects of magnetic fusion (as opposed to inertial confinement fusion, whose subject matter is mostly classified), from the science of plasma confinement research to the technology of power reactors. In 1981, after the Soviet invasion of Afghanistan, both countries agreed to a U.S. initiative to limit the scope of the exchange only to topics on plasma theory, experimental physics, and technology related to physics experiments. This was in response to a new policy directed by State of pursuing only those activities of substantial interest to DOE.

A ten-year Protocol on Joint Projects in Controlled Thermonuclear Fusion and Plasma Physics of February 6, 1974, established the US-USSR Joint Fusion Power Coordinating Committee (JFPCC) to review the status of each other's program, address issues resulting from past actions and make recommendations for new activities. The JFPCC has met every year since 1974 except for 1980.

The level of effort in fusion is given in Table 1. As can be seen, the level of exchange activity increased through 1976 as the participants on both sides took advantage of their initial opportunity to learn in detail about the activities of the other country. After 1976, the level of activity began to drop as the exchange participants became more familiar with each other's programs. This reduction coincided with a slowdown in the momentum of the Soviet fusion program, in part due to the death of its leader, Lev Artsimovich. The Soviet invasion of Afghanistan in late 1979 resulted in a hiatus of nearly two years. By mid-1981, agreement had been reached in principle to resume the exchanges on a modest, more selective basis.

Dollar costs of the exchanges with the USSR are minimal. The exchange operates on the principle that the "sending side pays" the expenses of their traveling delegation, such as transportation costs, per diem, and telephone calls. For the DOE fusion program, the manpower cost of time spent preparing for and participating in exchanges in the USSR and hosting exchanges in the U.S. are integrated into the program's general budget. This expense is generally in direct support of priority program activities and is not considered as a special cost against program resources.

Assessment

The Soviet fusion program is slightly larger than the US program, and until the mid-1970's, was considered the world's leader. It is still quite competitive with the US program, but recently has been hampered by its shortcomings in support technology, some of which has been compensated by theoretical resourcefulness and experimental creativity.

Over the past 15 years, the Soviet fusion program has achieved major discoveries and successes which have profoundly affected the US fusion program. Soviet achievements cover every major aspect of fusion science. The Soviets invented the Tokamak confinement concept on which DOE has expended the majority of its program funds over the past ten years. The Soviets were coinventors of the magnetic well for mirror machines, did the original work on the concepts which led to the development of the plasma-stream stabilization process for mirrors, and simultaneously with the US, invented the tandem mirror concept; next to tokamaks, the DOE fusion program is spending the largest amount of its funds to develop the mirror confinement concept. The Soviets are the world leaders in developing compact toroids, a highly promising concept as a relatively small and inexpensive fusion reactor. The Soviets were the first to operate a tokamak with superconducting magnets and pioneered the development of negative-ion neutral-beam sources and gyrotrons for plasma heating. The Soviets are world leaders in fusion theory which is the analytic underpinning for all fusion design work. The Soviets are also placing more emphasis in certain areas than the US, such as stellarators, fusion/fission hybrid reactor designs, adiabatic compressional heating, and electromagnetic traps. It is advances such as these which the DOE fusion program has tried to exploit through the Atomic Energy Agreement.

Essentially all of the detailed information obtained from the Soviet magnetic fusion program is through the fusion exchange program. In contrast to US practice, the Soviets have access to almost all DOE-sponsored work through the open literature. Moreover, due to travel restrictions and foreign exchange limitations, Soviets are not well represented at international conferences and their papers seldom provide the details needed to understand fully their work. This severely limits the utility of conferences as a means of acquiring Soviet information. Soviets are also reticent to discuss their failures or problems unless they know and trust their counterparts. Thus, DOE needs the exchange to gain this information while the Soviets do not rely on the exchange nearly as much. Since the cost of the exchange is low, the exchange program is a major asset to the DOE fusion program.

Another measure of value of the exchange is the attitude of scientists participating in the exchanges. While the number of exchanges reached a high point in 1976-77, by 1979 the attitude of most US

scientists was that the exchange was a burden to be tolerated. Without any exchanges in 1980 and 1981, this attitude prevailed at the resumption of activities in 1982. By the end of the 11 exchanges conducted in 1982, the attitude had shifted to one of support and appreciation of the exchanges due to the programmatic value of the interactions of US scientists with their Soviet counterparts.

For the future, if the US-USSR Atomic Energy Agreement is renewed, DOE expects that the fusion exchanges would continue to be of substantial benefit to DOE, not only because of the experience gained over the past ten years on how to work and communicate with the Soviets, but also because the Soviet fusion program is expected to continue at about the same level and pace as the US program. The exchange would continue to be focused on plasma theory, experimental physics, and technology related to physics experiments.

Fundamental Properties of Matter

Program Description

Exchanges between the US and USSR have been underway since 1959. In December 1975, the Joint Committee established the US-USSR Joint Committee on Cooperation in the Fundamental Properties of Matter (JCCFPM) to guide the cooperative program in this area. Cooperative activities in the field of high energy physics, nuclear (i.e. medium energy) physics, and accelerator sciences include visits by individual scientists and groups to laboratories and universities; conferences and workshops on specialized topics by theorists and experimentalists; experiments, principally at major accelerator laboratories; and research and development activities on accelerator physics and detectors. This exchange program is the most extensive under the Atomic Energy Agreement and involves multi-year experimental programs, usually at US facilities, with the transport of expensive Soviet hardware to US laboratories.

The normal mode of operation of the JCCFPM since 1975 has been to meet alternately in the US and USSR at intervals of about a year. Signed records of the meeting always included an agreed-upon program of cooperation for the coming year. New programs arising during the year were agreed upon by communications between the US and USSR cochairmen. Since the Soviet invasion of Afghanistan and the subsequent new guideline of pursuing only activities of substantial benefit to DOE, there have been fewer cooperative activities.

The fifth JCCFPM was held in February 1982 shortly after the imposition of martial law in Poland. Under revised US guidelines, DOE was able to discuss proposed plans for 1982 and to have each activity continue on a case-by-case basis, but was not allowed to sign an agreed-upon plan. The Soviets expressed unhappiness with this new US position and pointed out their difficulties in committing resources to projects subject to subsequent US review and possible cancellation. Nevertheless, since this meeting, the Soviet have continued their past practice of building and exporting special equipment to the US for cooperative experiments.

Soviet scientists participating in experiments in the US make up the majority of the exchanges in Fundamental Properties of Matter, in a ratio of about 5 to 1 in man-weeks. This is due to the superior US facilities in which experiments can be conducted. Soviet research proposals compete with those from other countries in high energy physics and are judged on the basis of scientific merit, not national origin.

Assessment

The exchange program in the Fundamental Properties of Matter has served to keep open valuable channels of communication with the Soviet high-energy and nuclear-physics community. Although exchanges were conducted prior to the the US-USSR Atomic Energy Agreement, the formal program has helped very much to pave the way for reciprocal exchanges. The JCCFPM meetings have served to coordinate and regulate these exchanges and have greatly helped US scientists to gain access to Soviet laboratories and institutes. The JCCFPM is also an official channel through which the US and USSR can communicate policy and operational concerns relative to the exchange. Because a number of USSR and US high energy physicists tend to be prominent in advising their governments, these channels have had added importance.

Technical benefits to the US have been substantial in the areas where the Soviets excel, such as accelerator R&D, instrumentation (i.e. detector) R&D, and theoretical physics. These areas are generally conceptual in nature and indeed Soviet scientists have created and shared some very innovative ideas. For example, the Soviets did the original theoretical and experimental work on the Radio Frequency Quadrupole, which was then fully developed by the Los Alamos National Laboratory for use as the accelerator on the proposed, $200 million Fusion Materials Irradiation Test Facility. The Soviets also developed the negative ion source which has become the standard source used in the US for injecting high brightness beams into circular accelerators as well as the source for the development of high energy neutral beam injectors used in magnetic fusion research. The US is also developing detectors originated at Novosibirsk which promise to achieve the best time resolution of any detector now available for tracking subatomic particles. These conceptual ideas are the most important long term benefits of the exchange in the Fundamental Properties of Matter.

When the Soviets come to the US to conduct experiments, they usually bring accelerator detectors and other components designed and built in the USSR. These contributions are valuable to accelerator R&D and experimentation, and have saved the US several million dollars. DOE has not transported instrumentation of any significance to the USSR under this exchange program.

The Soviets are currently supplying accelerator/detector components for four major experiments at the Fermi National Accelerator Laboratory. This Soviet equipment will save DOE over $8.5 million

dollars and allow some experiments to take place one or two years earlier than otherwise possible. In these programs, the Soviet investment is considered to be substantial, and the US stands to profit considerably from their contribution. Details of these programs are given in Appendix 2.

In the future, if the Agreement is renewed, more US scientists are likely to go to the USSR than they have in the past. The USSR has initiated construction of a very big superconducting proton accelerator, UNK, which will be capable of reaching record energies of 3 TeV by about 1990. Access to the unique capabilities of this fixed target accelerator will probably be sought by US scientists desiring to do experiments in this energy range, and additional physics benefits to the US are anticipated, including new discoveries.

Fast Breeder Reactors

Program Description

The Fast Breeder Reactor cooperation was based upon a Protocol on Cooperation in the Field of Fast Neutron Breeder Reactors between the US Atomic Energy Commission and the USSR State Committee for the Utilization of Atomic Energy. The Protocol was signed October 4, 1974, and expires ten years hence. The Protocol established a Joint Coordinating Committee which has met five times.

Under the guidance of the Joint Coordinating Committee, exchanges of papers and their discussion were conducted on a relatively ad hoc basis. There has been no assignment of personnel. The few seminars held focused on the development of steam generators for Liquid Metal Fast Breeder Reactors. Some US cladding materials were tested in the Soviet BOR-60 breeder reactor and some USSR cladding materials were tested in the EBR-II. The final experimental results have yet to be exchanged, in part due to the absence of a pressing DOE demand for the data. The results of other tests on steam generator and other materials were discussed at the Tampa Steam Generator Seminar in October 1978. Exploratory talks on the possiblity of testing a US steam generator in the Soviet BN-350 breeder were terminated in 1978 because of the major cost required to rectify the technical incompatibilities between the Soviet reactor and the US steam generator, which was designed for use on the Clinch River Breeder Reactor.

The level of activities during the 1974-1979 period was modest, consisting primarily of technical information exchanged by means of seminars. Following the Soviet invasion of Afghanistan in December 1979, the cooperative program came to a virtual standstill from which it has never recovered.

Each side paid its own expenses (primarily associated with seminar preparation, travel and translation costs) which were estimated at less than $100,000 per year during the five years of activity.

Assessment

The Fast Breeder Reactor exchange during its active period led to a large increase in the US awareness, understanding, appreciation and personal knowledge of the Soviet LMFBR program. Most scientists and engineers who participated in FBR exchanges reported that their contacts with the USSR were beneficial.

However, the exchange was not balanced and favored the Soviets. The FBR exchange was considered a high priority by the Soviets, providing them, among other things, access to US high quality assurance practices in the design, development, construction and operation of LMFBRs, an area of weakness in the Soviet program. Although on a one-to-one basis the Soviets appeared willing to exchange information and materials, governmental procedures concerning the release of technological information to foreigners severely limited the quality and quantity of information and materials actually received by DOE.

Nevertheless, the DOE nuclear program would like to maintain the option for future Fast Breeder Reactor exchanges under a renewed Atomic Energy Agreement. The Soviets are now operating the world's largest LMFBR, the BN600. The Atomic Energy Agreement may provide DOE an avenue by which useful information on this program could be obtained. This could be achieved by carefully and rigorously structuring the scope and agenda of each exchange in advance to ensure that the topics of interest to DOE are covered and that the exchange is balanced.

Other Topics

Cooperative activities in the areas of Thermionics, Spent-Fuel Storage, and Light Water Reactor (LWR) Safety were also explored. The decline in the DOE thermionics program frustrated the efforts of a proposed program put together by the two delegations exchanged in 1976 and 1977. Delegations were exchanged in LWR Safety in 1978, and the topic was approved by the Joint Committee in April 1978. However, the program was dropped when the Soviets invaded Afghanistan. The exchange in Spent Fuel Storage was never initiated because of a lack of sufficient mutual interest.

Recommendation

On the basis of the foregoing discussion DOE considers the technical benefits accruing to its programs, particularly in the areas of Magnetic Fusion and Fundamental Properties of Matters, to warrant extension of the Atomic Energy Agreement. We recommend that the Agreement be renewed without modification. Experience has shown that the work under the Agreement has been highly beneficial, and the activities can readily and effectively be expanded or curtailed

as conditions warrant. While the area of Fast Breeder Reactors is currently dormant, we recommend that the topic not be deleted as it may at some point in the future provide us with valuable insight into the significant USSR LMFBR program. We recommend that the Agreement be renewed for ten years, since progress in the program areas is dependent upon large experimental projects, which require time frames on the order of a decade to build, operate and analyze the results.

TABLE 1

STATISTICAL SUMMARY OF EFFORT FOR VISITS AND ASSIGNMENTS TO IMPLEMENT ACTIVITIES UNDER THE US-USSR ATOMIC ENERGY AGREEMENT

Calendar Year	Man-Weeks from US	Man-Weeks from USSR
Controlled Thermonuclear Fusion		
1974	68	44
1975	129	127
1976	191	142
1977	132	130
1978	98	63
1979	33	51
1980	0	0
1981	0	0
1982	24	42
Fundamental Properties of Matter		
1976		
1977	110	430
1978	43	210
1979	6	309
1980	66	238
1981	39	240
1982	24	303
Fast Breeder Reactors		
1974	18	10
1975	22	9
1976	21	12
1977	0	8
1978	5	19
1979	24	6
1980	0	0
1981	0	0
1982	0	0

Assessment of the Results

of

Magnetic Fusion Energy Cooperation

between the

United States and the Soviet Union

1974 through 1982

March 4, 1983

APPENDIX I

I. Objectives

The objective of the magnetic fusion energy programs in both the United States and the Soviet Union is to develop the understanding of magnetically confined nuclear fusion to the point where this process can be used as a controlled source of energy. The objective of the bilateral exchange between the U.S. and Soviet magnetic fusion programs under the US/USSR Atomic Energy Agreement is to share the information developed separately by the two programs to assist in their independent activities.

The scope of the magnetic fusion exchange covered all magnetic confinement development activities when it was initiated, including both scientific and technological aspects extending from basic confinement research to power reactor applications. After the invasion of Afghanistan, both countries agreed to a U.S. initiative to reduce the scope of the exchange to science topics (i.e., plasma theory and experimental physics) and technology directly related to science experiments. This reduction was arranged for two reasons; first, because the U.S. had not benefitted equitably from past technology exchanges other than those directly related to science experiments, and second, to avoid questions concerning the transfer of sensitive technology information.

II. Program Description

A formal agreement providing for the exchange of information on fusion development has existed between the U.S. and the Soviet Union since 1958. This was renewed and broadened in mid-1973 as part of the Nixon-Brezhnev accord. The exchange activities reached a peak of more than 100 man weeks in 1976-1977. Based on an assessment in the U.S. that the amount of new information to be obtained through the exchange was declining, the U.S. reduced the exchange level by a factor of two by 1980. However, before the 1980 program could be implemented, the USSR invaded Afghanistan. The U.S. policy response dictated a severe cutback in the exchange which, for various reasons, resulted in a complete hiatus for two years while policy issues were clarified. By mid-1981, agreement had been reached with all parties to restart the exchange on a modest, selected scale.

The level of effort of the fusion exchanges scheduled under this agreement in 1982 was nominally six exchange trips in each direction totaling approximately 80 man weeks. The activities were principally limited to the topics of plasma theory and experimental physics. Experience with the exchanges in 1982 was very encouraging in that the Soviet scientists and program officials were fully cooperative in providing the desired detailed technical information during the exchanges and in providing access to the Soviet facilities and scientists. (11 of the 13 planned exchanges took place in 1982, the other two were rescheduled by mutual consent for the first quarter of 1983.)

The activities conducted under the magnetic fusion exchange program currently include the following:

A. Meetings and Workshops - These activities comprise the bulk of the exchange activities. They consist of both formal and informal presentations by the U.S. and Soviet exchange participants on the activities and developments in their programs. These presentations are routinely followed by question and answer and discussion periods.

B. Joint Work - These activities occur in both the experimental physics and theoretical physics areas. In the experimental physics area, visiting scientists from either the Soviet Union or the U.S. are incorporated as visiting scientists into the experimental staffs of the host country for periods of a few weeks. This provides the visiting scientists with a direct opportunity to observe the techniques and equipment being used by the host country. No joint or coordinated experimental programs are currently being conducted.

In the theoretical physics area, researchers periodically meet to discuss topics of mutual interest and attempt to develop improved understanding of these topics by pooling their knowledge and through the benefits of their combined talents. The results of these sessions are normally used separately by the participants rather than being published as joint papers.

C. Facility Tours - These activities are conducted as part of visits arranged for other purposes and are simply intended to acquaint the visiting party with the types of facilities being built or used. The information gained is used primarily to monitor progress in the program and to identify topics for potential future exchanges of the types discussed in A and B above.

All of the magnetic fusion exchanges currently being conducted are stand alone activities. There are no series of coordinated exchanges specifically established to monitor or conduct joint activities extending between exchange visits. However, since the programs being conducted in both countries are multi-year efforts, it is common for exchanges on various topics to be arranged periodically to allow researchers to exchange information as their independent programs progress.

III. Level of Effort

The approximate level of effort for the US/Soviet magnetic fusion bilateral exchange program, in relation to the overall U.S. magnetic fusion program level of effort is shown below:

Calendar Year	Approximate U.S. Level of Effort for US/Soviet Exchanges (Incremental Travel Costs - US to USSR)	Overall U.S. Program Level of Effort
73	This exchange started in 1974.	
74	$106K	$ 63M
75	124	118
76	198	219
77	164	316
78	148	332
79	104	355
80	0	350
81	0	394
82	34	451

As indicated by the preceeding data, the travel cost of the US/Soviet bilateral has run from a maximum of 0.17 percent of the overall U.S. magnetic fusion energy program budget in 1974 to a low of 0.007 percent in 1982. Accordingly, the exchange is considered to represent a minimal additional expense to the program.

The exchange operates on the principle that the "sending side pays" the expenses of their traveling delegation. The only identifiable expenses associated with the exchange other than travel costs, are for periodic telephone calls at the rate of about one call per month for a total of approximately $300 per year. All other expenses, specifically the manpower cost of time spent preparing for and participating in exchanges in the USSR and hosting exchanges in the U.S., are integrated into the program's general expenses and are estimated to involve about one additional day for every day of an exchange. This expense is conservatively estimated to be less than $300,000 for calendar year 1982. Since this expense is generally in direct support of priority program activities, it is not properly counted as a cost against program resources.

The major expense involved with the US/Soviet fusion exchanges is the administrative effort involved in planning them and obtaining clearance for them to occur. These problems stem primarily from the difficulty of communicating through formal channels; including reviews and clearances involving at least the U.S. fusion laboratories, the DOE Office of Fusion Energy, the DOE Office of Energy Research, DOE International Affairs, several different offices within the State Department, and the National Security Council. It took approximately 1/3 of one person's time within the Office of Fusion Energy to prepare the documentation associated with the 11 US/Soviet fusion exchanges which took place in 1982, plus

substantial additional time spent by supervisory staff within the Office of Fusion Energy and on through the concurrence chain. This is more effort than it took to conduct the 56 US/Japan fusion bilateral exchanges that occurred during the same period. The time delays in this cumbersome system have routinely led to last minute approvals and misunderstandings in arranging the most straightforward and harmless exchanges, despite the best efforts and intentions of all parties involved.

IV. Benefits

A. In the past, the benefits to the U.S. program from cooperation with the Soviets have been significant and wide ranging as demonstrated by the following specific examples:

1. The tokamak confinement concept was developed by the late head of the Soviet program, L. A. Artsimovich, based on a concept originated by another Soviet, A. Sakarov. The basic ideas and detailed experience were openly and willingly provided to scientists in the U.S. and other countries by the Soviets. The tokamak concept is currently the most advanced in the world, largely due to advances made independently by the U.S., building on the initial Soviet invention. The tokamak concept is being used by the U.S. in the device with which we expect to become the first nation to demonstrate fusion's scientific feasibility.

   It is significant to note here that the initial, promising Soviet tokamak data were not believed when they were initially published. It took direct observation during an exchange, in this case a visit by British scientists, to convince the Western nations that the Soviets were correct.

   It is further significant to note that the ability of the U.S. to initiate work rapidly on the tokamak concept and reproduce the Soviet results rapidly stems largely from the fact that the Soviets allowed Dr. Artsimovich to travel to the U.S. and discuss his work with U.S. fusion researchers. Thus the Soviets, to some degree, coached the teams which built the first U.S. tokamaks.

2. The mirror confinement program has benefitted similarly from exchanges of information with the Soviet program. The earliest example was the independent proposal on the use of open trap confinement, i.e. "magnetic mirrors", by G. I. Budker of the Soviet Union. This concept was further refined by the Soviet team led by M. S. Ioffe through their invention of the stable, "minimum B" configuration and the concepts which led to the "stream stabilization process". Both of these concepts were incorporated into the 2XIIB experiment in the U.S. which reached record ion temperatures and kept the mirror concept in contention as a reactor concept.

Next, news of the independent invention of the tandem mirror concept by G. I. Dimov in the Soviet Union led U.S. scientists to expedite their work on our TMX machine. TMX then became the first operating tandem mirror experiment within 18 months, much earlier than would have occurred without the Soviet competition and confirmation of our theoretical predictions.

Most recently, Dr. Ioffe's group provided U.S. mirror researchers with information which led to the "sloshing ion" approach to stabilization of loss cone instabilities and thus to an acceptable design for the MFTF-B end cells. This development was a key element in the U.S. decision to proceed with the MFTF-B project and with tandem mirrors as our second "main line" confinement concept.

3. In the compact toroid area, the most advanced of the three configurations being studied in the U.S. is based on work done by R. Kh. Kurtmullaev. His group has developed techniques for formation, translation and compression of field reversed configurations which are unrivaled outside the Soviet Union. The compact toroid concept is one of the most promising for a long range, fundamental improvement in the size and cost of fusion power reactors.

   Although the Soviet compact toroid experimental apparatus is apparently located in a classified area to which we cannot gain access, our scientists have been given full access to the Soviet scientists and their work, specifically including laboratory notebooks, experimental techniques, and raw data.

4. On the topic of plasma theory, the analytic underpinning for all fusion design work, the Soviet program has an unsurpassed reputation. For example, V. D. Shafranov is recognized world wide as the dean of MHD theory; B. B. Kadomtsev was a motivating force and contributed much of the basis for our current theory of plasma turbulence and instabilities; N. N. Bogoloubov, S. I. Braginskii, A. A. Galeev, and R. Z. Sagdeev provided much of the body of kinetic and transport theory; L. Landau and A. A. Vlasov developed the basis of our understanding of wave phenomena in plasmas; D. D. Ryutov did the initial analysis of collisionality in open systems; V. P. Pastukhov developed the theory of ion transport in mirror systems; V. N. Tsytovich provided innovations on the topic of nonlinear plasma physics and L. M. Kovrizhnykh developed transport coefficients for the EBT concept.

   Besides their long standing expertise, the Soviet theoreticians invariably offer a different perspective and methodology for the solution of fundamental fusion problems. Among the reasons for this different perspective are their severe limitations in computational facilities which force them to develop approaches unique to those taken in the U.S. Another contributing factor is the Soviet tradition of extensive mathematical and analytic education.

B. Over this last year in particular, ten exchanges were held that resulted in specific contributions that introduced new Soviet ideas, confirmed U.S. hypotheses, saved valuable time in our experimental programs, and supported our advanced design efforts. Some of these contributions are the following:

1. A correspondence between U.S. experimental results in Ion Cyclotron Resonance Heating and the directly applicable Soviet theory was developed.

2. Soviet experience in controlling gas recycling and flow in tandem mirrors was incorporated into the new U.S. TARA experiment.

3. New insights and constructive criticism were obtained in the theory of plasma stability and transport in three major types of toroidal devices (tokamak, bumpy tori, and stellarators).

4. Information leading to the optimization of our advanced toroidal facility design was obtained.

5. We gained access to the Soviet's decade-long experience on compact stellarator configurations, including two state-of-the-art fabrication techniques for RF antennas and complex magnetic field coils.

6. Information was obtained concerning a new Soviet technique for "sawtooth" instability control. This technique has favorable implications for the feasibility of low q tokamaks and has led to a reordering of the U.S. electron cyclotron heating program on the PLT facility.

7. Specific concepts in the analytic theory of alpha particle stability, new techniques for the calculation of transport coefficients, and new models for calculation of anomalous electron transport were learned.

One exchange produced only mixed results, but even it proved valuable by leading to an improved method of preparing for the current year's exchanges.

C. Essentially all detailed information concerning the Soviet program comes from the U.S./Soviet exchange activities. There are several reasons for this:

1. Due to travel restrictions and foreign exchange limitations, the Soviets are not well represented at international conferences, thus severely limiting the utility of such conferences for information transfer. Even when they do attend international conferences, they seldom provide printed copies or present the details needed to fully understand their work. They also hardly ever discuss their failures or problems in these formal settings. This reticence

seems to be part of the scientific tradition in the Soviet Union wherein only the most complete work is discussed outside the local scientific working groups. It has taken establishment of a sense of professional comradery and face to face contact through the exchange program to obtain this valuable information and allow us to avoid any mistakes the Soviets may have made.

2. Without the existence of the formal Agreement, few U.S. scientists would be able to visit Soviet laboratories other than those leading scientists invited personally by Soviet leaders. Even in this case, it is the USSR who is solely taking the initiative while the U.S. can only accept or refuse the invitation. As a result, the visits would concentrate on their interests rather than on ours.

3. The Soviets do not publish widely in international journals, and when they do, their papers tend to be late and lacking in the technical details which are necessary to directly use or reproduce their work.

4. As a practical matter, most U.S. scientists are not able to read the original Soviet papers when they are available since they are generally printed in Russian and our routine translation capability is limited. However, as a result of contacts and discussions conducted face to face during the exchanges, our scientists become aware of important documents and then invest the time and money to have them translated.

5. It is also pertinent to note that, as a result of interactions during the exchanges, the Soviets act as a powerful goad and quality control check for the U.S. program. This function would almost totally disappear without the exchange.

V. Assessment

The magnetic fusion energy research program in the Soviet Union is roughly the same size as the U.S. program and is in general as advanced. The Soviet program is primarily focused on development of the tokamak confinement concept; however, parallel efforts on the tandem mirror and stellarator concepts are also under way. Their program is particularly strong in its theory innovativeness and its large personnel resources. Its main weaknesses are its limitations in computing capability and its lack of focus toward development of a practical application. To the degree that a fusion application focus exists, it appears to be toward development of fusion/fission hybrids in support of the Soviet fission program.

Although the U.S. program is generally considered to be the world leader, the Soviet fusion program has contributed substantially to the U.S. fusion development effort in the past and continues to do so. The personnel exchange between the U.S. and the USSR is the primary mechanism through which the U.S. obtains benefits from the Soviet program due to the travel, access and document availability problems discussed above. A renewal of

the US/Soviet Atomic Energy Agreement would allow the U.S. fusion program to continue to obtain information from the Soviet fusion program as we have in the past.

The degree of cooperativeness of the Soviets in conducting this exchange has varied through the life of the exchange. In general, the technical representatives of the Soviet program have been open and cooperative throughout. However, in a few instances prior to the invasion of Afghanistan, the administrative representatives were unwilling to freely share information in certain areas, all relating to technology. Since the restart of the exchange in 1982, the Soviet and U.S. fusion programs have, at U.S. initiative, limited the exchange to science topics and that technology directly related to science experiments. The result has been open and cooperative relations with all of the Soviets involved in the exchange process.

As stated previously, the US/Soviet bilateral exchanges are the primary mechanism whereby the U.S. fusion program obtains information concerning the Soviet program. The information transfer occurs both directly during the exchanges and as informal sharing of information during follow-up correspondence with contacts made during the exchanges.

While we have no direct statements from the Soviets to establish the importance they place on the exchange, there are several indirect indications that they find it valuable. First, they regularly send senior technical members of their program on the exchanges, and while in the U.S., these individuals expend far more energy in conducting exchange activities than they would if they didn't find the exchanges useful. Second, the Soviets have routinely proposed more exchanges than the U.S. and seem genuinely disappointed when we hold the number of exchanges down. Last, as a measure of an increasing sense of importance, the number of instances of administrative problems with the exchanges has dropped to essentially zero in 1982.

VI. Recommendation

The Soviet fusion program is a large, vigorous, centralized effort with capable personnel and experimental devices which can significantly add to or complement the information available from our own program. The US/Soviet fusion personnel exchange is the primary mechanism with which we can obtain this valuable information.

An objective measure of the value of the US/Soviet fusion exchange is given by the examples listed earlier in this paper of information made available to our program by the Soviets. An equally important, subjective measure of the value is the change in the attitudes of the U.S. scientists toward the exchange. On a technical basis, interest in the Soviet exchange was high in the mid-to-late 1970's, but had dropped significantly by 1980 when the hiatus in the exchange occurred. As a result, when the exchange was restarted in 1982, U.S. scientists were somewhat skeptical of the value of their participation. Their attitudes after conducting the exchanges have, with rare exception, been that the exchanges were worthwhile and should be continued.

It is the position of the Office of Fusion Energy that failure to continue the exchange would definitely be a detriment to the U.S. fusion program. We recommend that the parts of the US/USSR Atomic Energy Agreement that are applicable to the magnetic fusion program be renewed or extended for an additional ten years.

VII. Statistical Summary

A. Visits and Assignments

1. Short Term and Long Term -

Calendar Year	No. of Trips from US	Man-Weeks from US	No. of Trips from USSR	Man-Weeks from USSR
1973	This exchange started in 1974.			
1974	36	68	14	44
1975	30	129	27	127
1976	51	191	29	142
1977	49	132	45	130
1978	52	83*	28	72*
1979	33	76*	31	119*
1980	0	0	0	0
1981	0	0	0	0
1982	15	24	21	42

*Estimates from incomplete files.

2. Long Term - The long term exchanges are listed above with the short term exchanges since our records are not complete enough to separate them. In general, no more than one long term exchange per year occurred.

3. Project - None.

B. Publications - There may be a few jointly authored papers which resulted from this exchange activity, but we have not kept any record of them. We know of no papers authored by either U.S. or Soviet personnel which are attributed to the exchange, although doubtlessly information from the exchange has influenced and contributed to papers written in the U.S.

C. Major Meetings - No major meetings have been organized through this exchange.

Background and Recommendation

US/USSR Atomic Energy Agreement Extension

US/USSR Joint Committee on Cooperation - Fundamental Properties of Matter (JCC-FPM)

I. Objective

Objectives pursued under the JCC-FPM are exchanges of experience and cooperative efforts in basic physics research. The rationale is that maintaining contact with Soviet scientists and jointly pursuing basic knowledge is of benefit to the U.S. Exchanges between the U.S. and the U.S.S.R. have proceeded since 1959. The US/USSR Joint Committee on Cooperation - Fundamental Properties of Matter (JCC-FPM) was established on December 5, 1975, during the third meeting of the US/USSR Joint Committee on Cooperation in The Field of Peaceful Uses of Atomic Energy. This Agreement remains in force until June 1983. However, its possible nonrenewal need not affect the validity of implementing protocols and existing contracts between interested organizations and institutions of the two countries as the Agreement permits their survival beyond its expiration.

II. Program Description

Under the guidance of the US/USSR JCC-FPM, cooperative projects have covered the following kinds of activities in the fields of high energy physics, nuclear physics, and accelerator-related materials sciences: visits by individual scientists and groups to laboratories and universities; conferences and workshops on specialized topics by theorists and experimentalists; experiments, principally at major accelerator laboratories; and research and development activities on accelerator physics and detectors.

The normal mode of operation of the US/USSR JCC-FPM has been to meet alternatley in the U.S. and the U.S.S.R. at intervals of about a year. A signed record of the meeting has included an agreed-upon Program of Cooperation for the coming year. New programs arising during the year were agreed upon by communication between the U.S. and U.S.S.R. Cochairmen. Since the Soviets move into Afghanistan and the subsequent development of a new State Department initiated U.S. guidelines, there have been fewer cooperative activities. However, the framework of cooperation has been intentionally maintained for exchange activities of substantial benefit to the U.S. The 1981 and 1982 cooperative efforts have proceeded according to the agreed-upon program of December 1980.

The fifth planning meeting for the CY 1982 joint program was held at Stanford Linear Accelerator Center (SLAC) in February 1982 with the U.S. delegation operating under Post-Afghanistan and Post-Poland guidelines. Under U.S. guidelines the U.S. was able to discuss proposed plans for 1982 but was not able to sign an agreed-upon plan, and was able to have each activity continue on a case-by-case basis. The Soviets expressed unhappiness with this new U.S. position and pointed out its difficulties in committing resources to projects subject to U.S. review and cancellation. However, since that meeting, the Soviet Union has exported equipment to the U.S. for cooperative experiments.

The sixth planning meeting for the CY 1983 joint program is being planned by both the U.S. and U.S.S.R. Governments to be held in Russia during April 1983. This time, the U.S. delegation is expected to be authorized to sign an agreed-upon Program of Cooperation, again restricted to the continuation of ongoing activities, with the provision that individual items are subject to U.S. Government approval on a case-by-case basis.

III. Level of Effort

The majority of the 21 CY 1981 programs were active with 4 items postponed and 2 inactive. Of the 18 items continuing into CY 1982, 10 were active, 3 postponed, and 5 inactive. Funding arrangements are: for exchanges involving Soviet Academy of Science institutions, receiving side pays local costs on a reciprocal basis; for exchanges involving the Soviet State Committee on Atomic Energy institutions, sending side pays. Estimated costs to the U.S. for JCC-FPM activities is $80,000 per year.

IV. Benefits

The US/USSR Cooperative Exchange Program on Fundamental Properties of Matter has served to keep open valuable channels of communication with the Soviet High-Energy and Nuclear-Physics communities. It should be noted that exchanges are possible without any such program; however, the formal program has helped very much to pave the way for reciprocal exchanges. The Committee meetings serve both to coordinate and regulate these exchanges and have greatly helped U.S. scientists gain access to Soviet laboratories. They are also an official channel through which the U.S. and the U.S.S.R. can communicate policy and operational concerns. Because a number of the U.S.S.R. high-energy physicists tend to be prominent, these channels may have added importance.

Technical benefits to the U.S. under this program are substantial in areas where the Soviets excel. These areas include accelerator R&D, instrumentation (detector) R&D, and theoretical physics. These areas are generally conceptual in nature; and, indeed, Soviet scientists are very capable of having very good and innovative ideas. In addition, the U.S.S.R. has initiated construction of a very big superconducting proton accelerator, UNK, which will be capable of reaching energies of 3 TeV by about 1990. Access to the unique capabilities of this fixed target accelerator may be sought by U.S. scientists who wish to do experiments in this energy range, and some physics benefits to the U.S. would be anticipated, including new discoveries.

Soviet scientists participating in experiments in the U.S. make up the vast bulk of the US/USSR exchanges, there being very little traffic the other way at this time (the ratio is about 5/1 in man-weeks). They bring with them on occasion instruments (accelerator and detector components) designed and built in the U.S.S.R. These contributions have been valuable to accelerator R&D and experimentation, but it should be noted that the U.S. accelerator and experimental program are not dependent on this input. The U.S. in recent years has not transported instrumentation of any signficance to the U.S.S.R. for the purposes of this program.

Specific benefits to the U.S. program include those major responsibilities actually assumed by U.S.S.R. collaborators on accelerator/detector components. At Fermilab, for example, there are four projects of particular interest which come under the US/USSR agreements. Each of these was initiated in 1981 or earlier and each has come to a critical point in which the Soviet side must make major new commitments of equipment and effort if these cooperative research projects are to keep to a reasonable schedule. In appropriate order of priority, insofar as scientific benefit to the U.S. side is concerned, these are as follows:

1. Joint effort in creating an antiproton source. This program dates back to 1978 and is a collaboration of Fermilab, Institute of Nuclear Physics (Siberian Academy of Sciences), LBL and U. of Wisconsin. The group in Novosibirsk in 1958 invented the concept of "electron cooling" of charged particle beams in order to decrease phase space and increase beam storage and accumulation capability. They are very much on top of the theory of beam cooling even though the Fermilab project will make use of the CERN version, stochastic cooling. INP is also contributing to the theory of non-linear beam-beam interactions. The INP group has also pioneered in the development of a strong, axially focusing beam optical device, i.e. the lithium lens. Novosibirsk developed, constructed, and delivered a prototype lens and power-supply which has been undergoing tests at Fermilab. The design of a final version of this lens for the Tevatron I antiproton source is complete, and this is being constructed in Novosibirsk. This and other equipment is to be provided by INP. Fermilab estimates the U.S. cost of replicating these devices at $1,500,000. The collaboration is clearly of benefit to the U.S. program in that the Soviets are contributing unique devices and very capable scientists to the TeV I program.

2. Tevatron Experiment E-672: A study of Hadronic Final States produced in association with high transverse momentum jets and high mass di-muons. This is a collaboration of the Institute of High Energy Physics, Serpukhov (IHEP) with scientists from Fermilab, Florida State, George Mason U., U. of Illinois, Indiana U., U. of Maryland and Rutgers U. In accordance with a division of effort worked out by the scientists, IHEP was assigned the task of constructing a large Cerenkov electromagnetic shower detector. The fabrication of lead glass counters is not unique to the Soviet Union but they have developed this technique to a high degree. A great deal of effort will have been devoted to the construction of this large lead glass array. If this were to be built in the U.S., the cost would be approximately $4 million, and the delivery would be such as to extend the date for completion of the detector by at least two years.

3. Research on Polarization Effects - Tevatron experiment E-704, a collaboration with Northwestern U., Rice U., Saclay (Paris), Kyoto (Japan), Argonne National Lab., Lawrence Berkeley Lab., LAPP (France), INFN (Trieste), and IHEP (Serpukhov). Here again this large multinational consortium has been approved to mount a very incisive set of experiments based upon the new polarized proton facility. The Soviet assignment is to produce a lead glass system of 800 pieces complete with photomultipliers, bases, and mechanical support systems. In the U.S., such a system is priced (1980 $) at about $2500 per unit or $2M for the entire array.

4. Studies of Rare Decays and Properties of Charged Hyperons - A collaboration of Fermilab, Yale U., Iowa State and LNPI - Gatchina (Leningrad). The Soviet group is building a transition radiation detector and associated large proportional wire counter system. The utilization of transition radiation is a detection technique which has been developed in the Soviet Union. They are also contributing integrated circuit amplifiers and discriminators which are to be tested at Fermilab. The overall system is major - about 10,000 wires and, in the U.S., this would cost upwards of $1M.

In each of the above programs the Soviet investment is substantial, and the U.S. stands to profit considerably from the activity. There are, of course, several other collaborative programs but these are near completion and do not have the urgency of the above listed four items.

At BNL, the U.S. and Soviet Academy of Sciences Institute for Nuclear Physics-Moscow programs on solar neutrinos have involved only visits and consultations to date. There has been some discussion of the U.S.S.R. supplying some tonnage of pure Chromium and Gallium for future experiments, but this has not reached any decision stage as yet.

At SLAC, cooperation with the Siberian Academy of Sciences - Novobibirsk on electromagnetic radiation experiments and related detector developments has been of benefit to the U.S. program. In particular, the work on detectors originated by Pestov at Novosibirsk, but developed at SLAC, has the promising goal of achieving the best time resolution of any detector.

Of additional technical benefit to the U.S. program are the following accelerator associated items:

1. Radio Frequency Quadrupole (RFQ) - Theoretical and experimental development has proceeded in the U.S.S.R. and has been brought to full practical fruition in the U.S. by LANL. The RFQ represents a major development in low energy accelerator structures.

2. H^- ion source, developed in the U.S.S.R., has become a standard feature in U.S. accelerator technology for injecting high brightness beams into circular accelerators. H^- ion sources also have important application in neutral beam injectors for magnetic fusion energy systems.

Finally, in theoretical physics, the exchange of ideas between top U.S. and Soviet theorists is clearly of benefit to the U.S. program. Okun and Polyakov in particular are much sought featured speakers at large international conferences in high energy physics.

V. Assessment

The U.S. program in Fundamental Properties of Matter does derive direct benefit from cooperative exchanges with the U.S.S.R. The most important long term benefits include the conceptual ideas obtained through those exchanges, and keeping open the formal channels of communication.

VI. Recommendation

It is recommended that the JCC-FPM exchanges be allowed to continue.

VII. Statistical Summary (Estimated)

	Scientists From U.S.	Man Weeks	Scientists From USSR	Man Weeks
A. Short Term				
1976	NA	NA	NA	NA
1977	NA	NA	NA	NA
1978	NA	NA	NA	NA
1979	NA	NA	NA	NA
1980	8	8	6	23
1981	5	13	32	130
1982	3	6	36	55
Long Term				
1976	NA	NA	NA	NA
1977	NA	NA	NA	NA
1978	NA	NA	NA	NA
1979	NA	NA	NA	NA
1980	2	58	6	215
1981	2	26	7	110
1982	2	18	10	248

B. Joint Publications	
1976	NA
1977	NA
1978	NA
1979	NA
1980	NA
1981	20
1982	8
C. Workshops & Conferences	
1976	NA
1977	1
1978	0
1979	2
1980	1
1981	1
1982	0

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(7-79)

U.S. DEPARTMENT OF ENERGY

memorandum

DATE: MAR 24 1983

REPLY TO ATTN OF: NE-75

SUBJECT: USDOE/USSR Cooperation in the Liquid Metal Fast Breeder Reactor (LMFBR)

TO: John Metzler, Program Analyst
International Energy Cooperation, IA-22

The following is a review of, and recommendation on, the subject cooperative agreement:

I. Objective

The objective as stated in the Protocol on Cooperation is "Cooperation in the development of fast breeder reactors will be directed toward finding solutions to mutually agreed upon basic and applied problems connected with the design, development, construction, and operation of nuclear powerplants utilizing fast breeder reactors."

II. Program Description

The cooperative agreement originally enacted by a Protocol signed October 8, 1974, based on the June 21, 1973 Nixon/Brezhnev Agreement, was coordinated by a Joint Coordinating Committee.

Joint activities were in five areas:

(1) Joint seminars.
(2) Specialists meetings.
(3) Exchange and test of structural materials.
(4) Direct exchange of information.
(5) Exploratory exchanges on the test of a U.S. Steam Generator in the USSR BN-350 reactor plant.

The first two were ad hoc exchanges of papers and discussions of papers. Seminar emphasis was on the development of the LMFBR Steam Generators. Fuel clad materials were exchanged for test of U.S. clad in the Soviet BOR-60 and the USSR clad in EBR-II. Final tests are yet to be exchanged--now in abeyance.

The results of tests of exchanged steam generators materials and other materials were discussed at the Tampa Steam Generator Seminar in October 1978.

The exploratory exchanges on the possibility of testing a U.S. Steam Generator in BN-350 were terminated in 1978.

There has been no exchange of personnel.

III. Level of Effort

The level of activities during the 1974-1979 period consisted primarily of technical information exchanged by means of the seminars. Cooperative efforts came to a virtual standstill following the Soviet invasion of Afhganistan in 1979.

The LMFBR agreement calls for each party to pay its own expenses. Expenses are primarily associated with seminar preparation and translation costs, estimated at about $100,000 per year during the 5-year period of activity.

IV. Benefits

There have been no apparent direct monies saved in the United States LMFBR development program as a result of the exchange agreement and no apparent direct impacts on U.S. programmatic decisions. Soviet seminar papers, though general in nature, provided an exploratory base on which to pursue more specific interchanges. The principal benefit has been to maintain an awareness of technological advances in the Soviet Union. The nonscientific/technical benefits are difficult to assess. We are not aware of any semi-official channels of communication that have been established.

V. Assessment

U.S. awareness, understanding, appreciation, and knowledge of Soviet LMFBR program increased by a large order from 1974 to 1980, based mainly on the exchange program.

The LMFBR exchange was considered a top priority by the Soviets. It gave them access to U.S. design, development, construction, and operation practices that contain high quality assurance as compared to Soviet quality assurance practices.

VI. Recommendations

Inasmuch as the Soviets now operate two of the world's largest LMFBR's (BN-350 and BN-600), access to which could benefit the U.S. LMFBR program, we would, in the absence of foreign policy considerations, recommend renewing the cooperative agreement and continuing the exchange. A renegotiated agreement should, however, contain precise terms and conditions that would ensure an equitable exchange of information.

VII. Statistical Summary

Since 1974 there have been nine seminars with the USSR. These 1-week meetings have been equally divided between the United States and the USSR.

Short term visits - man-weeks

	From U.S.	From USSR
1974	18	10
1975	22	9
1976	21	12
1977	-	8
1978	5	19
1979	24	6
	90	64

Publications

Exchanged about 100 papers each, none jointly authored - mainly at seminars.

Frank Pilsbury (acting)

Sol Rosen, Director
Division of International Programs
Office of Support Programs
Office of Nuclear Energy

TREATIES AND OTHER INTERNATIONAL ACTS SERIES 7655

ATOMIC ENERGY

Scientific and Technical Cooperation for Peaceful Uses

Agreement Between the
UNITED STATES OF AMERICA
and the UNION OF
SOVIET SOCIALIST REPUBLICS

Signed at Washington June 21, 1973

UNION OF SOVIET SOCIALIST REPUBLICS

Atomic Energy: Scientific and Technical Cooperation for Peaceful Uses

Agreement signed at Washington June 21, 1973;
Entered into force June 21, 1973.

AGREEMENT BETWEEN
THE UNITED STATES OF AMERICA AND
THE UNION OF SOVIET SOCIALIST REPUBLICS
ON SCIENTIFIC AND TECHNICAL COOPERATION
IN THE FIELD OF PEACEFUL USES OF ATOMIC ENERGY

The United States of America and the Union of Soviet Socialist Republics;

Attaching great importance to the problem of satisfying the rapidly growing energy demands in both countries as well as in other countries of the world;

Desiring to combine the efforts of both countries toward the solution of this problem through the development of highly efficient energy sources;

Recognizing that solutions to this problem may be found in more rapid development of certain nuclear technologies already under study, such as controlled thermonuclear fusion and fast breeder reactors, as well as in additional basic research on the fundamental properties of matter;

Noting with satisfaction the successful results of previous cooperation between the Parties in the field of peaceful uses of atomic energy;

Wishing to establish a more stable and long-term basis for cooperation in this field for the benefit of both their peoples and of all mankind;

In accordance with and in further development of the Agreement between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in the Fields of Science and Technology of May 24, 1972; [1] the Memorandum on Cooperation in the Peaceful Uses of Atomic Energy of September 28, 1972 between the U. S. Atomic Energy Commission and the USSR State Committee for the Utilization of Atomic Energy; [2] and the General Agreement between the United States of America and the Union of Soviet Socialist Republics on Contacts, Exchanges and Cooperation of June 19, 1973; [3]

Have agreed as follows:

ARTICLE 1

The Parties will expand and strengthen their cooperation in research, development and utilization of nuclear energy, having as a primary objective the development of new energy sources. This cooperation will be carried out on the basis of mutual benefit, equality and reciprocity.

ARTICLE 2

1. Cooperation will be concentrated in the following three areas:

a. Controlled thermonuclear fusion.

The aim of cooperation in this area is the eventual development of prototype and demonstration-scale thermonuclear reactors. Cooperation may include theoretical, calculational, experimental and design-construction studies at all stages up to industrial-scale operations.

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[1] TIAS 7346; 23 UST 856.
[2] Not printed.
[3] TIAS 7649; 24 UST.

b. Fast breeder reactors.

Cooperation in this area will be directed toward finding solutions to mutually agreed basic and applied problems connected with the design, development, construction and operation of nuclear power plants utilizing fast breeder reactors.

c. Research on the fundamental properties of matter.

Cooperation in this area will include joint theoretical and experimental studies on mutually agreed subjects, and particularly in high, medium and low energy physics, through utilization of accelerators, data processing equipment and other facilities of the two countries. Cooperation may also be undertaken on the design, planning and construction of joint facilities to be used in this area of research.

2. Further details of cooperation in each of these three areas will be arranged through individual implementing protocols.

3. Other areas of cooperation may be added by mutual agreement.

4. Cooperation under this Agreement shall be in accordance with the laws of the respective countries.

ARTICLE 3

1. Cooperation provided for in the preceding Articles may take the following forms:

a. Establishment of working groups of scientists and engineers for design and execution of joint projects;

b. Joint development and construction of experiments, pilot installations and equipment;

c. Joint work by theoretical and experimental scientists in appropriate research centers of the two countries;

d. Organization of joint consultations, seminars and panels;

e. Exchanges of appropriate instrumentation, equipment and construction materials;

f. Exchanges of scientists and specialists; and

g. Exchanges of scientific and technical information, documentation and results of research.

2. Other forms of cooperation may be added by mutual agreement.

ARTICLE 4

In furtherance of the aims of this Agreement, the Parties will, as appropriate, encourage, facilitate and monitor the development of cooperation and direct contacts between organizations and institutions of the two countries, including the conclusion, as appropriate, of implementing protocols and contracts for carrying out cooperative activities under this Agreement.

ARTICLE 5

1. For the implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy. Meetings will be convened once a year in the United States and the Soviet Union alternately, unless otherwise mutually agreed.

2. The Joint Committee shall take such action as is necessary for effective implementation of this Agreement including, but not limited to, approval of specific projects and programs of cooperation; designation of appropriate participating organizations and institutions responsible for carrying out cooperative activities; and making recommendations, as appropriate, to the two Governments.

3. The Executive Agents of this Agreement shall be, for the United States of America, the U.S. Atomic Energy Commission, and for the Union of Soviet Socialist Republics, the USSR State Committee for the Utilization of Atomic Energy. The Executive Agents, on their respective sides, shall be responsible for the operation of the Joint Committee and shall coordinate and supervise the development and implementation of cooperative activities conducted under this Agreement.

ARTICLE 6

Nothing in this Agreement shall be interpreted to prejudice other agreements concluded between the Parties.

ARTICLE 7

1. This Agreement shall enter into force upon signature and shall remain in force for ten years. It may be modified or extended by mutual agreement of the Parties.

2. The termination of this Agreement shall not affect the validity of implementing protocols and contracts concluded under this Agreement between interested organizations and institutions of the two countries.

DONE at Washington, this 21st day of June, 1973, in duplicate, in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA:	FOR THE UNION OF SOVIET SOCIALIST REPUBLICS:
[1]	[2]
President of the United States of America	General Secretary of the Central Committee, CPSU

[1] Richard Nixon
[2] L. I. Brezhnev

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Cathy

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