APPENDIX—CORRESPONDENCE TO DR. HERMAN T. FRANSSEN, OCEAN AND COASTAL PROJECT, CONGRESSIONAL RESEARCH SERVICE, LIBRARY OF CONGRESS ON U.S.-U.S.S.R. AGREEMENT ON COOPERATION IN STUDIES OF THE WORLD OCEAN

UNIVERSITY OF CALIFORNIA, SAN DIEGO,
La Jolla, Calif., August 11, 1976.

DR. HERMAN T. FRANSSEN,
Ocean and Coastal Resources Project, Congressional Research Service, Library of Congress, Washington, D.C.

DEAR DR. FRANSSEN: I am very pleased to give you my assessment of the US/USSR agreement on oceanography.

As you know, I have a good deal of experience in scientific affairs. I was Assistant Secretary General of NATO involved in many programs of this kind including, incidentally, oceanography and also on other panels of the State Department and the President's Science Advisory Committee involved in such programs.

I consider the current one the most successful that I have ever been involved in. The principal reason is that the leaders on both sides approached the selection of joint research activities with great circumspection with regard to resources available in manpower, money and ships. They entered into no programs they were unable to make progress on—nor did they enter into any programs that the rank and file scientists were not interested in.

It would have been a natural mistake to have done otherwise given the large resources of both countries in this area, and it is to the credit of the delegation leaders on both sides that they didn't make this error.

Sincerely,

WILLIAM A. NIERENBERG,
Director, Scripps Institution of Oceanography.

INSTITUTE FOR MARINE STUDIES HA-35,
UNIVERSITY OF WASHINGTON,
Seattle, Wash., August 16, 1976.

DR. HERMAN FRANSSEN,
Ocean and Coastal Resources Project, Congressional Research Service, Library of Congress, Washington, D.C.

DEAR HERMAN: You asked for my views on the value of the US/USSR Agreement on Cooperation in Studies of the World Ocean and on possible ways whereby it could be made more effective.

In general, such agreements appear to be an inevitable consequence of detente and thus have a symbolical value apart from any practical results. United States and Soviet scientists would undoubtedly find ways to cooperate in scientific projects of mutual interest whether or not such an agreement existed, but the agreement tends to capitalize in a political sense on such cooperation.

The agreement also facilitates such cooperation. This must be particularly true in the Soviet Union where the agreement makes official the kinds of projects that the scientists want to carry out. There are multilateral arrangements, such as the the Intergovernmental Oceanographic Commission, that could theoretically be used to facilitate the execution of joint projects. But in practice, these organizations may be paralysed by developing country politics so that developed countries find it more effective to cooperate through bilateral arrangements.

Some projects—the Deep Sea Drilling Project is a good example—had already achieved USSR participation before the agreement was activated, and it is hard to see how existence of the agreement affected the course of events. On the other hand, Soviet participation in POLYMODE appears to have been facilitated greatly by the agreement. In the Southern Ocean, USA and USSR programs were developing independently, and discussions under the agreement may succeed in bringing these programs together.

Most of the projects now underway as part of the agreement were initiated by the United States. If the Soviet Union were to propose a dramatic new project, response from our side might be slow because of the way research is organized in this country. Unless the U.S. contribution were to come solely from a government laboratory, the process of recruiting interested scientists, developing proposals to funding agencies, getting them safely and quickly through the review process and getting the projects funded might take a long time and the outcome would be in doubt.

Given the nature of the agreement and the activities sponsored under it, it is difficult to suggest how it might be strengthened. Of course, if generous new funding were available for any projects developed under the agreement, it might have much more impact on the conduct of oceanographic research. But this sort of funding is both unlikely and not necessarily desirable since it might tend to break down the proposal and review process that ensures high quality in our scientific endeavors.

Yours sincerely,

WARREN S. WOOSTER.

WOODS HOLE OCEANOGRAPHIC INSTITUTION,
Woods Hole, Mass., August 23, 1976.

DR. HERMAN FRANSSEN,
West Springfield, Va.

DEAR HERMAN: Last week you asked if I would give you some comments on the Joint US/USSR Program on Cooperative Studies of the World Ocean. Also, that if the Program were to be continued, how could it be improved.

As you know, the Program has been going since 1973, and, in my opinion, has done well in this relatively short period considering the formidable problems involved in bringing together two super powers with divergent political inclinations. I believe that physical oceanography and geology, geophysics and geochemistry have done better than other areas. This is in part due to the fact that both countries have large programs of similar interest in these areas.

In physical oceanography there has developed a large cooperative effort in the North Atlantic called POLYMODE, which combines earlier Soviet efforts in a Polygon experiment with similar U.S. efforts in the MODE (mid-ocean dynamic experiment) program. POLYMODE represents a sizable investment in both dollars and people for both countries. The scientific problem of understanding the dynamics of circulation of the deep ocean is of such a nature and size in is amenable to the combined assault by both countries. In fact, without the assistance of the Soviets, it is doubtful if the U.S. would or could mount a program of the magnitude necessary to understand what is happening in the deep ocean. The size of the Soviet contribution to this program is similar to the U.S. effort. In quality, this is an area in which they have good theoretical ability, considerable ship resources, but only moderate instrument capability. Nonetheless, they are fully able to hold up their side of their program and to make significant contributions. In short, we are probably getting as much from them as they are getting from us in this effort.

The geology, geophysics and geochemistry program is somewhat different. There is no single, large program with joint participation. Instead, there are several smaller efforts which involve the study of specific problems or geographical areas. Generally, this entails Soviet participation on U.S. ships and vice versa. There have been more Soviet visitors on U.S. ships than the reverse, but this is due to a lack of enthusiasm, in part because of the language barrier, of the U.S. scientists to accept Soviet invitations. However, some important exchanges have taken place where U.S. scientists have joined Russian ships in the Sea of Okhotsk. Recently, the U.S. has proposed two fairly large programs concerning the study of the sea floor. The first deals with a study of the lithospheric layer and the second with factors affecting sedimentation. Although the Soviets have agreed in principle to participate in both of these, they have yet to sit down with the U.S. in a planning session to firm up details of a program. In the geophysical area, the U.S. tends to have more strength in instrumentation than the Soviets, but since they are able to procure equipment from Japan and other countries, they do not lag us by far.

One problem common to all of the programs in the joint study of the world ocean is communications—or lack of it. Letters are not answered promptly by the Soviets and often they do not show up at scheduled meetings. Their ship schedules cannot be relied upon, therefore making it difficult for joint cruises. In spite of these problems, I believe it is worth the effort we put into the program.

The Soviets represent the largest single source of work in oceanography outside the U.S., and this program provides for a reasonable exchange of data.

The joint program is somewhat limited in that the U.S. side is restricted to ongoing programs. That is, no special funds are available for it. If a small sum could be set aside in the U.S. to encourage our scientists to undertake new programs jointly with the Soviets, I believe this might improve greatly the U.S. participation. As it is, everything done now must be within existing budgets and programs, and often the scientist looks at the joint program as a diversion of his resources. If he could definitely see that the joint program would enable him to undertake a program he couldn't otherwise, I am sure this would enhance the U.S. input.

In summary, the first few years of this program have been mildly productive (at no extra cost in the U.S. except for coordination) although much of the time has been utilized in setting up meaningful cooperative arrangements. It would be a pity if this momentum were to be lost by not renewing the original five-year agreement. I see much to be gained and little lost by continuing as is. Perhaps even more could be gained by the U.S. if some "seed money" were available to start new programs.

The Soviets have great strength in oceanography, and it is growing and improving with time. It would be shortsighted on our part not to take avantage of their efforts through cooperative work. By dropping out of the joint program, it is conceivable we could also lose our access to the large amount of data and science they produce.

I hope these rather rambling comments on the joint US/USSR program to study the world ocean are of use to you. My best personal regards.

Sincerely,

ARTHUR E. MAXWELL.

DUKE UNIVERSITY MARINE LABORATORY
Beaufort, N.C., September 2, 1976.

MR. H. P. FRANSSEN,
Ocean and Coastal Resources Project, Congressional Research Service, Library of Congress, Washington, D.C.

DEAR MR. FRANSSEN: I am very pleased to have the opportunity to comment on portions of the U.S.–U.S.S.R. Cooperative Programs in Science. My own background of involvement with the Soviet scientists goes back to the Second International Oceanographic Congress, Moscow, 1966. For approximately 10 days the Congress provided me with an opportunity to meet and talk with Soviet scientists involved in a variety of aspects of the marine sciences and the subsequent "post-Congress tour," involving visits to a number of facilities on the Black Sea, expanded my understanding of the Soviet system and my circle of acquaintances within the Soviet Union. I have maintained contact with a number of these scientists and in 1974 I was invited to tour four major marine science facilities in the Soviet Union as a guest of the Soviet Academy of Sciences. This visit of 21 days included a period of time at the Far Eastern Institute of Marine Biology, Nadhodka, The Institute for Limnology at Lake Baikal, The Institute of Oceanology, Moscow, and the Institute of Zoology, Leningrad. On my return from this visit I was appointed to serve as one of a seven man U.S. working party with the program "Biological Productivity and Biochemistry of the World's Oceans". In this capacity I returned to Moscow for a joint meeting with the Soviet working group in December of 1974 and was involved in the development of the general program, the protocol, etc. In November of 1975 I served as organizer and host for a workshop which fell within the subprogram "Ecology of Fouling Communities", involving participation by five Soviet scientists, and in May of 1976 the Duke University Marine Laboratory again served as the site for the second meeting of the joint working parties, this time involving four Soviet scientists. I am anticipating an invitation for the return workshop under "Ecology of Fouling Communities", scheduled for Leningrad, U.S.S.R., the last week in November 1976 and, barring unforeseen events, the U.S. working party will plan to go to the Soviet Union in January or February of 1977 for our next joint meeting.

From this involvement, both with the Soviet scientific community and as a member of the U.S. working party, I have developed rather definite thoughts concerning several aspects of the effort.

There is no doubt in my mind that the program as presently organized will make a very definite contribution to a better understanding between the U.S. and the Soviet scientific communities. It will provide for a number of scientists the first real opportunity to be engaged in exchange visits within the two countries and also an opportunity to acquire a first-hand impression of the quality of science, the mechanisms which are involved in the management of science, and facilities which are available for the conduct of science within the general framework of oceanology and marine biology. Thus far participation has been quite limited and all too frequently restricted to individuals within agencies of the Federal government who are involved solely with the management of science as opposed to its conduct. Very few members of the U.S. scientific community per se are at present involved, especially those who are younger, but the general plan and organization within the section that I am involved with should provide better opportunities for active participation by individuals within the scientific community as the program progresses. For example, at the November 1975 workshop here, approximately 21 U.S. scientists had numerous opportunities to talk personally with the five participating Soviet scientists and the distribution of the published proceedings, to be in both English and Russian, should further identify for interested individuals in both scientific communities their counterparts and the types of research which are currently underway and planned. In November of 1976 eight U.S. scientists will hope to participate with approximately 30 Soviet scientists in Leningrad and presumably this will offer additional opportunities for first-hand communication. One of the main objectives of the Leningrad workshop will be to permit those individuals who met here in November of 1975 to meet again, consider in greater detail plans for cooperative research in either the U.S. or the Soviet Union, and make more specific plans for involvement during 1977, 1978, and 1979. As a result of the November 1975 workshop, four Soviet scientists are already making plans to become involved in cooperative research here at the Duke University Marine Laboratory in the summer of 1977. By expansion of this type of person-to-person communication, I sincerely believe that we will see a very definite increase in the involvement and, hopefully, far greater input and productivity in terms of the science under consideration. It should be remembered, however, that we cannot expect the same rate of progress with our Soviet colleagues as we might legitimately expect in a similar program involving scientists from, let us say, Great Britain! For most of the involved scientists it is their first "face-to-face" meeting with scientists from the other country and after 50 years of total isolation, it would be ludicrous to expect the same sort of rapport, trust, and cultural understanding that we could legitimately expect from scientists in many of the countries of the western world.

In spite of the fact that I feel that the program is progressing and will eventually show concrete and positive results, there are a number of aspects which I have continued to criticize, beginning with my letter to President Philip Handler, U.S. Academy of Sciences, March 1975. We continue to encounter a number of extremely frustrating situations with out Soviet counterparts, in part because of their own philosophy, mechanisms for communication, and inexperience. I have very little hope to change many of these within the near future but will continue to hope that continued involvement with scientific communities outside of the Soviet Union will point out some of the fallacies and inadequacies of their own system. It is the inadequacies within the U.S. system that trouble me most since I still feel that some of these can and should be changed. In general, these inadequacies fall into several convenient categories: representation, organization, continuity, interprogram relationships, and financial support.

Within the realm of "representation", I feel that it is most unfortunate that the entire program is run by some number of "lead agencies" directly representing agencies of the Federal government. To my knowledge the U.S. Academy of Sciences is not represented in any way and I feel that this was a most unfortunate oversight. For years, in some cases well before several of the existing and actively involved U.S. government agencies even existed, the U.S. Academy of Sciences has had some number of cooperative exchange programs with the Soviet Academy of Sciences and is quite knowledgeable about some of the idiosyncrasies which have thus far plagued our present relationship with Soviet groups and individuals. I can easily understand the philosophy of having involvement by U.S. government agencies, if only because it would normally be assumed that these agencies represented a direct source of potential financial support within a particular scientific discipline. As I will indicate later, however, this particular justification is totally irrelevant. Thus far major and active involvement on the part of the Soviet

scientific community has been through the Soviet Academy of Sciences with some involvement on the part of VNIRO, the all Soviet marine fisheries group. From conversations with a number of the Soviet participants it has become apparent that they do not understand why, in their own dealings with the U.S. government, the U.S. Academy of Sciences has been omitted. I feel that it would have been highly desirable to have some direct involvement by the U.S. Academy, if only to assure that the experience which they have would be available and to effect a better line of communications between the Soviet scientists representing the Soviet Academy of Sciences. Another problem with representation has been that thus far there is relatively little involvement on the part of the U.S. scientific community and very little general information concerning the program has been made available to the U.S. scientific community. If we are truly interested in encouraging the development of cooperative research programs within the disciplines involved, we will have to improve the lines of communication and encourage younger scientific workers to become aware of areas in which they would have potential interest.

Within the category of "organization", it is difficult to know where to begin! Within the program "Biological Productivity and Biochemistry of the World's Oceans", the working party has yet to have an active chairman and the "senior U.S. delegate", of which we have now had two within two years, has on occasion demonstrated little interest or previous working knowledge insofar as a U.S.-Soviet program is concerned. Within the two year period of the program we have had two staff members, both representatives of NOAA, and whatever progress may have been made can certainly be attributed to the active involvement and sincere interest of these two staff members. It is my understanding that because of pending reorganization within NMFS (NOAA) our present coordinator, who has made a very sincere effort to improve a number of aspects of the program, may well be replaced by still a third person who must start all over again in becoming familiar with the individual working party members and the program which they have developed. An example of the weakness of the organization would be the fact that prior to the December 1974 joint meeting in Moscow, the U.S. working party did not even "caucus" and we arrived with virtually no understanding of what the U.S. "policy" was to be, any individual areas for which we would be responsible, or any briefing on logistics, general protocol, etc. While in Moscow, in part perhaps because of the fact that a vacancy existed in the office of the Scientific Attache, U.S. Embassy, we had no contact whatsoever with professional diplomats or others who are presumed to have some working knowledge of the details of dealing with the Soviet scientific community.

In the third category, "continuity", I have already touched on the fact that there has been very little effort to maintain a "team" for the entire five year period that the program is intended to run. The frequent changes in leadership and staff personnel has made it extremely difficult and far more complicated than was necessary.

Within the nine programs which I understand have been planned, two pertain, in one way or another, to the marine sciences: the one with which I am involved, "Biological Productivity and Biochemistry of the World's Oceans" and a second which is concerned with pollution in the marine environment. Thus far, in spite of suggestions on several occasions, it has been virtually impossible to convince anyone of the need for a joint meeting between the two U.S. working parties who are involved in these programs. From conversations with associates who are involved with the program on marine pollution it is apparent that the one working party is assuming that the other is doing a variety of things, frequently erroneously, and it is highly conceivable that we are overlooking a number of areas where cooperation between the two groups could be most productive. Presumably, if such areas occur, it would be appropriate for the U.S. to recommend cooperative areas between all of the working groups and efforts could be made to develop specific programs that logically fall within the interface which exists.

The most obvious deficiency within the entire program falls in the realm of "financial support". From the beginning we have been told that separate funds were not available for any aspect of the program, even in terms of providing financial reimbursement for the members of the working party to enable them to participate in meetings in this country as well as in the Soviet Union. Much to my amazement one member of the U.S. working party participated in the Moscow 1974 December meeting and then found that there was still some doubt as to whether his expenses would be reimbursed. It was only in May of 1976 that we arrived at some reasonable understanding concerning the responsibility of the

lead agency, NOAA, to provide the minimal financial support to permit the various working party members to meet on occasion in Washington prior to meetings of the joint working parties. Funding for programs which may evolve within the framework of the protocol are totally unsupported, unless one of the involved agencies feels that the area is of sufficient interest to justify its own financial support. For example, the subprogram "Ecology of Fouling Communities" has proven to be of sufficient interest to the U.S. Office of Naval Research that they have undertaken the responsibility of financing the November 1975 workshop in Beaufort, the publication of the proceedings, and involvement by a number of the eight U.S. scientists who expect to participate in the Leningrad, November 1976 workshop. The U.S. Office of Naval Research has indicated that it would expect to provide some support for the development of cooperative research programs and possibly several of the workshops which are planned later in the five year period. I can certainly appreciate the fact that such a program cannot be given a "blank check" but, assuming that the intent behind the development of the original agreement was to further the cause of science and the exchange of scientific information, it would seem only reasonable that the U.S. scientific community should expect moderate financial support to permit them to develop it within the framework which has been provided by their own government! The absence of financial support goes far beyond the immediate needs of the current program! Although a few U.S. scientists may read Russian, a vast majority do not and the current U.S. level of effort in translating the various scientific journals from Russian to English appears to be totally inadequate, primarily because financial support is not available. A large percentage of the Soviet literature is never translated and those journals which are translated become available two or three years after their publication date. During my visit to a number of oceanographic facilities within the Soviet Union I was given between 30 to 40 "recent" publications, just from within the rather limited area of oceanography, and, to my knowledge, not one of these has been translated. If we are to seriously consider an expanded effort leading to cooperative research programs with the scientists of the Soviet Union, I feel that it is essential to develop a far larger and more efficient system of translation and publication of the Soviet journals involved within the English language.

Hopefully this will provide some thoughts on the various ways in which, in my opinion, the present U.S.-U.S.S.R. program could be improved. I wish to emphasize, however that in spite of my critical remarks, I feel that this initial effort is a most worthwhile one! I sincerely hope that at the end of our present five year effort we can give serious thought to another five year program which hopefully will represent a "second level" of involvement and that in time we will be able to look back at this period as one of the more important periods in history insofar as truly cooperative research within the world's oceans is concerned. If you should have questions concerning any aspects of my remarks, please do not hesitate to write or call. With best regards.

Sincerely,

JOHN D. COSTLOW,
Director.

CHAPTER III—U.S.-U.S.S.R. AGREEMENT FOR COOPERATION IN ATOMIC ENERGY*

The agreement for cooperation in atomic energy between the Soviet Union and the United States is a pragmatic solution to a perplexing problem of international relations between these adversary nations. The problem was to achieve some exchange of information on atomic energy both for possible benefit to the U.S. nuclear industry and to better inform the Government of Soviet development in use of this energy source. By the early 1950's, many U.S. nuclear scientists and engineers were intensely curious about announced Soviet nuclear progress. Although Congress in 1954 had opened the way for international cooperation in civil nuclear energy, its conditions precluded such cooperation in civil nuclear energy with the U.S.S.R. So how was some kind of cooperation and exchange of information on atomic energy to be accomplished?

The pragmatic solution initially took the form of visits and culminated in a bilateral agreement of 1973 for cooperation in atomic energy. The mutual interests in atomic energy of the United States and the Soviet Union during the past two decades was strong enough to permit their scientists and engineers to explore opportunities for cooperation in peaceful uses of the nuclear sciences that also supported their strategic nuclear arms.

The purpose of this essay is to provide some information about nuclear energy in the Soviet Union; to describe the agreement itself and its history; to indicate some experience with the agreement; and to compare the agreement with other agreements for cooperation in nuclear energy separately authorized by Congress. It concludes with some observations and identification of matters of likely interest to Congress.

Nuclear Energy in the Soviet Union

Soviet nuclear power has evolved differently than in the United States. Soviet emphasis has been upon commercial use of light-water reactors for generation of electricity, with long-term development of the breeder and its implied use of plutonium as a nuclear fuel.

At a time when the U.S. nuclear industry is in the doldrums, the Soviet nuclear industry appears poised for substantial expansion. Unlike the situation in the United States, in the Soviet Union nuclear powerplants are considered safe enough to be placed near enough to large cities for the waste heat to be used for district heating.[1]

In these circumstances, the Soviet nuclear industry probably is more interested in information and experience from the U.S. nuclear industry than vice versa. One exception is U.S. interest in Soviet development of breeder reactors.

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*Prepared by Warren H. Donnelly, senior specialist and Donna S. Kramer, research assistant, Environment and Resources Policy Division, Congressional Research Service.

[1] A. M. Petrosyants. From scientific search to atomic industry. Modern problems of atomic science and technology in the U.S.S.R. Danville, Ill.: The Interstate Printers and Publishers, Inc., 1974, p. 228.

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THE SOVIET NUCLEAR POWER PROGRAM

Nuclear energy has been given increasing attention in the Soviet Union as an alternative to oil and gas to meet growing demands for electricity in European Russia.

The Soviet Union claims credit for the first nuclear powerplant in the world. A. M. Petrosyants, Chairman, U.S.S.R. State Committee on Use of Atomic Energy, points out that at the end of June 1954, the Mosehnergo power system was supplied with electricity from a 5,000 kilowatt nuclear powerplant in Obninsk. This small nuclear powerplant opened a new era in the Soviet power industry.

In 1970, the Soviet Union produced 3.5 billion kilowatt-hours from its nuclear plants, which was less than 1 percent of the total output. On the other hand, 11 percent of the new electrical generating capacity scheduled for the ninth 5-year plan (1971–75) year was nuclear.

In 1976, the Soviet Union had 16 operating nuclear power reactors with a combined electrical output of 5,216 megawatts and 28 more under construction, with a total electrical output of 26,380 megawatts. Details appear in table I.

The most recent information on Soviet intentions for nuclear power appears in Business Week of August 2, 1976. Here, Soviet plans are decribed for a mammoth factory, "Atommash," to mass produce nuclear powerplants of 1,000 megawatts electrical generating capacity at the rate of 3 to 4 a year. Eventually Atommash also would mass produce breeder reactors. If this plan works, nuclear power would dominate Soviet electricity generation by the end of the century.

TABLE I.—NUCLEAR POWER REACTORS IN THE SOVIET UNION IN 1975

Name of atomic powerplant	Location	Reactor type[1]	Station generating capacity (megawatts)	Year of operation
Obninsk APS	Kaluga region	Graph-H2O	5.0	1954
Obninsk BR5	Kaluga	FBR	12.0	1959
Troitsk	Siberia	Graph-H2O	600.0	1958–64
NS Lenin	do	PWR		1958
Melekess ARBUS	Ulyanovsk	ORM	0.5	1963
Beloyarsk 1	Near Sverdlovsk	Graph-BWR	100.0	1964
Novo Voronezh 1	Voronezh	PWR	196.0	1964
Melekess VK50	Ulyanovsk	BWR	70.0	1966
Beloyarsk 2	Near Sverdlovsk	Graph-BWR	200.0	1968
Novo Voronezh 2	Voronezh	PWR	365.0	1969
Melekess BOR60	Ug	FBR	12.0	
Novo Voronezh 3 and 4	Voronezh	PWR	820.0	1971
Shevchenko BN350	Mangyshalk Peninsula	FBR	350.0	1973
Kola 1 and 2	Murmansk	PWR	820.0	
Billbin (Chukota)	do	BWR	48.0	
Novo Voronezh 5	Voronezh	PWR	1,000.0	
Leningrad 1	Leningrad	PWR	1,000.0	1974
BN 600	Urals	FBR	600.0	1973
Armenia 1 and 2	do	PWR	880.0	
Kursk 1	do	PWR	1,000.0	1976
Leningrad 2	Leningrad	PWR	1,000.0	1975
Kursk 2	do	PWR	1,000.0	
Smolensk 1 and 2	do	Graph-BWR 2	2,000.0	
Chernobyl 1 and 2	do	Graph-BWR 2	2,000.0	
West Ukraine 1 and 2	do	PWR	880.0	

[1] Graph-H2O=graphite-moderated, water cooled; FBR=fast breeder reactor; PWR=pressurized water reactor; OMR=organic moderated reactor; BWR=boiling water reactor; Graph-BWR=graphite-moderated, boiling water reactor.

Source: Nuclear Engineering International, April Supplement, April 1976, p. 26.

Possible Soviet interest in imported nuclear powerplants and technology is suggested in a CIA research report which noted U.S.S.R. interest in Western assistance.[2] The Soviets reportedly have negotiated with West Germany to buy up to four nuclear power stations of 1,300 megawatt generating capacity each, to be paid for by electricity sent back to Germany.[3] Also, in 1975, the Soviets reportedly negotiated with a French nuclear company to buy six nuclear powerplants each of 900 megawatts generating capacity.[4] The Soviets also reportedly requested that Japan supply equipment for a large nuclear powerplant on the Sakhalin Island and submitted proposals to the United Kingdom for nuclear cooperation, including possible Soviet purchase of British nuclear equipment.[5] While none of these arrangements have been completed, they are an indiciation of Soviet interest in foreign nuclear power technology and equipment.

In 1974, Soviet Academician V. A. Kirillin, Deputy Chairman of Council of Ministers of the U.S.S.R. and Chairman of the State Committee for Science and Technology, presented an optimistic outlook for nuclear power. He saw nuclear power as an important means for developing the production of power and the national economy as a whole for almost all countries, especially for those countries without sufficient resources of fossil fuels.[6] Kirillin claimed that its light water and graphite power reactors will have wide application because of reliability, simplicity in design and control, and slightly lower capital costs in comparison with other types of power reactors. Also, their graphite-type reactor is an effective producer of plutonium to fuel future breeder reactors.

Unlike the United States, the Soviet Union sees a clear future for production and use of plutonium as a nuclear fuel and plans to emphasize development of the breeder reactor and reprocessing of nuclear fuels to recover plutonium. Petrosyants wrote in 1974 that the first nuclear powerplants would be operated to supply base-load electricity and to produce plutonium for breeders.[7] The breeders would gradually increase in number and take over the base-load generation, and present-type reactors would be transferred for a half-peak operation.

The Era of No Cooperation in Atomic Energy

The Atomic Energy Act of 1946 was written to keep the secret of the atom bomb. In the interests of secrecy, it terminated all U.S. nuclear cooperation with its allies and prohibited cooperation in industrial use of atomic energy, but permitted dissemination of scientific and technical information relating to atomic energy. Subsequently, Congress amended the act in 1951 to permit the AEC to enter into specific arrangements for communication to other nations of information on refining, purification and treatment of source materials; reactor development, production of fissionable material and research and development if four conditions were met. One condition barred such an arrangement with any nation threatening

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[2] U.S. Central Intelligence Agency. Research aid. Soviet long-range energy forecasts. September 1975. Rept. A (ER) 75-71, p. 21.
[3] New York Times, Jan. 15, 1975, p. 27.
[4] Nucleonics Week, Mar. 6, 1975, p. 2.
[5] Financial Times, Nov. 17, 1974, p. 9.
[6] V. A. Kirillin. The Power Industry of the U.S.S.R.: Its Present and Future. Atom, No. 213, July 1974, p. 169.
[7] Petrosyants, op. cit., p. 222.

the security of the United States. The AEC also had to determine that the proposed arrangement would substantially promote and would not endanger the common defense and security of the United States. These conditions ruled out cooperation with the Soviet Union.

The attempt to prevent the spread of nuclear weapons by secrecy failed. In August 1949, the Soviet Union detonated its first nuclear explosive and in June 1954, the first Soviet nuclear plant began to produce electricity.

By 1953, the policy of restriction and secrecy came under question as some U.S. experts and officials began to worry that other countries might draw ahead of the United States in civil nuclear power and the country would lose its nuclear leadership. Gen. Walter Bedell Smith, as Under Secretary of State, cautioned the Joint Committee on Atomic Energy of the consequences if the Soviet Union were to get ahead of the United States. He said:

> It is of paramount importance to our international relationships generally that the United States maintain and improve its leadership in atomic energy development. It is important, therefore, that we press ahead with the development of nuclear power. There is every reason to believe we will be the first to have nuclear power if we are prepared to move with vigor in this direction. It would be very damaging to the position of the United States if another country were to be first in this field of endeavor, and it would be especially damaging if the Soviet Union were to precede us in the development of atomic power. If this were to happen, the Soviet Union would cite their achievement as proof of their propaganda line that the United States is interested in atomic energy only for destructive purposes while the Soviet Union is interested in developing it for peaceful purposes.[8]

The Era of Cooperation

Congress rewrote the Atomic Energy Act in 1954 to open the way for private development of commercial nuclear power. Reflecting President Eisenhower's call for international cooperation in nuclear energy at the United Nations in December 1953, the act also provided for substantial international cooperation under special agreements. Section 3 of the act authorized a program of international cooperation to promote the common defense and security and to make available to cooperating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit. Section 123 of the act, however, required conditions that precluded such agreements with the Soviet Union.

Origins of U.S.-U.S.S.R. Nuclear Cooperation

Despite the strains and hostility of overall U.S.-U.S.S.R. relations in the 1950's, there was strong mutual interest in nuclear power, and some exchange of information began. The policy of the United States relating to exchanges with the Soviet bloc can be traced to the meeting of the heads of government held in Geneva in July 1955 at the first U.N. international conference on peaceful uses of atomic energy.[9]

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[8] Statement of Walter Bedell Smith in U.S. Congress. Joint Committee on Atomic Energy. Atomic Power Development and Private Enterprise. Hearings before the 83d Cong., 1st sess., 1953, p. 65.

[9] The following description of U.S.-U.S.S.R. nuclear cooperation through 1960 draws heavily upon a report to the Joint Committee on Atomic Energy in 1960 by Robert McKinney. Cf. U.S. Congress. Joint Committee on Atomic Energy. Background material for the review of the international atomic policies and programs of the United States. Report to the 86th Cong., 2d sess., 1960, vol. 4, pp. 1336-1342. (Joint committee print.)

The stated objectives of this policy were:

—To lower the barriers which * * * impeded the interchange of information and ideas between our peoples.

—To lower the barriers which * * * impeded the opportunities of people to travel anywhere in the world for peaceful, friendly purposes, so that all will have a chance to know each other face to face.

—To create conditions which will encourage nations to increase the exchange of peaceful goods throughout the world.

How this policy was to be carried out was left to the Foreign Ministers. Meetings for this purpose began in October 1955. At these meetings, over the following 2 years, the United States proposed a general visit exchange program based on reciprocity, but could not get the Soviet Union to agree. From October 1957 until January 1958, negotiations continued in Washington under the direction of Ambassador William S. B. Lacy for the United States and Ambassador G. N. Zaroubin for the Soviet Union. The result was an agreement on exchanges in the cultural, technical, and educational fields. The objectives of the agreement were the improvement of mutual understanding between the peoples of the two countries, better relations between the two countries, and a lessening of international tensions. Although the proposed exchange projects in science and technology for 1958 and 1959 did not directly mention atomic energy, personnel of the AEC and its contractors participated in many conferences and visitor exchanges. The agreement did provide for exchange of exhibits in peaceful use of atomic energy. A Soviet exhibit was displayed in New York in 1959 and a U.S. exhibit in Moscow in 1959.

In April 1959, the AEC proposed exchange of visits of United States and Soviet scientists in the field of thermonuclear research in such a way that the International Atomic Energy Agency and its members would benefit, as had been proposed by AEC Chairman McCone to the IAEA's Third General Conference in September 1958. The idea was informally explored in Vienna in May 1959 by Dr. I. I. Rabi, the U.S. representative to the IAEA's Scientific Advisory Committee, and Dr. John A. Hall, the AEC's Assistant General Manager for International Activities, with Prof. V. S. Emelyanov, the Soviet representative to the Committee and also Director of the U.S.S.R. Main Administration for the Utilization of Atomic Energy. Emelyanov reacted favorably to the proposal and agreed to discuss it with his Government.

Subsequently, in 1959 Soviet Vice Chairman Kozlov and Vice President Nixon exchanged visits to various cities and sites, including atomic energy facilities. Mr. Kozlov visited the AEC's Berkeley Laboratory, the Shippingport atomic power station, and the NS *Savannah*, then under construction. Vice President Nixon, accompanied by Admiral Rickover, visited the nuclear power station of Beloyarsk and the nuclear icebreaker *Lenin*. Soon after, at U.S. invitation, Soviet Premier Khrushchev visited the United States. Professor Emelyanov accompanied him to further discuss cooperation in atomic energy.

Meetings in September 1959 between Professor Emalyanov and AEC Chairman McCone discussed cooperation for research and power reactor technology, basic research in the physical and life sciences,

including high energy physics, and controlled thermonuclear reaction technology. The agreements for initial exchange of visits of atomic scientists to the U.S.S.R. and the United States developed at these negotiations were later approved by the respective governments.

AEC Chairman McCone visited the U.S.S.R. in October 1959 with key members of his staff. Their itinerary included the Atomic Energy Institute at Moscow, the *Lenin*, the powerplants at Beloyarsk and Vorenezh and also a Ukraninian uranium mine and mill. In return, at the end of October 1959, Professor Emelyanov and eight colleagues visited the United States.

The main agreement between the United States and the U.S.S.R. for cooperation in exchanges in scientific, technical, and cultural fields for 1960–61, which was an extension of the Lacy-Zaroubin agreement, was signed in Moscow on November 21, 1959. Section II of the agreement provided for cooperation in utilization of atomic energy for peaceful purposes and recognized that specific proposals to this end would be developed by the AEC and the Main Administration for the Utilization of Atomic Energy.

On November 24, 1959, an addendum to the agreement was signed to provide for initial exchanges of visits by scientific and technical personnel specialized in thermonuclear research, nuclear power reactors, high energy physics and nuclear physics, neutron physics and the structure of the nucleus. The addendum also provided for exchange of documents, reports and abstracts, and the exploration of the feasibility of joint projects.

The initial agreements led to a series of biennial cultural exchange agreements providing for exchanges in education, performing arts, exhibits, science, and technology. Between 1958 and 1972, there were some 93 technical delegations exchanged. The AEC administered a strong exchange program and gathered much useful information about Soviet work in reactors and controlled nuclear fusion. These exchanges, for the most part were short term.[10]

In 1972, according to the State Department, the character of this cooperation changed substantially with the signing of Basic Principles of Relations. This overall agreement included agreements to promote the growth of commercial and economic ties and to develop useful contacts and cooperation in the fields of science and technology. The next year, a cooperative agreement was concluded for atomic energy.

The U.S.–U.S.S.R. Agreement for Cooperation In Atomic Energy

The agreement for scientific and technical cooperation between the United States and the U.S.S.R. in atomic energy was signed in Washington on June 21, 1973. Its purpose is to expand and strengthen cooperation between the two countries in research, development and use of nuclear energy, having as a primary objective the development of new energy sources. The cooperation is to be carried out on the basis of mutual benefit, equality and reciprocity. Cooperation is to be concentrated in three areas: controlled thermonuclear fusion, fast

[10] Cf. Statement of Myron B. Kratzer, Acting Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs in U.S. Congress. House of Representatives. Committee on Science and Technology. U.S.-U.S.S.R. Cooperative Agreements in Science and Technology. Hearings, 94th Cong., 1st sess., 1975, p. 49.

breeder reactors, and fundamental properties of matter.[11] Details of cooperation in these three areas is to be arranged through individual implementing protocols. Other areas of cooperation may be added by mutual agreement.

The cooperation may take several forms including:

—Establishment of working groups of scientists, and engineers for design and execution of joint projects;
—Joint development and construction of experiments, pilot installations and equipment;
—Joint work by theoretical and experimental scientists in research centers of the two countries;
—Organization of joint consultations, seminars and panels;
—Exchanges of instrumentation, equipment and construction materials;
—Exchanges of scientists and specialists; and
—Exchanges of scientific and technical information, documentation and results of research.

Note, other forms of cooperation may be added by mutual agreement.

The agreement specifically commits the parties to encourage, facilitate and monitor the development of cooperation and direct contacts between organizations and institutions of the two countries through protocols and contracts.

Implementation of the agreement is the function of a U.S.–U.S.S.R. Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy which meets annually, alternating between the United States and the Soviet Union unless otherwise mutually agreed. The Joint Committee takes such action as is necessary for effective carrying out of the agreement including, but not limited to, approval of specific projects and programs of cooperation, designation of participating organizations and institutions, and making recommendations to the two governments. The term of the agreement is 10 years and it may be modified or extended by mutual agreement.

Administration of the Atomic Energy Agreement

As noted above, the central organ for administration of the U.S.–U.S.S.R. atomic energy agreement is the Joint Committee. It is chaired by high-level officials and include eminent authorities from the private as well as the public sector. The Joint Committee heads a structure of joint coordinating committees, joint working groups and joint project groups which develop details of cooperation. Each joint organization meets periodically and records its discussions in signed minutes. Between meetings, work is either done separately by each side and then exchanged and compared, or participants from each country work together for extended periods of time.

According to the State Department, the process of deciding on areas of cooperation, selecting specific topics for joint work, defining the topics and developing the programs is painstaking and time consuming. It summed up the process as follows:

[11] For fusion research, the aim of the cooperation 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." For the breeders, cooperation 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." For fundamental properties of matter, the cooperation will include joint theoretical and experimental studies on mutually agreed subjects, and particularly in high, medium and low energy physics. Cooperation may also be undertaken on the design, planning and construction of joint facilities to be used in this research.

Difficult decisions and hard bargaining are necessary to make sure that projects are defined to include areas of good prospects for U.S. benefits and that programs include the types of activities needed to realize these prospects.[12]

Experience With U.S.-U.S.S.R. Cooperation

Some insight into experience with the U.S.-U.S.S.R. agreement for cooperation in atomic energy can be found in the record of the third meeting of the Joint Committee in December 1975. This is the most recent meeting for which there is information. A fourth meeting was held on December 6–9, 1976, in Erevan, Armenian U.S.S.R.

The record of the third meeting lists the participants, briefly reviews the joint program, and, of more specific interest, includes a protocol on cooperation for the Joint Coordinating Committee on Fundamental Properties of Matter, information on exchange of specialists in thermionic research during 1976, discussion of a possible telecommunications link between ERDA, Washington, and the U.S.S.R. State Committee on Utilization of Atomic Energy in Moscow; a U.S. draft proposal on patent rights for discussion at the fourth Joint Committee meeting; and agreement on subjects for information exchanges relating to light-water power reactors.

Of the nine U.S. participants in the third meeting of the Joint Committee, seven were Government officials, one the head of an ERDA operating contractor, and one from the electricity industry. None of the U.S. representatives were involved with the regulation, construction, and operation of nuclear powerplants which seems to be a curious omission. The U.S. Government representatives were drawn from research and development for nuclear energy or U.S. international nuclear cooperation. The Soviet participants likewise strongly represented research and development interests, with only one participant from the power machine industry. Table II lists the participants. With little participation by the nuclear industry, there is the question of how benefits of the cooperation would reach users in industry.

Table II.—List of Participants in the Third Meeting of the U.S.-U.S.S.R. Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy, December 1975

U.S. PARTICIPANTS

Dr. Robert C. Seamans, Administrator, ERDA.
Dr. Richard W. Roberts, Assistant Administrator for Nuclear Energy.
Dr. John M. Teem, Assistant Administrator for Solar, Geothermal and Advanced Energy Systems.
Mr. Nelson F. Sievering, Jr., Assistant Administrator for International Affairs.
Dr. Gerald F. Tape, President, Associated Universities, Inc.
Dr. Chauncy Starr, President, Electric Power Research Institute.
Dr. Robert L. Hirsch, Director, Division of Controlled Thermonuclear Research.
Dr. George W. Cunningham, Deputy Director for Development and Technology, Division of Reactor Research and Development.
Mr. B. D. Hill, Chief, East-West Affairs Branch, Office of International Program Implementation—Executive Secretary.

U.S.S.R. PARTICIPANTS

Andronik M. Petrosyants, Chairman of U.S.S.R. State Committee on Atomic Energy.

[12] Kratzer, op. cit., p. 50.

Ivan G. Morozov, Deputy Chairman of U.S.S.R. State Committee on Atomic Energy.
Anatoliy I. Maksimov, Deputy Minister of Power and Electrification.
Aleksandr G. Meshkov, Deputy Chairman of U.S.S.R. State Committee on Atomic Energy.
Ivan V. Chuvilo, Director, Institute of Theoretical and Experimental Physics.
Yevgeniy P. Velikhov, Deputy Director, I. V. Kurchatov Institute of Atomic Energy.
Viktor P. Lobanov, Deputy Minister of Power Machine Building.
Gennadiy B. Myakinkov, Deputy Chief of Administration, U.S.S.R. State Committee on Atomic Energy.
Arkadiy S. Veselovskiy, Deputy Department Chief, U.S.S.R. State Committee on Atomic Energy.
Vladimir P. Astakhov, Reviewer, U.S.S.R. State Committee on Atomic Energy.

COOPERATION IN LIGHT WATER REACTORS

At the third meeting, each side agreed to the desirability of cooperation in light water reactors, thus adding a substantial new subject to the agreement. The following were identified as subjects for consideration for information exchanges:

—Reactor safety regulation, including in-service inspection;
—Peak load management;
—Utilization of waste heat;
—Reactor safety research;
—Reactor safety confirmatory research;
—Reactor materials and in-pile testing; and
—Operation of atomic power stations and water chemistry.

In addition, the Soviet side identified problems of design, fabrication of components and construction and operation of atomic power stations using light water reactors.

From the U.S. viewpoint, all of these topics are important for the commercial future of light water reactors in this country.

COOPERATION IN FAST BREEDERS

The second meeting of the U.S.-U.S.S.R. Joint Fast Breeder Reactor Coordinating Committee, under the agreement, was held in Washington on November 13–14, 1975. The record indicates that exchanges under this joint venture included two joint seminars, the first on fast breeder steam generators with sodium cooling held in Los Angeles, in December 1974, and the second on experience and problems of construction and operation of sodium-cooled fast neutron reactors, held in Obninsk, U.S.S.R., in June 1975. Looking ahead, the coordinating committee agreed to hold a seminar in 1976 on problems on the reliability and safety of steam generators with attention to small and large leak sodium-water reactions, accoustical detection of water/steam to sodium leaks, carbon transport, and tube vibration. This seminar was to be followed by a meeting to agree upon desired research. In addition, both sides agreed to start exchange of samples of cladding materials and tubing of steam generators and intermediate heat exchangers. However, both sides deferred until 1977 planned seminars upon cladding materials and shielding.

Some of the delay associated with the cooperation is suggested in the report. A U.S. proposal of August 1975 to exchange specialists in the boiler-water chemistry was considered by the U.S.S.R. which was to reply during the first half of 1976 with the objective of reaching an agreement for the 1976 meeting of the coordinating committee.

Similarly, an August 1975 U.S. proposal to exchange specialists in steam generator heat transfer was deferred for discussion at the 1976 meeting of the coordinating committee. On a more positive note, the third meeting of the Joint Committee shows Soviet interest in a U.S. proposal to test a prototype evaporator for the U.S. Clinch River Breeder Reactor demonstration in the U.S.S.R.'s BN–350 nuclear powerplant. The United States was to forward early in 1976 enough details for the U.S.S.R. to study the possibility of such testing.

The membership of the U.S. delegation for the Joint Fast Breeder Reactor Coordinating Committee included more members from industry than on the parent Joint Committee. The nine members included three from ERDA, two from ERDA laboratories, three from the U.S. nuclear industry and one from the U.S. electricity industry. The nuclear industry members included one each from the two leading U.S. nuclear competitors.

THE FOURTH MEETING OF THE U.S.-U.S.S.R. JOINT COMMITTEE

A fourth meeting of the U.S.-U.S.S.R. Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy took place in Erevan, Armenian U.S.S.R., on December 6–9, 1976. The representatives were to report on results of cooperation during 1976 in controlled thermonuclear research, fast breeder reactors and research in the fundamental properties of matter. They also were to discuss and approve joint cooperation to be carried out during 1977.

Following the formal meeting, the U.S. delegation visited Soviet atomic energy facilities in Erevan, Shevchenko, and Moscow. The U.S. delegation to the fourth meeting included a representative of the Nuclear Regulatory Commission as well as members from ERDA, and an ERDA's operating contractor for the Brookhaven National Laboratory.

The Joint Committee was expected to schedule a fifth meeting in the United States during the fourth quarter of 1977.

Comparison of the U.S.-U.S.S.R. Agreement With Section 123 Agreements

The U.S.-U.S.S.R. Agreement for Cooperation in Peaceful Uses of Atomic Energy is unique in that it is the only such agreement not negotiated and administered under section 123 of the Atomic Energy Act of 1954 as amended. The reason for a separate agreement is straightforward. The conditions specified by Congress for the kinds of cooperation authorized under section 123 could not be met by the Soviet Union.

The U.S.-U.S.S.R. agreement differs substantially from section 123 agreements in part, but is quite similar in other respects. Before discussing these differences and similarities, it is pertinent to present some information about section 123 agreements.

REQUIREMENTS OF SECTION 123 AGREEMENTS

Section 123 of the Atomic Energy Act of 1954, as amended, provides the basis for 29 U.S. agreements for cooperation with countries and two international organizations, the International Atomic Energy

Agency and EURATOM. In section 123, Congress requires such agreements to include:

—The terms, conditions, duration, nature and scope of the cooperation;

—A guaranty by the cooperating party that security safeguards and standards as set forth in the agreement for cooperation will be maintained;

—A guaranty by the cooperating party that any material to be transferred pursuant to such agreement will not be used for atomic weapons, or for research on or development of atomic weapons or for any other military purpose; and

—A guaranty by the cooperating party that any material or any Restricted Data to be transferred pursuant to the agreement for cooperation will not be transferred to unauthorized persons or beyond the jurisdiction of the cooperating party, except as specified in the agreement for cooperation.[13]

Before a section 123 agreement can take effect, the President has to approve it and make a written determination that the performance of the proposed agreement will "* * * promote and will not constitute an unreasonable risk to the common defense and security." Also, the President must first submit the agreement to the Joint Committee on Atomic Energy. For agreements involving small nuclear reactors, that is, capable of producing less than 5 megawatts of thermal energy or special nuclear material for use with it, the agreement must lay before the Joint Committee for 30 days while Congress is in session. For agreements involving larger reactors, that is, of 5 megawatts thermal output or more and associated special nuclear material, the agreement must lay before the Joint Committee for 60 days. During the first 30 days, the Joint Committee is to report to the Congress its views and recommendations and provide a proposed concurrent resolution stating in substance that Congress favors, or does not favor, the proposed agreement. If Congress passes an unfavorable resolution, the agreement cannot take effect. With the impending demise of the Joint Committee, bills are now before Congress to reassign this function to the international relations committees of each House.[14]

NOTABLE SIMILARITIES

The U.S.-U.S.S.R. agreement and section 123 agreements are similar in that cooperation can take the form of visits, joint projects, exchanges of unclassified information and reports. Both run for fixed terms, although the duration of section 123 agreements is much longer. Both are limited to civil uses of nuclear energy. Neither involve communication of restricted data.

NOTABLE DIFFERENCES

The U.S.-U.S.S.R. agreement and section 123 agreements differ notably. The former is an executive agreement with no statutory base that was not submitted to Congress for review or approval. It does not

[13] Note, the Atomic Energy Act of 1954 defines Restricted Data to mean "all data concerning (1) design manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy, but shall not include data declassified or removed from the Restricted Data category. * * *

[14] Cf. H.R. 4409, Mr. Bingham; and S. 897, Senator Percy.

provide for the exchange of special nuclear materials or other nuclear items whose export is controlled by the Atomic Energy Act of 1954 as amended. Since no such items are exchanged, there are none of the nonproliferation commitments found in section 123 agreements to keep the cooperating nation from using U.S. nuclear technology or items to make nuclear explosives or to place U.S. supplied items under safeguards of the International Atomic Energy Agency. While under section 123 agreements, nuclear organizations can deal directly with each other in the United States and the cooperating nation, under the U.S.-U.S.S.R. agreement all contacts and projects have to be arranged through the Joint U.S.-U.S.S.R. Coordinating Committee and are subject to detailed conditions of protocols. On the other hand, the U.S.-U.S.S.R. agreement can be amended at any time by mutual agreement whereas section 123 agreements include no similar provision.

CONCLUDING COMMENTS

What can be said now of the U.S.-U.S.S.R. Agreement for Nuclear Cooperation? On the basis of a limited, preliminary examination, it seems fair to say that the agreement has worked. It has opened up many new contacts for Government officials and nuclear scientists and engineers with their counterparts in each country. It has led to many visits, exchanges of information and some joint work in nuclear energy. It has given U.S. experts opportunity to assess and understand the Soviet nuclear program and the use of nuclear power.

Whether the agreement helped relieve tensions between the United States and the U.S.S.R., and whether it helped U.S. foreign policy objectives was not evident in the information available to this analysis. Likewise, the available information cannot support assessment of benefits to U.S. nuclear programs and to the nuclear industry. The Atomic Energy Commission, published little information on the workings of the various agreements. Since ERDA was created in 1974, it too has published little.

It seems somewhat paradoxical that an agreement for cooperation in nuclear energy with the Soviet Union, the chief adversary of the United States on the world scene, was established and carried out without being presented to the Congress whereas agreements for nuclear cooperation with U.S. allies and trading partners have to meet statutory conditions and lay before Congress. Granted that the two types of agreements are different, nonetheless a sense of incongruity remains. Perhaps it is time to see what would be necessary to bring the U.S.-U.S.S.R. cooperation under the Atomic Energy Act, recognizing that some amendment would be necessary.

Looking to the administration of the agreement, again there is little information in AEC or ERDA reports on difficulties or limitations experienced, although there was some hint of problems in the 1975 hearings of the House Committee on Science and Technology. The information available suggests that administration of the agreement involves long, drawnout negotiations and procedures that seem more designed to test patience and stamina than to further exchange of information and experience. U.S. participants in planning and arranging specific exchanges have been mainly officials of ERDA, and

lately NRC, with some participation of ERDA contractors. Arrangements for specific undertakings have included individuals from the U.S. nuclear industry, but are still dominated by ERDA officials. The few industrial participants come mainly from the large companies, which is probably to be expected since smaller companies may find it difficult to invest the time and expense of participation, particularly for their key personnel.

It is not clear how information and insight derived from U.S. participation is made available to the nuclear community, to the public, and, for use in Government. A search of information and reports available from the National Technical Information Service of the Department of Commerce shows no reports on nuclear power in the Soviet Union identifiable with the agreement.

On the whole, it would seem that the Soviet Union should be able to benefit from exchanges of information on light water reactors which are the mainstay of the U.S. commercial nuclear power generation, while the United States should be able to get some benefit from the Soviet breeder program. The value of this U.S. benefit will depend upon the position of the new administration on the future of the breeder and on the use of plutonium as a nuclear fuel. If there is a decision to delay or deemphasize the breeder and plutonium fuel, then the near term benefits of continued U.S. access to Soviet breeder progress will be less. Both countries should benefit mutually from exchanges concerning fusion. The technological problems of fusion power remain so formidable that a substantial joint effort would make considerable sense.

Looking to the future, several questions are likely to merit the attention of Congress. These include:

(1) To what extent do the anticipated future benefits for U.S. foreign policy and diplomacy justify continuation or expansion of the agreement?

(2) To what extent do the anticipated future benefits to the U.S. nuclear development and the U.S. nuclear industry justify continuation?

(3) In what ways, if any, should the present balance of U.S. participation between Government officials, professionals from ERDA laboratories, and professionals from universities and the nuclear industry be changed to increase benefits for the U.S. nuclear power?

(4) What would be the potential benefits for U.S. nonproliferation goals of expanding the present agreement to include exchanges concerning nuclear safeguards and other nonproliferation measures? If this is desirable, what changes would have to be made in the Atomic Energy Act of 1954, as amended?

(5) Assuming continuing benefits from the agreement, should it be placed within the ambit of the Atomic Energy Act? If so, what amendment would be required?

(6) To what extent would fuller and wider publication of the results of U.S.-U.S.S.R. nuclear cooperation benefit U.S. foreign policy, diplomatic and nuclear interests? If wider publication is desirable, how can this be achieved at least cost?

APPENDIX—CHRONOLOGY OF HIGHLIGHTS IN U.S.-U.S.S.R. COOPERATION IN ATOMIC ENERGY

1955

July—Meeting between the United States and the Soviet Union to lay the foundation for subsequent U.S. policy of the United States for exchanges with the Soviet bloc on atomic energy.

October—United States and U.S.S.R. Foreign Ministers and staffs began meetings to arrange reciprocal exchanges.

1956

June 29—President Eisenhower expressed U.S. policy to encourage mutually beneficial contacts with certain Eastern European countries, reaffirming the program advanced by the Western Foreign Ministers at Geneva in October 1955.

1957

October 28, 1957–January 27, 1958—Final negotiations on a formal exchange on atomic energy conducted in Washington under the direction of Ambassador William S. B. Lacy and Ambassador G. N. Zaroubin of the Soviet Union.

1958

September—AEC Chairman McCone, at the third General Conference of the IAEA, proposed that the Agency undertake to serve as the medium through which its members engaged in fusion research freely exchange technical information.

1959

——— Soviet Vice Chairman Koslov and Vice President Nixon exchanged visits to various atomic energy facilities. Mr. Kozlov visited the AEC's Berkeley Laboratory, the Shippingport power station and the NS *Savannah* during his visit in July. Vice President Nixon, accompanied by Admiral Rickover, visited the nuclear power station of Beloyarsk and the nuclear icebreaker *Lenin* during a visit in August.

April—The AEC discussed possible exchange visits of United States and U.S.S.R. fusion scientists in such a way that the IAEA and its member states would benefit.

May—Dr. I. I. Rabi, U.S. Representative to the IAEA's Scientific Advisory Committee and Dr. John A. Hall of AEC discussed with Prof. V. S. Emelyanov, head of the U.S.S.R. Main Administration for Utilization of Atomic Energy, the possibility of an exchange on controlled fusion and nuclear power.

June—John A. Hall, the Atomic Energy Commission's Assistant General Manager for International Activities, and Prof. Isador I. Rabi, U.S. Member on the IAEA Scientific Advisory Committee, met with Prof. Vasily S. Emelyanov.

June 29–August 19—A Soviet atomic energy exhibit was displayed as part of the Soviet national exhibition in New York City.

July 25–September 5—A U.S. atomic energy exhibition was displayed as part of the U.S. national exhibition in Moscow.

September—Soviet Premier Krushchev visited the United States accompanied by Professor Emelyanov.

September—Professor Emelyanov met with AEC Chairman McCone to discuss exchanges in the peaceful uses of atomic energy and the sharing of information on a worldwide scale through the IAEA.

September—Professor Emelyanov and AEC Chairman McCone continued the discussions. Agreements for an initial exchange of visits of atomic scientists to the U.S.S.R. and the United States developed at this meeting, were approved.

October—AEC Chairman McCone and five colleagues visited the atomic institutes and facilities in the U.S.S.R.
November—Professor Emelyanov and eight colleagues visited the United States.
November—The main "Agreement between the United States and the U.S.S.R. for Cooperation in Exchanges in the Scientific, Technical and Cultural Fields in 1960–1961," which was an extension of the Lacy-Zaroubin agreement, was signed in Moscow.
November—AEC Chairman McCone and Professor Emelyanov signed an addendum to the 1960–61 Lacy-Zaroubin agreement, covering cooperation in peaceful uses of atomic energy. The addendum provided for initial exchanges of visits by scientific personnel in fusion research, nuclear power reactors, high energy physics and nuclear physics, neutron physics and the structure of the nucleus; exchange of documents, reports and abstracts; and exploration of the feasibility of joint projects.

1960

May—Five U.S. scientists took part in the first formal visit to Soviet high-energy physics facilities while five Soviet scientists visit U.S. fusion facilities.
June—A second group of five U.S. scientists visited the U.S.S.R. and its facilities. Also in July, five Soviet scientists toured U.S. high-energy physics laboratories.

1963

May—AEC Chairman Glenn T. Seaborg, visited the U.S.S.R. on the invitation of M. Petrosyants, Chairman of the State Committee of U.S.S.R. Council of Ministers on the Utilization of Atomic Energy. They signed a memorandum on cooperation in the peaceful uses of atomic energy between the U.S. and U.S.S.R. extending through 1965. (This memorandum implemented the atomic energy section of the U.S.-U.S.S.R. exchanges agreement in the Scientific, Technical, Educational, Cultural, and other fields, which was signed in 1962.)
November—M. Petrosyants and 10 colleagues visited the United States in exchange for the U.S. visit in May.

1964

———Exchange visits on radioactive waste disposal and power reactor development were made in late 1964. In addition, the AEC and the U.S.S.R. State Committee on the Utilization of Atomic Energy began a reciprocal exchange of unclassified documents on a monthly basis. The AEC reported that scientists of both countries continued to visit nuclear energy facilities in conjunction with conferences or through visits arranged by other organizations participating in the U.S.-U.S.S.R. exchange program.
February—Ten U.S. specialists in plasma physics and controlled thermonuclear reactions visited U.S.S.R. facilities. Seven Soviet solid-state physics experts visited U.S. installations.
March—United States and U.S.S.R. power reactor specialists made reciprocial visits.
June—A U.S. solid-state physics group and a U.S.S.R. delegation on controlled thermonuclear reactions made reciprocal visits.
November—Eight U.S. radioactive waste disposal experts visited the Soviet Union.
November—An agreement on cooperation between the United States and U.S.S.R. in the field of desalinization, including the use of atomic energy was signed in Moscow.
December—United States and U.S.S.R. scientists completed reciprocal visits in the fields of controlled thermonuclear reaction and solid-state physics.

1965

———The United States and the Soviet Union exchanged several delegations to conferences and scientific symposia during 1965 and continued the reciprocal exchange of scientific and technical reports.
May—Ten Soviet atomic waste disposal specialists began a tour U.S. installations.
November—The first phase of the long-term controlled thermonuclear reactions research exchange was carried out when a U.S. physicist arrived at the

Lebedev Institute in Moscow for a 3-month visit and a U.S. scientist went to the Physical Technical Institute in Kharkov in December for 6 months.

December—A U.S. team of specialists in radioneurological research visited medical facilities in the Soviet Union, and a Soviet delegation of low-energy physics specialists visited the United States.

1966

February—A U.S. delegation of low-energy physicists visited facilities in the Soviet Union.

June—A Soviet team of specialists in radioneurological research visited medical facilities in the United States.

October—A U.S. delegation of medical tracer specialists visited medical facilities in the Soviet Union. Two U.S. specialists in fusion reaction completed assignments at the Lebedev Institute in Moscow and 6 months at the Physical Technical Institute in Kharkov.

December—Two Soviet fusion specialists reported the AEC's Princeton Plasma Physics Laboratories to begin 4 to 5 months of research.

1969

April—United States and U.S.S.R. representatives began technical discussions in Vienna on peaceful uses of nuclear explosions.

November—Ten Soviet nuclear reactor specialists visited a nuclear powerplant and the Brookhaven National Laboratory.

1970

———Five U.S. physicists began a 6-month stay at the High Energy Physics Institute at Serpukhov, working with Soviet scientists from the Joint Institute for Nuclear Research in Dubna. Two Soviet scientists attended a summer seminar at the AEC's National Accelerator Laboratory. A 2-week visit by a team of specialists in turbulent heating in fusion research to laboratories in Moscow and Kharkov was the first of its kind under the high energy physics agreement.

February—The United States and U.S.S.R. signed a renewal of the Memorandum on Cooperation in the Peaceful Uses of Atomic Energy, extending it for 2 years.

February—United States and U.S.S.R. representatives continued technical discussions in Moscow on peaceful uses of nuclear explosions.

June–July—A delegation of 10 U.S. nuclear reactor specialists toured laboratories and nuclear power installations in the U.S.S.R.

November—Ten nuclear reactor specialists from the U.S.S.R. toured unclassified facilities in the United States.

November—The AEC and the U.S.S.R. State Committee on the Utilization of Atomic Energy signed a protocol, under the overall U.S.-U.S.S.R. exchange agreement, covering joint projects in high energy physics.

1971

April—Ten Soviet scientists toured unclassified U.S. nuclear facilities.

July—Representatives of the United States and U.S.S.R. began technical discussion in Washington on peaceful applications of nuclear explosions.

August 4–20—AEC Chairman Seaborg lead a visit of officials and scientists to Soviet research centers, nuclear power stations and universities in Russia, Siberia, and other Soviet republics.

1972

March—Seven Soviet scientists arrived at the AEC's National Accelerator Laboratory to join U.S. scientists in high energy physics experiments.

July—Seven U.S. specialists visited the Soviet Union to tour industrial radiation facilities.

1973

September—A Soviet delegation of five Soviet specialists toured industrial process radiation facilities in the United States.

1974

February—First meeting of the U.S.-U.S.S.R. Joint Committee on Cooperation in the Peaceful Uses of Atomic Energy, in Washington.
February—The United States and U.S.S.R. signed a joint protocol for scientific exchanges on nuclear fusion research.
October—Second meeting of the U.S.-U.S.S.R. Joint Committee, in Moscow.
October—Four Soviet scientists arrived in the United States for the first of 12 scientific exchanges on nuclear fusion research.
December—A Soviet delegation attended a fast breeder reactor steam generator seminar in Los Angeles sponsored by the AEC. The group also visited fast breeder related facilities in the United States.

1975

December—Third annual meeting of the U.S.-U.S.S.R. Joint Committee, in Washington.
December—The Soviet delegation to the Joint Committee visited scientific and industrial centers of the United States.

1976

December—Fourth annual meeting of the U.S.-U.S.S.R. Joint Committee, in Erevan, Armenia.

APPENDIX

[Treaties and Other International Acts Series 7344]

Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in the Field of Medical Science and Public Health, Signed at Moscow, May 23, 1972

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

Realizing the significance which medical science and public health have for mankind today;

Recognizing the desirability of joining in a common effort to promote their further development;

Desiring to promote the broadening of cooperation in this field, and by so doing to promote a general improvement of health;

Desiring to reaffirm the understanding reached in the Letters of Agreement between the Department of Health, Education, and Welfare of the United States of America and the Ministry of Health of the Union of Soviet Socialist Republics, signed February 11, 1972; [1]

And in accordance with the Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural, and Other Fields, signed April 11, 1972; [2]

Have agreed as follows:

ARTICLE 1

The Parties undertake to develop and extend mutually beneficial cooperation in the field of medical science and public health. By mutual agreement and on the basis of reciprocity, they will determine the various directions of this cooperation, proceeding from the experience acquired by the Parties in the course of previous contacts, visits, and exchanges.

The Parties agree to direct their initial joint efforts toward combating the most widespread and serious diseases, such as cardio-vascular and oncological diseases, because of the major threat they pose to man's health, toward solving the problems associated with the effects of the environment on man's health, as well as toward the resolution of other important health problems.

ARTICLE 2

The cooperation provided for in the preceding article may be implemented specifically in the following ways:

—Coordinated scientific research programs and other activities in health fields of mutual interest;

—Exchanges of specialists and delegations;

—Organization of colloquia, scientific conferences and lectures;

—Exchange of information;

—Familiarization with technical aids and equipment.

ARTICLE 3

The Parties will encourage and facilitate the establishment of direct and regular contacts between United States and Soviet medical institutions and organizations.

The Parties will also encourage and facilitate exchanges of equipment, pharmaceutical products, and technological developments related to medicine and public health.

[1] Not printed.
[2] TIAS 7343; 23 UST.

ARTICLE 4

The Parties will continue to provide assistance to international medical organizations, specifically the World Health Organization, and will afford these organizations the opportunity of drawing on the knowledge gained by the Parties, including knowledge gained in the course of their joint efforts.

ARTICLE 5

The Parties will delegate the practical implementation of this Agreement to the U.S.-U.S.S.R. Joint Committee for Health Cooperation. The Joint Committee shall periodically work out specific programs of cooperation, creating working subgroups whenever necessary, and shall be responsible for supervising implementation of these programs.

ARTICLE 6

Cooperation shall be financed on the basis of reciprocal agreements worked out by the Joint Committee, using the resources of the Department of Health, Education, and Welfare of the United States of America and the Ministry of Health of the Union of Soviet Socialist Republics, as well as the resources of institutions participating in direct inter-institutional cooperation.

ARTICLE 7

This Agreement shall enter into force upon signature and shall remain in force for five years, after which it will be extended for successive five-year periods unless one Party notifies the other of the termination thereof not less than six months prior to its expiration.

DONE on May 23, 1972 in Moscow in duplicate, in the English and Russian languages, both texts being equally authentic.

For the Government of the United States of America:

WILLIAM P. ROGERS,
Secretary of State.

For the Government of the Union of Soviet Socialist Republics:

BORIS V. PETROVSKY,
Minister of Health.

[Treaties and Other International Acts Series 7345]

Agreement on Cooperation in the Field of Environmental Protection Between the United States of America and the Union of Soviet Socialist Republics, Signed at Moscow, May 23, 1972

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

Attaching great importance to the problems of environmental protection;

Proceeding on the assumption that the proper utilization of contemporary scientific, technical and managerial achievements can, with appropriate control of their undesirable consequences, make possible the improvement of the interrelationship between man and nature;

Considering that the development of mutual cooperation in the field of environmental protection, taking into account the experience of countries with different social and economic systems, will be beneficial to the United States of America and the Union of Soviet Socialist Republics, as well as to other countries;

Considering that economic and social development for the benefit of future generations requires the protection and enhancement of the human environment today;

Desiring to facilitate the establishment of closer and long-term cooperation between interested organizations of the two countries in this field;

In accordance with the Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural, and Other Fields in 1972–1973, signed April 11, 1972, [1] and developing further the principles of mutually beneficial cooperation between the two countries;

Have agreed as follows:

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[1] TIAS 7343; 23 UST.

ARTICLE 1

The Parties will develop cooperation in the field of environmental protection on the basis of equality, reciprocity, and mutual benefit.

ARTICLE 2

This cooperation will be aimed at solving the most important aspects of the problems of the environment and will be devoted to working out measures to prevent pollution, to study pollution and its effect on the environment, and to develop the basis for controlling the impact of human activities on nature.

It will be implemented, in particular, in the following areas:

—air pollution;
—water pollution;
—environmental pollution associated with agricultural production;
—enhancement of the urban environment;
—preservation of nature and the organization of preserves;
—Marine pollution;
—biological and genetic consequences of environmental pollution;
—influence of environmental changes on climate;
—earthquake prediction;
—arctic and subarctic ecological systems;
—legal and administrative measures for protecting environmental quality.

In the course of this cooperation the Parties will devote special attention to joint efforts improving existing technologies and developing new technologies which do not pollute the environment, to the introduction of these new technologies into everyday use, and to the study of their economic aspects.

The Parties declare that upon mutual agreement, they will share the results of such cooperation with other countries.

ARTICLE 3

The Parties will conduct cooperative activities in the field of environmental protection by the following means:

—exchange of scientists, experts and research scholars;
—organization of bilateral conferences, symposia and meetings of experts;
—exchange of scientific and technical information and documentation, and the results of research on environment;
—joint development and implementation of programs and projects in the field of basic and applied sciences;
—other forms of cooperation which may be agreed upon in the course of the implementation of this Agreement.

ARTICLE 4

Proceeding from the aims of this Agreement the Parties will encourage and facilitate, as appropriate, the establishment and development of direct contacts and cooperation between institutions and organizations, governmental, public and private, of the two countries, and the conclusion, where appropriate, of separate agreements and contracts.

ARTICLE 5

For the implementation of this Agreement a US–USSR Joint Committee on Cooperation in the Field of Environmental Protection shall be established. As a rule this Joint Committee shall meet once a year in Washington and Moscow, alternately. The Joint Committee shall approve concrete measures and programs of cooperation, designate the participating organizations responsible for the realization of these programs and make recommendations, as appropriate, to the two Governments.

Each Party shall designate a coordinator. These coordinators, between sessions of the Joint Committee, shall maintain contact between the United States and Soviet parts, supervise the implementation of the pertinent cooperative programs, specify the individual sections of these programs, and coordinate the activities of organizations participating in environmental cooperation in accordance with this Agreement.

ARTICLE 6

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

ARTICLE 7

This Agreement shall enter into force upon signature and shall remain in force for five years after which it will be extended for successive five year periods unless one Party notifies the other of the termination thereof not less than six months prior to its expiration.

The termination of this Agreement shall not affect the validity of agreements and contracts between interested institutions and organizations of the two countries concluded on the basis of this Agreement.

Done on May 23, 1972 at Moscow in duplicate, in the English and Russian languages, both texts being equally authentic.

For the United States of America:

RICHARD NIXON
President of the United States of America

For the Union of Soviet Socialist Republics:

N. V. PODGORNY
Chairman of the Presidium of the Supreme Soviet of the USSR

[Treaties and Other International Acts Series 7346]

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, Signed at Moscow, May 24, 1972

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

Recognizing that benefits can accrue to both countries from the development of cooperation in the fields of science and technology;

Wishing to assist in establishing closer and more regular cooperation between scientific and technical organizations of both countries;

Taking into consideration that such cooperation will serve to strengthen friendly relations between both countries;

In accordance with the Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural, and Other Fields, signed April 11, 1972, [1] and in order to develop further the mutually beneficial cooperation between the two countries;

Have agreed as follows:

ARTICLE 1

Both Parties pledge themselves to assist and develop scientific and technical cooperation between both countries on the basis of mutual benefit, equality and reciprocity.

ARTICLE 2

The main objective of this cooperation is to provide broad opportunities for both Parties to combine the efforts of their scientists and specialists in working on major problems, whose solution will promote the progress of science and technology for the benefit of both countries and of mankind.

ARTICLE 3

The forms of cooperation in science and technology may include the following:

(a) Exchange of scientists and specialists;

(b) Exchange of scientific and technical information and documentation;

(c) Joint development and implementation of programs and projects in the fields of basic and applied sciences;

(d) Joint research, development and testing, and exchange of research results and experience between scientific research institutions and organizations;

(e) Organization of joint courses, conferences and symposia;

(f) Rendering of help, as appropriate, on both sides in establishing contacts and arrangements between United States firms and Soviet enterprises where a mutual interest develops; and

(g) Other forms of scientific and technical cooperation as may be mutually agreed.

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[1] TIAS 7343; 23 UST.

ARTICLE 4

1. Pursuant to the aims of this Agreement, both Parties will, as appropriate, encourage and facilitate the establishment and development of direct contacts and cooperation between agencies, organizations and firms of both countries and the conclusion, as appropriate, of implementing agreements for particular cooperative activities engaged in under this Agreement.

2. Such agreements between agencies, organizations and enterprises will be concluded in accordance with the laws of both countries. Such agreements may cover the subjects of cooperation, organizations engaged in the implementation of projects and programs, the procedures which should be followed, and any other appropriate details.

ARTICLE 5

Unless otherwise provided in an implementing agreement, each Party or participating agency, organization or enterprise shall bear the costs of its participation and that of its personnel in cooperative activities engaged in under this Agreement, in accordance with existing laws in both countries.

ARTICLE 6

Nothing in this Agreement shall be interpreted to prejudice other agreements in the fields of science and technology concluded between the Parties.

ARTICLE 7

1. For the implementation of this Agreement there shall be established a U.S.-U.S.S.R. Joint Commission on Scientific and Technical Cooperation. Meetings will be convened not less then once a year in Washington and Moscow, alternately.

2. The Commission shall consider proposals for the development of cooperation in specific areas; prepare suggestions and recommendations, as appropriate, for the two Parties; develop and approve measures and programs for implementation of this Agreement; designate, as appropriate, the agencies, organizations or enterprises responsible for carrying out cooperative activities; and seek to assure their proper implementation.

3. The Executive Agent, which will be responsible for assuring the carrying out on its side of the Agreement, shall be, for the United States of America, the Office of Science and Technology in the Executive Office of the President and, for the Union of Soviet Socialist Republics, the State Committee of the U.S.S.R. Council of Ministers for Science and Technology. The Joint Commission will consist of United States and Soviet delegations established on an equal basis of which the chairmen and members are to be designated by the respective Executive Agents with approval by the respective parties. Regulations regarding the operation of the Commission shall be agreed by the chairmen.

4. To carry out its functions the Commission may create temporary or permanent joint subcommittees, councils or working groups.

5. During the period between meetings of the Commission additions or amendments may be made to already approved cooperative activities, as may be mutually agreed.

ARTICLE 8

1. This Agreement shall enter into force upon signature and shall remain in force for five 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 agreements made hereunder between agencies, organizations and enterprises of both countries.

DONE at Moscow this 24 day of May, 1972, in duplicate, in the English and Russian languages, both equally authentic.

For the Government of the United States of America:

WILLIAM P. ROGERS,
Secretary of State

For the Government of the Union of Soviet Socialist Republics:

V. A. KIRILLIN,
Chairman of the State Committee of the Council of Ministers of the USSR on Science and Technology

[Treaties and Other International Acts Series 7347]

Agreement Between the United States of America and the Union of Soviet Socialist Republics Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes, Signed at Moscow, May 24, 1972

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

Considering the role which the U.S.A. and the U.S.S.R. play in the exploration and use of outer space for peaceful purposes;

Striving for a further expansion of cooperation between the U.S.A. and the U.S.S.R. in the exploration and use of outer space for peaceful purposes;

Noting the positive cooperation which the parties have already experienced in this area;

Desiring to make the results of scientific research gained from the exploration and use of outer space for peaceful purposes available for the benefit of the peoples of the two countries and of all peoples of the world;

Taking into consideration the provisions of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies,[1] as well as the Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space; [2]

In accordance with the Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural, and Other Fields, signed April 11, 1972, [3] and in order to develop further the principles of mutually beneficial cooperation between the two countries;

Have agreed as follows:

Article 1

The Parties will develop cooperation in the fields of space meteorology; study of the natural environment; exploration of near earth space, the moon and the planets; and space biology and medicine; and, in particular, will cooperate to take all appropriate measures to encourage and achieve the fulfillment of the Summary of Results of Discussion on Space Cooperation Between the U.S. National Aeronautics and Space Administration and the Academy of Sciences of the U.S.S.R. dated January 21, 1971. [4]

Article 2

The Parties will carry out such cooperation by means of mutual exchanges of scientific information and delegations, through meetings of scientists and specialists of both countries, and also in such other ways as may be mutually agreed. Joint working groups may be created for the development and implementation of appropriate programs of cooperation.

Article 3

The Parties have agreed to carry out projects for developing compatible rendezvous and docking systems of United States and Soviet manned spacecraft and stations in order to enhance the safety of manned flight in space and to provide the opportunity for conducting joint scientific experiments in the future. It is planned that the first experimental flight to test these systems be conducted during 1975, envisaging the docking of a United States Apollo-type spacecraft and a Soviet Soyuz-type spacecraft with visits of astronauts in each other's spacecraft. The implementation of these projects will be carried out on the basis of principles and procedures which will be developed in accordance with the Summary of Results of the Meeting Between Representatives of the U.S. National Aeronautics and Space Administration and the U.S.S.R. Academy of Sciences on the Question of Developing Compatible Systems for Rendezvous and Docking of Manned Spacecraft and Space Stations of the U.S.A. and the U.S.S.R. dated April 6, 1972. [5]

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[1] TIAS 6347; 18 UST 2410.
[2] TIAS 6599; 19 UST 7570.
[3] TIAS 7343; 23 UST.
[4] Not printed.
[5] Not printed.

ARTICLE 4

The Parties will encourage international efforts to resolve problems of international law in the exploration and use of outer space for peaceful purposes with the aim of strengthening the legal order in space and further developing international space law and will cooperate in this field.

ARTICLE 5

The Parties may by mutual agreement determine other areas of cooperation in the exploration and use of outer space for peaceful purposes.

ARTICLE 6

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

Done at Moscow this 24th day of May 1972 in duplicate, in the English and Russian languages both equally authentic.

For the United States of America
RICHARD NIXON
President of the United States of America

For the Union of Soviet Socialist Republics
A. N. KOSYGIN
Chairman of the Council of Ministers of the USSR

[Treaties and Other International Acts Series 7651]

Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in Studies of the World Ocean, Signed at Washington, June 19, 1973

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

Recognizing the importance of comprehensive studies of the World Ocean for peaceful purposes and for the well-being of mankind;

Striving for more complete knowledge and rational utilization of the World Ocean by all nations through broad international cooperation in oceanographic investigation and research;

Aware of the capabilities and resources of both countries for studies of the World Ocean and the extensive history and successful results of previous cooperation between them;

Desiring to combine their efforts in the further investigation of the World Ocean and to use the results for the benefit of the peoples of both countries and of all mankind; and

In pursuance and 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] and in accordance with the Agreement on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural and Other Fields of April 11, 1972,[2] and in accordance with the Agreement on Cooperation in the Field of Environmental Protection of May 23, 1972;[3]

Have agreed as follows:

ARTICLE 1

The Parties will develop and carry out cooperation in studies of the World Ocean on the basis of equality, reciprocity and mutual benefit.

ARTICLE 2

In their studies of the World Ocean, the Parties will direct cooperative efforts to the investigation and solution of important basic and applied research problems. Initially, cooperation will be implemented in the following areas:

(a) Large-scale ocean-atmosphere interaction, including laboratory studies, oceanic experiments, and mathematical modeling of the ocean-atmosphere system.

(b) Ocean currents of planetary scale and other questions of ocean dynamics.

(c) Geochemistry and marine chemistry of the World Ocean.

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[1] TIAS 7346; 23 UST 856.
[2] TIAS 7343; 23 UST 790.
[3] TIAS 7345; 23 UST 845.

(d) Geological and geophysical investigations of the World Ocean, including deep sea drilling for scientific purposes.

(e) Biological productivity of the World Ocean and the biochemistry of the functioning of individual organisms and whole biological communities in the World Ocean.

(f) Intercalibration and standardization of oceanographic instrumentation and methods.

Other areas of cooperation may be added by mutual agreement.

ARTICLE 3

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

(a) Joint planning, development, and implementation of research projects and programs;

(b) Exchange of scientists, specialists, and advanced students;

(c) Exchange of scientific and technical information, documentation, and experience, including the results of national oceanographic studies;

(d) Convening of joint conferences, meetings, and seminars of specialists;

(e) Appropriate participation by both countries in multilateral cooperative activities sponsored by international scientific organizations;

(f) Facilitation by both Parties, in accordance with laws, rules and regulations of each country and relevant bilateral agreements, of use of appropriate port facilities of the two countries for ships' services and supplies, including provision for rest and changes of ships' personnel, in connection with carrying out cooperative activities.

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 agencies, organizations and firms of the two countries, including the conclusion, as appropriate, of implementing agreements for carrying out specific projects and programs under this Agreement.

ARTICLE 5

1. For implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in World Ocean Studies. This Joint Committee shall meet, as a rule, once a year, alternately in the United States and the Soviet Union, unless otherwise mutually agreed.

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

3. Each Party shall designate its Executive Agent which will be responsible for carrying out this Agreement. During the period between meetings of the Joint Committee, the Executive Agents shall maintain contact with each other and aoordinate and supervise the development and implementation of cooperative cctivities conducted under this Agreement.

ARTICLE 6

Nothing in this Agreement shall be interpreted to prejudice other agreements between the Parties or commitments of either Party to other international oceanographic programs.

ARTICLE 7

Each Party, with the consent of the other Party, may invite third countries to participate in cooperative activities engaged in under this Agreement.

ARTICLE 8

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

2. The termination of the Agreement shall not affect the validity of implementing agreements concluded under this Agreement between interested agencies, organizations and firms of the two countries.

Done at Washington, this 19th day of June, 1973, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the Government of the United States of America:

WILLIAM P. ROGERS

For the Government of the Union of Soviet Socialist Republics:

A. GROMYKO

[Treaties and Other International Acts Series 7652]

Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in the Field of Transportation, Signed at Washington, June 19, 1973

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

Recognizing the important role played by safe and efficient transportation systems in the development of all countries;

Considering that the improvement of existing transportation systems and techniques can benefit both of their peoples;

Believing that the combined efforts of the two countries in this field can contribute to more rapid and efficient solutions of transportation problems than would be possible through separate, parallel national efforts;

Desiring to promote the establishment of long-term and productive relationships between transportation specialists and institutions of both countries;

In pursuance and 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] and in accordance with the Agreement on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural and Other Fields of April 11, 1972,[2] and in accordance with the Agreement on Cooperation in the Field of Environmental Protection of May 23, 1972;[3]

Have agreed as follows:

ARTICLE 1

The Parties will develop and carry out cooperation in the field of transportation on the basis of mutual benefit, equality and reciprocity.

ARTICLE 2

This cooperation will be directed to the investigation and solution of specific problems of mutual interest in the field of transportation. Initially, cooperation will be implemented in the following areas:

(a) Construction of bridges and tunnels, including problems of control of structure stress and fracture, and special construction procedures under cold climatic conditions.

(b) Railway transport, including problems of rolling stock, track and roadbed, high speed traffic, automation, and cold weather operation.

(c) Civil aviation, including problems of increasing efficiency and safety.

(d) Marine transport, including technology of maritime shipping and cargo handling in seaports.

(e) Automobile transport, includuing problems of traffic safety. Other areas of cooperation may be added by mutual agreement.

ARTICLE 3

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

(a) Exchange of scientists and specialists;

(b) Exchange of scientific and technical information and documentation;

(c) Convening of joint conferences, meetings and seminars; and

(d) Joint planning, development and implementation of research programs and projects.

Other forms of cooperation may be added by mutual agreement.

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[1] TIAS 7346; 23 UST 856.
[2] TIAS 7343; 23 UST 790.
[3] TIAS 7345; 23 UST 845.

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 agencies, organizations and firms of the two countries, including the conclusion, as appropriate, of implementing agreements for carrying out specific projects and programs under this Agreement.

ARTICLE 5

1. For the implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in Transportation. This Committee shall meet, as a rule, once a year, alternately in the United States and the Soviet Union, 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 agencies and organizations to be responsible for carrying out cooperative activities; and making recommendations, as appropriate, to the Parties.

3. Each Party shall designate its Executive Agent which will be responsible for carrying out this Agreement. During the period between meetings of the Joint Committee, the Executive Agents shall maintain contact with each other, keep each other informed of activities and progress in implementing this Agreement, and 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 between the Parties or their respective rights and obligations under such other agreements.

ARTICLE 7

1. This Agreement shall enter into force upon signature and shall remain in force for five 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 agreements concluded under this Agreement between interested agencies, organizations and firms of the two countries.

Done at Washington, this 19th day of June, 1973, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the Government of the United States of America:

WILLIAM P. ROGERS.

For the Government of the Union of Soviet Socialist Republics:

A. GROMYKO.

[Treaties and Other International Acts Series 7650]

Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in the Field of Agriculture, Signed at Washington, June 19, 1973

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

Taking into account the importance which the production of food has for the peoples of both countries and for all of mankind;

Desiring to expand existing cooperation between the two countries in the field of agricultural research and development;

Wishing to apply new knowledge and technology in agricultural production and processing;

Recognizing the desirability of expanding relationships in agricultural trade and the exchange of information necessary for such trade;

Convinced that cooperation in the field of agriculture will contribute to overall improvement of relations between the two countries;

In pursuance and 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] and in accordance with the Agreement on Exchanges and Cooperation in Scientific, Technical, Educational, Cultural and Other Fields of April 11, 1972,[2] and in accordance with the Agreement on Cooperation in the Field of Environmental Protection of May 23, 1972;[3]

Have agreed as follows:

ARTICLE I

The Parties will develop and carry out cooperation in the field of agriculture on the basis of mutual benefit, equality and reciprocity.

ARTICLE II

The Parties will promote the development of mutually beneficial cooperation in the following main areas:

1. Regular exchange of relevant information, including forward estimates, on production, consumption, demand and trade of major agricultural commodities.
2. Methods of forecasting the production, demand and consumption of major agricultural products, including econometric methods.
3. Plant science, including genetics, breeding, plant protection and crop production, including production under semi-arid conditions.
4. Livestock and poultry science, including genetics, breeding, physiology, nutrition, disease protection and large-scale operations.
5. Soil science, including the theory of movement of water, gases, salts, and heat in soils.
6. Mechanization of agriculture, including development and testing of new machinery, equipment and technology, as well as repair and technical service.
7. Application, storage and transportation of mineral fertilizers and other agricultural chemicals.
8. Processing, storage and preservation of agricultural commodities, including formula feed technology.
9. Land reclamation and reclamation engineering, including development of new equipment, designs and materials.
10. Use of mathematical methods and electronic computers in agriculture, including mathematical modeling of large-scale agricultural enterprises.

Other areas of cooperation may be added by mutual agreement.

ARTICLE III

Cooperation between the Parties may take the following forms:

1. Exchange of scientists, specialists and trainees.
2. Organization of bilateral symposia and conferences.
3. Exchange of scientific, technical and relevant economic information, and methods of research.
4. Planning, development and implementation of joint projects and programs.
5. Exchange of plant germ plasm, seeds and living material.
6. Exchange of animals, biological materials, agricultural chemicals, and models of new machines, equipment and scientific instruments.
7. Direct contacts and exchanges between botanical gardens.
8. Exchange of agricultural exhibitions.

Other forms of cooperation may be added by mutual agreement.

ARTICLE IV

1. In furtherance of the aims of this Agreement, the Parties will, as appropriate, encourage, promote and monitor the development of cooperation and direct contacts between governmental and non-governmental institutions, research and other organizations, trade associations, and firms of the two countries, including the conclusion, as appropriate, of implementing agreements for carrying out specific projects and programs under this Agreement.
2. To assure fruitful development of cooperation, the Parties will render every assistance for the travel of scientists and specialists to areas of the two countries appropriate for the conduct of activities under this Agreement.
3. Projects and exchanges under this Agreement will be carried out in accordance with the laws and regulations of the two countries.

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[1] TIAS 7346; 23 UST 856.
[2] TIAS 7347; 23 UST 790.
[3] TIAS 7345; 23 UST 845.

ARTICLE V

1. For implementation of this Agreement, there shall be established a US–USSR Joint Committee on Agricultural Cooperation which shall meet, as a rule, once a year, alternately in the United States and the Soviet Union, unless otherwise mutually agreed.

2. The Joint Committee will review and approve specific projects and programs of cooperation; establish the procedures for their implementation; designate, as appropriate, institutions and organizations responsible for carrying out cooperative activities; and make recommendations, as appropriate, to the Parties.

3. Within the framework of the Joint Committee there shall be established a Joint Working Group on Agricultural Economic Research and Information and a Joint Working Group on Agricultural Research and Technological Development. Unless otherwise mutually agreed, each Joint Working Group will meet alternately in the United States and the Soviet Union at least two times a year. The Joint Committee may establish other working groups as it deems necessary.

4. The Executive Agents for coordinating and carrying out this Agreement shall be, for the Government of the United States of America, the United States Department of Agriculture, and for the Government of the Union of Soviet Socialist Republics, the Ministry of Agriculture of the USSR. The Executive Agents will, as appropriate, assure the cooperation in their respective countries of other institutions and organizations as required for carrying out joint activities under this Agreement. During the period between meetings of the Joint Committee, the Executive Agents will maintain contact with each other and coordinate and supervise the development and implementation of cooperative activities conducted under this Agreement.

ARTICLE VI

Unless an implementing agreement contains other provisions, each Party or participating institution, organization or firm, shall bear the costs of its participation and that of its personnel in cooperative activities engaged in under this Agreement.

ARTICLE VII

1. Nothing in this Agreement shall be interpreted to prejudice or modify and existing Agreements between the Parties.

2. Projects developed by the US–USSR Joint Working Group on Agricultural Research which were approved at the first session of the US–USSR Joint Commission on Scientific and Technical Cooperation on March 21, 1973, will continue without interruption and will become the responsibility of the US–USSR Joint Committee on Agricultural Cooperation upon its formal establishment.

ARTICLE VIII

1. This Agreement shall enter into force upon signature and remain in force for five years. It will be automatically extended for successive five-year periods unless either Party notifies the other of its intent to terminate this Agreement not later than six months prior to the expiration of this Agreement.

2. This Agreement may be modified at any time by mutual agreement of the Parties.

3. The termination of this Agreement will not affect the validity of implementing agreements concluded under this Agreement between institutions, organizations and firms of the two countries

Done at Washington, this 19th day of June, 1973, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the Government of the United States of America,

EARL L. BUTZ.

For the Government of the Union of Soviet Socialist Republics,

A. GROMYKO.

[Treaties and Other International Acts Series 7655]

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, Signed at Washington, June 21, 1973

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 U.S.S.R. 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 Contracts, 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.

(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;

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

(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.
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:

RICHARD NIXON
President of the United States of America

For the Union of Soviet Socialist Republics:

L. I. BREZHNEV
General Secretary of the Central Committee, CPSU

[Treaties and Other International Acts Series 7899]

Agreement Between the United States of America and the Union of Soviet Socialist Republics on Cooperation in the Field of Energy, Signed at Moscow, June 28, 1974

The United States of America and the Union of Soviet Socialist Republics;
Attaching great importance to meeting the energy needs of the two countries, with proper regard to the protection of the environment;
Recognizing that the development of cooperation in the field of energy can benefit the peoples of both countries and all mankind;

Desiring to expand and to deepen the cooperation now existing between the two countries in the field of energy research and development;

Recognizing the need to create better mutual understanding of each country's national energy programs and outlook;

Convinced that cooperation in the field of energy will contribute to the overall improvement of relations between the two countries;

In accordance with and in 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] and the Agreement on Cooperation in the Field of Environmental Protection between the United States of America and the Union of Soviet Socialist Republics of May 23, 1972, [2] as well as in accordance with the 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 of June 21, 1973, [3] 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; [4]

Have agreed as follows:

ARTICLE I

The Parties will expand and strengthen their cooperation in the field of energy on the basis of mutual benefit, equality and reciprocity.

ARTICLE II

The main objectives of such cooperation under this Agreement are:

(a) to use the scientific and technical potential of both countries to accelerate by cooperative efforts research and development in the areas of existing and alternative sources of energy as well as to increase effectiveness in the use of energy and its conservation, and

(b) to achieve a better mutual understanding of each country's national energy programs and outlook.

ARTICLE III

1. Cooperation will be implemented in the following areas:

(a) technologies concerning the exploration, extraction, processing and use of fossil fuels, including but not limited to oil, shale, natural gas and coal, and, in particular, new methods of drilling and of increasing the rate of extraction and degree of recovery of oil and natural gas from strata, and of mining, extracting and processing coal and shale;

(b) the exchange of relevant information, views and methods of forecasting concerning the national energy programs and outlooks of the respective countries, including all questions of mutual interest related to production, demand and consumption of the major forms of fuels and energy;

(c) technology for developing non-conventional sources of energy, such as solar and geothermal energy and synthetic fuels;

(d) energy-related environmental technology; and

(e) measures to increase the efficiency of energy use and to restrain demand.

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

ARTICLE IV

1. Cooperation between the Parties may take the following forms:

(a) exchange of scientists and specialists;

(b) exchange of scientific and technical information, documentation and results of research;

(c) establishment of groups of experts for the planning and execution of joint research and development programs;

(d) joint work by theoretical and experimental scientists in appropriate research centers of the two countries; and

(e) holding joint consultations, seminars and panels.

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

3. Cooperation under this Agreement will be carried out in accordance with the laws and regulations of the respective countries.

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[1] TIAS 7346; 23 UST 856.
[2] TIAS 7345; 23 UST 845.
[3] TIAS 7655; 24 UST 1486.
[4] TIAS 7649; 24 UST 1395.

ARTICLE V

1. In furtherance of this Agreement, the Parties will, as appropriate, encourage, facilitate and monitor the development of contacts and cooperation between organizations, institutions and firms of the respective countries, including the conclusion, as appropriate, of implementing agreements for carrying out cooperative activities under this Agreement.

2. To assure fruitful development of cooperation, the Parties will render every assistance for the travel of scientists and specialists to areas of the respective countries appropriate for the conduct of activities under this Agreement.

ARTICLE VI

1. For implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in the Field of Energy. Meetings of the Joint Committee 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, consultations on the energy situation and outlook of the respective countries; 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. The Joint Committee shall establish the necessary working groups to carry out the programs, projects and exchange of information contemplated by this Agreement.

3. Each Party shall designate its Executive Agent which will be responsible for carrying out this Agreement. During the period between meetings of the Joint Committee, the Executive Agents shall maintain contact with each other, keep each other informed of activities and progress in implementing this Agreement, and coordinate and supervise the development and implementation of cooperative activities conducted under this Agreement.

ARTICLE VII

Nothing in the Agreement shall be interpreted to prejudice or modify any existing agreements between the Parties, except that energy projects within 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 and the Agreement between the United States of America and the Union of Soviet Socialist Republics on Cooperation in the Field of Environmental Protection of May 23, 1972 which clearly fall under this Agreement henceforward will be implemented pursuant to this Agreement.

ARTICLE VIII

Unless an implementing agreement contains other provisions, each Party or participating institution, organization or firm, shall bear the costs of its participation and that of its personnel in cooperative activities engaged in pursuant to this Agreement.

ARTICLE IX

1. This Agreement shall enter into force upon signature and remain in force for five years. It will be automatically extended for successive five-year periods unless either Party notifies the other of its intent to terminate this Agreement not later than six months prior to the expiration of this Agreement.

2. This Agreement may be modified at any time by mutual agreement of the Parties.

3. The termination of this Agreement will not affect the validity of implementing agreements concluded under this Agreement between institutions, organizations and firms of the respective countries.

Done at Moscow on June 28, 1974, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the United States of America:

RICHARD NIXON,
President of the United States of America.

For the Union of the Soviet Socialist Republics:

N. PODGORNYY,
Chairman of the Presidium of the Supreme Soviet of the USSR.

[Treaties and Other International Acts Series 7867]

Agreement Between the United States of America and the Union of Soviet Socialist Republics on Cooperation in Artificial Heart Research and Development, Signed at Moscow, June 28, 1974

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

Reaffirming the importance that medical science has for mankind today;

Realizing the advisability of further uniting the efforts of both countries in resolving the pressing problems of medical science;

Recognizing the great importance of scientific research and the study of heart disease, which is one of the leading causes of mortality in both their countries as well as throughout the world;

Desiring to expand and strengthen common efforts to promote the development of an artificial heart;

Realizing that the development of an effective artificial heart could eventually lead to a reduction in mortality;

In pursuance and 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 Field of Medical Science and Public Health, signed May 23, 1972;[1]

In accordance with the General Agreement between the United States of America and the Union of Soviet Socialist Republics on Contacts, Exchanges and Cooperation, signed June 19, 1973;[2]

Have agreed as follows:

Article I

Both parties undertake to develop and extend scientific and technical cooperation in artificial heart research and development on the basis of equality, reciprocity and mutual benefit.

Article II

The cooperation will be concentrated in the areas of research on, and joint development and testing of devices, materials, instruments and control mechanisms which will provide cardiovascular support including total heart replacement.

Article III

The cooperation provided for in the preceding Articles may be implemented principally in the following ways:

(a) exchange of scientific and technical information;
(b) organization of joint conferences, workshops and meetings of experts;
(c) exchanges of specialists and delegations;
(d) preparation of joint publications and technical manuals; and
(e) familiarization with and exchange of technical aids and equipment.

In the course of implementing this Agreement, other forms of cooperation may also be determined by mutual agreement.

Article IV

The parties will delegate practical implementation of this Agreement to the US-USSR Joint Committee for Health Cooperation. The Committee shall approve the programs of cooperation, designate the participating organizations responsible for the realization of these programs, and periodically review the progress of the cooperation.

Article V

Cooperation shall be financed on the basis of reciprocal agreements worked out by the Joint Committee, using the resources of the Department of Health, Education, and Welfare of the United States of America and the Ministry of Health of the Union of Soviet Socialist Republics, as well as the resources of those organizations and institutions taking part in the cooperation.

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[1] TIAS 7344; 23 UST 826.
[2] TIAS 7649; 24 UST 1395.

ARTICLE VI

Such cooperation will be carried out in accordance with the laws and regulations of the respective countries.

Nothing in this Agreement shall be construed to prejudice or modify other agreements concluded between the two parties.

ARTICLE VII

This Agreement shall enter into force upon signature and shall remain in force for three years after which it will be extended for successive five year periods unless one party notifies the other of its intent to terminate this agreement not less than six months prior to its expiration.

This Agreement may be modified by mutual agreement of the parties.

Done at Moscow on June 28, 1974, in duplicate, in the English and Russian language, both texts being equally authentic.

For the United States of America: For the Union of Soviet Socialist Republics:

HENRY A. KISSINGER
Secretary of State

A. GROMYKO
Minister of Foreign Affairs

[Treaties and Other International Acts Series 7898]

Agreement Between the United States of America and the Union of Soviet Socialist Republics on Cooperation in the Field of Housing and Other Construction, Signed at Moscow, June 28, 1974

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

Desiring to develop cooperation in the field of housing and other construction;

Realizing that a more effective application of new and traditional building materials and techniques can contribute to more rational utilization of the resources available to both countries;

Desiring to exchange information and techniques in the field of housing and other construction;

Believing that cooperation in the field of housing and other construction offers benefits for both the United States of America and the Union of Soviet Socialist Republics;

Convinced that such cooperation will serve to contribute to the improvement of relations between the two countries;

Noting cooperation already being implemented in these areas under existing agreements, and in accordance with the General Agreement between the United States of America and the Union of Soviet Socialist Republics on Contacts, Exchanges, and Cooperation, signed June 19, 1973;[1]

Have agreed as follows:

ARTICLE I

The Parties will develop and carry out cooperation in the field of housing and other construction on the basis of mutual benefit, equality and reciprocity.

ARTICLE II

This cooperation will be directed to the investigation and solution of specific problems of mutual interest in the field of housing and other construction.

Initially, cooperation will be implemented in the following areas:

(a) innovative techniques for the improvement of life safety, reliability, quality, and economy of buildings and building materials including: organization and management of construction, new methods and materials, and the improved use of traditional methods and materials;

(b) performance criteria for housing and other construction in seismic areas with special consideration of the impact of geophysical conditions;

(c) improvement of construction methods in areas of extreme climatic conditions, such as cold and arid regions, including techniques for erection and finishing of buildings under sustained freezing, and foundation construction under unusual soil conditions;

(d) services to housing and other buildings, including water supply, waste disposal, heating, lighting, and ventilation, with special reference to combined utility functions; and

(e) planning, design, and construction of new towns. Other areas of cooperation may be added by mutual agreement.

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[1] TIAS 7649; 24 UST 1395.

ARTICLE III

Cooperation pursuant to this Agreement may be implemented by the following means:

(a) exchange of experts, advanced students and delegations;
(b) exchange of scientific and technical information and documentation;
(c) conducting joint conferences, meetings and seminars;
(d) joint development and implementation of research programs and projects; and
(e) other forms of cooperation which may be mutually agreed upon.

Such cooperation shall be conducted in accordance with the constitution and applicable laws and regulations of the respective countries.

ARTICLE IV

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 agencies, organizations and firms of the two countries, including the conclusion, as appropriate, of implementing agreements for carrying out specific projects and programs under this Agreement.

ARTICLE V

1. For the implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in Housing and Other Construction. This Committee shall meet, as a rule, once a year alternately in the United States and the Soviet Union, unless otherwise mutually agreed.

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

3. Each Party shall designate its Executive Agent which will be responsible for coordinating and carrying out this Agreement, and, as appropriate, in their respective countries, shall assure the cooperation of other participating institutions and organizations. During the period between meetings of the Joint Committee, the Executive Agents will maintain contact with each other and will coordinate and supervise the development and implementation of cooperative activities conducted under this Agreement.

4. Unless an implementing agreement contains other provisions, each Party or participating institution, organization or firm shall bear the costs of its participation and that of its personnel in cooperative activities engaged in under this Agreement.

ARTICLE VI

Nothing in this Agreement shall be interpreted to prejudice other agreements between the Parties or their respective rights and obligations under such other agreements.

ARTICLE VII

1. This Agreement shall enter into force upon signature and remain in force for five years. It will be automatically extended for successive five year periods unless either party notifies the other of its intent to terminate this Agreement not later than six months prior to the expiration of this Agreement.

2. This Agreement may be modified at any time by mutual agreement of the Parties.

3. The termination of this Agreement shall not affect the validity of implementing agreements concluded under this Agreement between interested agencies, organizations and firms of the two countries.

Done at Moscow on June 28, 1974, in duplicate in the English and Russian languages, both texts being equally authentic.

For the United States of America:

RICHARD NIXON,
President of the United States of America.

For the Union of Soviet Socialist Republics:

A. KOSYGIN,
Chairman of the Council of Ministers of the USSR.

PROJECTS UNDER COOPERATIVE AGREEMENTS

AGRICULTURE

Agricultural Economic Research and Information: Agribusiness; Forecasting; Economic Information; Library Exchange.

Agricultural Research and Technological Development: Plant Science; Animal and Veterinary Science; Soil Science and Land Conservation; Mechanization of Agriculture.

ATOMIC ENERGY

Controlled Thermonuclear Fusion.

Fast Breeder Reactors.

Research on Fundamental Properties of Matter.

ENERGY

Design and Operation of Thermal and Hydroelectric Power Stations.

Design and Operation of Heat Rejection Systems for Thermal Power Plants.

Design and Operation of Air Pollution Reduction and Waste Disposal Systems for Thermal Power Plants.

UHV Transmission Technology and HVDC Transmission System Experience and Design.

Electric Power System Planning and Dispatching.

Superconducting Transmission Technology.

Development of Commercial Scale.

Open Cycle MHD Power Plants.

General Technology for the Utilization of Solar Energy.

General Technology for the Utilization of Geothermal Energy.

Prevention of Environmental Pollution During Well Drilling Production.

Pipeline Transportation of Oil and Gas.

ENVIRONMENTAL PROTECTION

Prevention of Air Pollution: Air Pollution Modeling and Standard Setting; Instrumentation and Measurement Methodology; Gaseous Emission Abatement Technology; Process Improvement and Modification; Transportation Source Air Pollution Control Technology.

Prevention of Water Pollution: Studies and Modeling of River Basin Pollution; Protection and Management of Water Quality in Lakes and Estuaries; Effect of Pollutants Upon Aquatic Ecosystems and Permissible Levels of Pollution; Prevention of Water Pollution from Industrial and Municipal Sources.

Prevention of Pollution Associated With Agricultural Production: Integrated Pest Management; Interreaction Between Forests, Plants, and Pollutants; Forms and Mechanisms by Which Pesticides and Chemicals Are Transported; Effect of Chemicals Used in Agriculture on Fauna.

Enhancement of the Urban Environment: Ensuring Adequate Environment in New Communities and Newly Developing Areas; Improvement of Environment With Regard to Historic Places and Monuments; Removal and Processing of Solid Waste in Urban Areas; Enhancement of Environment in Existing Cities; Recreation Zones in Urban and Near-Urban Areas.

Protection of Nature and the Organization of Preserves: Conservation of Wild Species of Fauna and Flora; Protection of Northern Ecosystems; Protected Natural Areas and National Parks; Biosphere Reserves; Protection of Arid Ecosystems; Marine Mammals.

Protection of the Marine Environment from Pollution: Prevention and Clean-Up of Pollution of the Marine Environment From Shipping; Effect of Pollutants on Marine Organisms.

Biological and Genetic Effects of Environmental Pollution: Biological and Genetic Effect of Pollutants; Comprehensive Analysis of the Environment.

Influence of Environmental Changes on Climate: Effects of Changes in the Heat Balance of the Atmosphere on Climate; Effects of Pollution of the Atmosphere on Climate; Influence of Solar Activity on Climate.

Earthquake Prediction: Field Investigations of Earthquake Prediction; Laboratory and Theoretical Investigations of the Physics of the Earthquake Source; Mathematical and Computational Prediction of Places Where Large Earthquakes Occur and Evaluation of Seismic Risk; Engineering-Seismological Investigations; System of Simultaneous Warnings on Tsunamis.

Arctic and Sub-Arctic Ecological Systems.

Legal and Administrative Measures for Protecting Environmental Quality: Legal and Administrative Measures; Harmonization of Air and Water Pollution Standards.

HOUSING

Building Design and Construction Management.

Industrialized Building Systems and Utilities.

Building Materials and Components.

Construction in Seismic Areas.

Building for Extreme Climates or Unusual Geological Conditions.

New Towns.

MEDICAL SCIENCE AND PUBLIC HEALTH

Cardiovascular Diseases: Pathogenesis of Arteriosclerosis; Management of Ischemic Heart Disease; Myocardial Metabolism; Congential Heart Disease; Sudden Death; Blood Transfusions; Blood Components and Prevention of Hepatitis With Particular Reference to Cardiovascular Surgery; Artificial Heart.

Malignant Neoplasms: Cancer Chemotherapy; Immunotherapy of Human Tumors; Leukemia and Tumor Viruses of Animals and Man; Genetics of Tumor Cells; Epidemiology; Cancer Control and Cancer Centers.

Environmental Health: Methodological Basis for the Assessment of the Biological Effect of Inhaled Chemicals; Methodological Basis for the Assessment of the Biological Effect of Orally Introduced Chemicals; Scientific Basis for the Assessment of the Complex Biological Effects of Chemicals (Inhaled and Introduced Orally).

Arthritides: Evaluation of Therapeutic Treatment; Microbiology and Immunology; Surgical Treatment.

Influenza and Acute Respiratory Diseases: Etiology and Specific Immunoprophylaxis of Influenza and Acute Respiratory Diseases; Epidemiology of Influenza and Acute Respiratory Diseases; Ecology of Human Influenza and Animal Influenza Related to Human Infection; Chemo-Interferon Prophylaxis and Therapy of Influenza and Acute Respiratory Diseases; Genetics, Structure, Replication and Biology of Influenza Viruses.

OCEANS

Large-Scale Ocean-Atmosphere Interaction: GARP Atlantic Tropic Experiment; Air/Sea Interaction Studies in the North Pacific.

Ocean Currents of Planetary Scale and Other Questions of Ocean Dynamics: Mid-Ocean Dynamics Experiment (POLYMODE); Southern Ocean Studies; Research in Numerical Models.

Geochemistry and Marine Chemistry of the World Ocean and Geochemical Ocean Sections Studies (GEOSECS).

Geological and Geophysical Investigations of the World Ocean Including Deep-Sea Drilling for Scientific Purposes: Deep-Sea Drilling; Trans-Atlantic Geophysical Traverse (TAG); North West Pacific Plate Dynamics; Configuration of the Second Layer of Ocean Floor and the Origin of Magnetic Anomalies.

Biological Productivity of the World Ocean and the Biochemistry of the Functioning of Individual Organisms and Whole Biological Communities in the World Ocean: Marine Ecological Systems and Biological Productivity.

Intercalibration and Standardization of Oceanographic Instrumentation and Methods.

SCIENCE AND TECHNOLOGY

Application of Computers to Management: Econometric Modeling; Computer Analysis Applied to the Economics and Management of Large Systems; Application of Computers to the Management of Large Cities; Theoretical Foundation for the Design, Development, and Production of Software; Computer-aided Refinement of Decision-Making of High-Ranking Executives.

Chemical Catalysis: Catalysis by Coordination Complexes and Organometallic Compounds; Catalytic Reactor Modeling; In-depth Study of Selected Catalytic Systems; Life Support Systems; Environmental Control.

Electrometallurgy: Electroslag Technology (Melting and Casting; Welding); Plasma-Arc Melting of Metallic Materials; Electron-Beam Evaporation of Metallic and Non-Metallic Materials in Vacuum; Investigation and Development of New Welding Materials for General and Special Applications; Determination and Analysis of Engineering Properties, and Quality Assessment; Solid State Joining.

Forestry Research and Technology: Effective Methods and Means of Detection, Prevention and Control of Forest Fires; Integrated Control of Forest Insects and Diseases; Classification of Forest Biogeocenosis (ecosystems) and Determination of Their Biological Potential; Development of Improved Technological Processes of Forest Harvesting; Reforestation and Afforestation.

Intellectual Property.

Metrology: Intercomparison of Pressure Standards; Intercomparison of Transportable Volt Standards; Intercomparison of Standards for Ionizing Radiation; Intercomparison of Laser Wavelengths; Intercomparison of Thermocouples; Intercomparison of Thermoelectric Voltage Converters; Refinement of Physical Constants; Automated Information and Control Systems in Standardization; Use of Computers for Control of the Process of Standardization; Standard Reference Data.

Microbiology: Development of Technology for Industrial Production of Food and Feed Proteins by Microbial Means; Engineering Research and Development of Instrumentation and Methods for the Computerized Simulation, Design and Control of Processes for Microbial Technology; Molecular Biology for Industrial Microorganisms; Development of Methods of Producing and Using Enzymes and Other Biologically Active Substances for Agriculture; Microbiological Control of Pests of Agricultural Crops.

Physics: Solid State Theory; Theoretical Relativistic Astrophysics.

Science Policy: Planning and Administration of R&D; Financing R&D; Training and Utilization of Scientific and Engineering Technical Personnel; Stimulating the Development of Fundamental Research.

S&T Information: Development and Testing of Common Communications Format for Bibliographic Data Exchange; Improving Methods of Forecasting Information Requirements and Services; Estimating Costs and Benefits of Information Services.

Standardization.

Water Resources: Planning, Utilization and Management of Water Resources; Cold-Weather Construction Techniques; Methods and Means of Automation and Remote Control in Water Resource Systems; Plastics in Construction.

SPACE

Apollo-Soyuz Test Project.
Satellite Meteorology.
Rocket Meteorology.
Space Biology and Medicine.
Space Science.
The Study of the Natural Environment.

TRANSPORTATION

Transport Construction: Bridge Structures; Transportation Tunnels.

Railroad Transportation: Improved Design and Maintenance of Railroad Track Systems; System of Transporting Perishable Foodstuff in Self-Contained Refrigeration Cars; Modern Electrified Railroads.

Civil Aviation: Airworthiness Standards and Certification Procedures; Air Traffic Control; Non-Visual Landing Systems; Methods of Gathering, Processing and Analyzing Data on Aircraft Accidents and Incidents, and What Causes Them for Increasing the Level of Safety in Civil Aviation; Training of Specialists for Civil Aviation; Utilization of Aviation in Agriculture, Construction, and Other Fields; Assuring Safety of Passengers, Aircraft, and Cargo.

Marine Transport: Requirements for Safety of Life at Sea; Ice Transiting Techniques and Technology; Organization and Technology of Ocean Commerce; Commercial Ship Equipment, Crew Training, and Human Factors; Joint Study of Ocean Wave Spectra and of Loads in Ships Body Elements at Sea.

Automobile Transport: Training of Automobile Drivers and Licensing Requirements; Dissemination of Information Concerning Traffic Laws and Regulations.

Transport Facilitation: Simplification and Standardization of Transport Documentation and Procedures for Trade; Identical Interpretation of Standard Commodity Descriptions and Their Codes; Development and Implementation of Cargo Data Interchange Systems.

Transport of the Future.

Urban Transportation.