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USSR–Western Europe: Implications of the Siberia-to-Europe Gas Pipeline [redacted]

An Intelligence Assessment

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USSR—Western Europe: Implications of the Siberia-to-Europe Gas Pipeline [redacted]

Key Judgments

The proposed project --which would be completed in about 1986 -- is vital to the Soviets and important to the West Europeans. We expect Soviet oil exports to the West to decline sharply by the mid-1980s. Increased gas exports are Moscow's only major alternative source of hard currency. Without the earnings expected from the pipeline deal, Moscow would have to reduce imports of Western machinery and other goods greatly. Moreover, the project furthers Soviet goals of drawing Western Europe into a closer political-economic relationship.

The Question of Political Leverage

The pipeline would be a major new element in Soviet-West European relations. It would provide the Soviets one additional pressure point they could use as part of a broader diplomatic offensive to persuade the West Europeans to accept their viewpoint on East-West issues. Such pressures might be directed, for example, at undermining European willingness to act in concert with the US on economic sanctions against the Soviets or on security issues.

Circumstances that would affect any thoughts the Soviets might have to threaten to cut off gas shipments for political ends include: (1) the Soviet need for hard currency earnings; and (2) the physical setup of the pipeline, which will preclude cutting off any one West European country without cutting them all off. But political leverage stemming from the gas pipeline could—and probably would—be applied more subtly. The emphasis would be on the benefits to be gained from cooperation and from avoiding contentious issues.

Nevertheless, even cutoffs are not without some precedent. The Soviets cut off oil supplies to Yugoslavia in 1948, to Israel in 1956, and to China in the early and mid-1960s. In all three cases, Moscow faced much less serious consequences than would be at stake with the European pipeline.

West European Perspective

Barring a major increase in East-West tensions, West European governments see increased use of Soviet gas as an acceptable political risk. Western Europe views the USSR as a more reliable supplier than many alternative sources. They argue, for example, that Moscow is less likely than Algiers to use gas leverage as a means of blackmail. They also point out that their overall dependence on Moscow for energy supplies would increase little, because of declining Soviet oil deliveries.

Moreover, the six West European countries involved see major economic benefits. They need to increase gas imports to offset the likely decline in oil supplies. Related equipment sales by West European firms would create thousands of jobs and billions of dollars in business. The Soviets would also spend a large part of their earnings from gas sales in Western Europe.

West European officials are nevertheless wary of signaling their approval to the Soviets while the Polish situation remains volatile. West Germany and France recently agreed to a joint study of the whole project, which they could use to delay it if necessary.

Impact of the "Natural Gas Weapon"

The likelihood is strong that the Soviets will attempt subtle exploitation of the developing natural gas relationship. The effects of such pressure would depend on: (1) West European and NATO cohesion and will; and (2) progress over the next few years by Western Europe in installing "insurance" in the form of strategic reserves and fuel substitution capability. West European countries are taking steps to protect themselves from Soviet supply interruptions. But additional measures are necessary to provide the cushion needed to avoid serious repercussions in the event of a complete Soviet cutoff.

One policy device yet to be fully explored is a mechanism for sharing shortages in the event of a supply disruption resulting from either technical or political factors.

[redacted]

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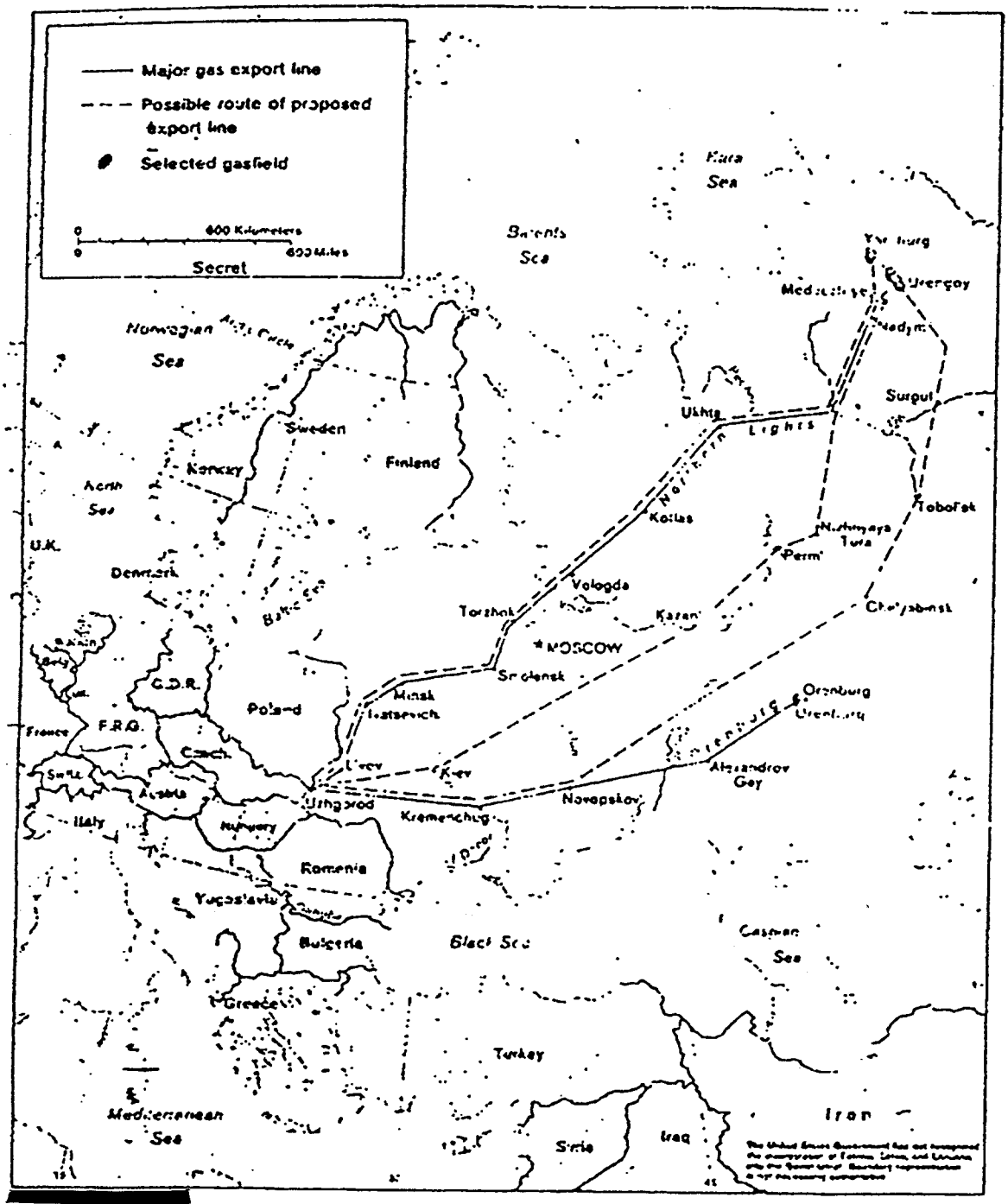

USSR—Western Europe: Implications of the Siberia-to-Europe Gas Pipeline [redacted]

Dimensions and Status of the Project

The proposed Siberia-to-Western Europe natural gas pipeline is the largest East-West trade project ever negotiated. The gas export project entails construction of a trunkline from the Yamburg gasfield in West Siberia to West Germany, a distance of approximately 5,000 kilometers. The pipeline will be almost totally dedicated to export. It will have a capacity of 4.8-5.8 billion cubic feet/day (cf/d), depending on whether it is a single or double line. The gas will be distributed among at least six West European countries—West Germany, France, Italy, the Netherlands, Belgium, and Austria. The agreement would cover a 20-year period, with the pipeline's hard currency costs recouped in two years. The East European countries across which the pipeline travels reportedly will receive roughly 20 percent of the exported gas as a transit fee. (See appendix A.) [redacted]

Soviet indecision regarding the pipeline's route and capacity has created a range in possible project dimensions. [redacted] Moscow will decide to build two lines operating at a lower maximum pressure than would be used in the single-line option, since operating a single line at higher pressures would present greater difficulties. The route in the USSR and Eastern Europe could follow several directions (see map). If a two-line route is selected, hard currency requirements for the Soviet portion of the line could reach $14 billion. (See appendix B.) Interest charges during construction would approximate $3 billion for that particular option. Bringing the pipeline to full capacity in any event will take at least four years from contract signing. [redacted]

Although no credit agreements have been initialed, the Soviets appear to have lined up perhaps $16 billion in Western financing, largely official and officially backed credits. The six principal West European participants have offered $13 billion, with another $3 billion probably extended by Japan. Gas pricing is an outstanding issue. The Soviets have backed off for now from a demand for gas prices at parity with crude oil, which at the present average OPEC price of $35 per barrel would be about $6 per 1,000 cubic feet (cf). [redacted] Moscow will eventually settle for less than parity with oil, but this seems unlikely given trends in recent gas price agreements within Western Europe. [redacted]

Benefits to the USSR

The gas pipeline project would constitute a financial bonanza for the Soviets. Specifically, the increase in gas exports will provide a major boost to hard currency earnings at a time when oil exports are declining. [redacted]

Once the pipeline is operating at full capacity, the USSR would be exporting for hard currency the equivalent of 1.1-1.2 million b/d—roughly the same volume of oil exported to hard currency countries in 1979-80. If prices achieve parity with crude oil by 1985, hard currency earnings from gas at 1980 oil prices would reach $15-19 billion, about matching combined earnings from exports of oil and gas in 1980. By 1990, gas export earnings would be in the $19-24 billion range. [redacted]

Moscow is counting on the gas project to provide an offset to declining hard currency earnings from oil. The near leveling off of oil production projected in the 1981-85 Soviet plan, coupled with rising domestic consumption and Soviet commitments to maintain current oil export levels to Eastern Europe, imply a drastic reduction in Soviet oil exports to the West. (See appendix C.) The Soviet Government probably expects such a reduction. [redacted] Moscow will face an even more difficult adjustment—that oil production will begin to decline within the next 1 to 3 years and continue

...rough the rest of the decade. Under these ...nces, even with tight domestic oil rationing, ... could not avoid an elimination of hard cur... ...il exports and probably would have to import ...stantial amounts of oil for hard currency.

The outlook for Soviet earnings from exports other than oil and gas is dim. Some of the more traditional exports of raw materials—timber and metals—are declining. Gold and arms are more promising, but they are erratic and in any event will not be large enough to offset the decline in export earnings. With the proposed pipeline, therefore, the Soviet Union could probably do no better than maintain the current purchasing power of its exports over imports of Western food, machinery, and materials other than oil. Without the pipeline, we doubt that Moscow could avoid a dramatic decline in such imports.

As for gas production, the project will not initially enhance Soviet output for domestic use because of the export pipeline's absorption of skilled labor and other resources needed on domestic pipeline projects. Over the long run, the technology transfer associated with the project should foster the development of critical gas industry infrastructure. The deal would enable the USSR to purchase Western Arctic-design equipment for gas extraction and transport—such as wellhead assemblies, drill pipe, large-diameter line pipe, and state-of-the-art compressors—essential to Siberian gas development but not mass-produced by the Soviets. Without the pipeline deal and its hard currency earnings, on the other hand, the Soviets would be hard pressed to finance imports of Western pipe and equipment essential to domestic gas projects.

East European Stake

The East Europeans would benefit substantially from the additional gas they would receive from the new pipeline. The precise amount will depend on the proposed pipeline's throughput, of which Eastern Europe will receive approximately 20 percent. Current Soviet gas deliveries of 3.2 billion cf/d annually account for about 6 percent of Eastern Europe's primary energy consumption and over 20 percent of all energy imports from the USSR. Soviet gas exports to the region nearly tripled during 1976-80, yet gas deliveries to the region as a whole over the next five years are currently expected to grow by only about 5 percent a year—with some countries anticipating no further increments. The additional gas deliveries, however, could boost the share of Soviet gas to close to 30 percent of Soviet energy deliveries to Eastern Europe and to 9 percent of Eastern Europe's total primary energy consumption by 1985.

If gas from the pipeline is paid as a transit fee only to those countries that the pipeline crosses, the additional gas would go entirely either to Poland and East Germany or to Czechoslovakia, depending on the route selected. Czechoslovakia appears to be the favored route at present, especially given the turmoil in Poland. If only one or two countries received the entire allotment, the additional gas would substantially improve the recipients' energy balances in the mid-to-late 1980s.

West European Perspective

The pipeline project would benefit Western Europe by further diversifying its gas supplies and reducing its dependence on OPEC oil. West European industries would also benefit substantially from the equipment sales that would be associated with the project. Finally, West European governments realize that most of the foreign exchange Moscow earns from the sale of gas will be spent in Western Europe.

The six West European countries depend on imported energy, primarily oil, for more than half of their energy. While oil remains the dominant energy source, natural gas is becoming increasingly important, accounting for almost 20 percent of total energy use last year compared with only 8 percent a decade earlier. The USSR already supplies Western Europe with about 2.2 billion cf/d based on prior agreements with West Germany, France, Italy, and Austria. The current negotiations are for additional Soviet supplies of at least 3.9 billion cf/d to these four countries plus Belgium and the Netherlands by 1990.

These plans would more than double the proportion of Soviet gas in total West European gas consumption from about 10 percent to about 25 percent. The most important increases would be in West Germany (from 14 to 29 percent) and Belgium (from 0 to 32 percent). France, which received no direct shipments of Soviet gas until 1980, could rely on the Soviets for as much as 28 percent of its gas by 1990. On a broader scale, Soviet gas would rise to about 6 percent of total West European primary energy supplies. (See appendix D.)

The West Europeans recognize that the pipeline deal would increase their vulnerability to Soviet economic leverage, but they have long seen the Soviets as a more reliable source of energy supply than the LDCs. This attitude originated in the Suez crisis of 1956, when Western Europe was affected by cutoffs of Middle Eastern oil and turned to the Soviet oil then beginning to enter the world market. The West Europeans have remained steady customers for Soviet oil, which continued to be delivered during the Middle East war of 1967 and the Arab oil embargo of 1973-74, even though the Soviets verbally supported the Arab action.

Another incentive encouraging the West European move is the prospect of large-scale equipment sales. Indeed, West European suppliers of pipeline, machinery, and equipment expect to benefit substantially from the project. Altogether, pipe and equipment sales of up to $14 billion may be involved. The chief West European beneficiaries would be the firms that have already provided several billion dollars in gas equipment to the Soviets during the 1970s. Many of these firms have developed substantial production capacity dedicated to Soviet needs. (See appendix E.)

Technical Risks to Delivery

Dependence on Soviet natural gas supplies can be risky from a technical, as well as a political, standpoint. Given the difficult terrain, long distances, and heavy demands on equipment, chances are high that supply problems will develop from time to time on purely technical grounds. The past record of Soviet gas deliveries substantiates this. Temporary reductions in gas deliveries for purely technical or seasonal reasons have become frequent in recent years, the new export pipeline would also be subject to such interruptions, particularly during the winter months. The primary causes of cutbacks are difficulties in meeting peak winter gas needs and unreliable operation of pipelines during the winter season.

With or without the project, the Soviet gas industry will have little surge production capacity. In fact, because of adverse winter conditions, output often declines when supplies are most needed. The problem is that gas storage capacity, less than 10 percent of consumption, has not filled the seasonal supply gap. Winter supply problems will persist, with peak demand probably increasing as a share of annual consumption. Substitution of gas for oil in domestic consumption will gain momentum by the late 1980s, enlarging the number of potential winter consumers. Although some fuel switching will be possible, flexibility will remain limited.

Breakdowns in pipeline operations due to pipe and valve failures have also caused export reductions and are likely to do so in the future. Although not confined to the winter season, pipeline failures are more likely during that period and often compound the difficulties of meeting peak gas demand. Operational reliability of the export pipeline will become particularly worrisome if it parallels the Northern Lights trunk system, one of the world's most trouble-prone pipe routes. Although good reliability has been achieved for gaslines in the North American Arctic, the Soviets probably will not fare as well. Pipe ruptures and compressor station breakdowns are probable, even if Western equipment is used. (See appendix F.)

Potential Soviet Political Leverage

Moscow sees definite political advantages in the prospective natural gas arrangement, short of attempting direct leverage through a gas cutoff. A supply interruption is unlikely because of the substantial economic cost to the USSR itself. In addition, cutting off gas supplies to attempt political blackmail would undermine any improvement in the Soviet–West European political climate that the pipeline project is in

part designed to foster. Finally, a supply interruption would be an extremely blunt weapon for the Soviets to apply since Moscow would be unable to interrupt supplies to just one target country. For example, all shipments would pass through West Germany; about 15 percent of the total would continue on to Belgium and the Netherlands. Withholding supplies to these countries, therefore, would require West German cooperation.

Short of a complete cutoff, the natural gas arrangement with Western Europe would yield two major opportunities for increased political influence for the Soviet Union. The first lies in the impetus that the gas deal would impart to broader Soviet efforts to draw Western Europe into closer political and economic relations with the USSR. The aim of this Soviet effort is to increase the legitimacy of Soviet foreign policy goals in the eyes of West Europeans and to persuade them to see US-led or coordinated NATO "anti-Soviet" initiatives as unnecessary or disturbing to a favorable status quo. The Soviets are now pursuing this goal, with mixed success, through individual bilateral and multilateral arrangements and through the Conference on Security and Cooperation in Europe.

The second advantage to the Soviet Union lies in opportunities that the evolving natural gas relationship would provide to help achieve specific political objectives. The pipeline deal might give the Soviets substantial opportunity to gain political benefits if they used their potential leverage indirectly and as only one element in a broader diplomatic offensive. Opportunities could arise during the construction phase of the gas deal (until at least the mid-1980s) because of European eagerness to keep production and employment levels as high as possible. After the pipeline is completed, the leverage would lie in West European reluctance to cope with Soviet manipulation of gas supplies.

To capitalize on these potential opportunities, the Soviets would have to create the apprehension (in the construction phase) that equipment orders might be canceled and (later) that the supply of gas might be reduced without appearing so threatening as to provoke a West European backlash and to unify the West European countries' resistance. Thus, they probably would allude to the gas situation only indirectly—by reminding the West Europeans of the benefits of economic cooperation—while stressing the need to avoid "anti-Soviet" actions that could worsen the West European political climate and playing on differences between the West Europeans and the United States and among West European countries. They could avoid direct threats by reducing gas supplies with the explanation that there were "technical problems," which would be "solved" if the political situation improved.

Specific Areas of Leverage

Two issues that the USSR might try to influence by using its potential natural gas leverage as part of a broader diplomatic effort are Western economic sanctions and NATO military modernization. In the first case, the Soviets probably would believe that the prospect of difficulties arising with Soviet gas deliveries would be an important consideration in West European support for a US-led economic boycott of the Soviet Union or in limiting transfers of high technology to the Soviets. The Soviets, for example, used energy diplomacy as one element in their campaign against West European support for US-led sanctions because of the invasion of Afghanistan. A TASS commentary in April 1980 hinted that Western Europe and Japan would risk losing fuel supplies from the Soviet Union if they joined in these sanctions. It is unclear how West European behavior was affected by such statements, but it is clear that European support for the sanctions was weakened because of a general concern about the economic and political costs of reduced trade with the USSR.

The gas connection could be used to influence decisions by European NATO members on implementation of the NATO Long-Term Defense Plan and deployment of long-range theater nuclear forces (LRTNF). For example, the increase in West German dependence on Soviet gas from 14 to 29 percent, when taken in the context of German efforts to maintain the present level of Soviet–West German economic interdependence, could provide one more argument for those groups that are trying to hold down growth in German real defense

spending. Similarly, the prospective doubling of French dependence on Soviet gas might assist the Soviet effort to slow or halt the recent trend toward closer military cooperation between France and its allies. Finally, if Belgium had been receiving natural gas from the Soviets in 1979, the USSR would have had an additional diplomatic point with which to press for Belgian opposition to LRTNF deployment.

The critical political factor in any Soviet effort to capitalize on the potential leverage flowing from the natural gas supply relationship would be how accurately the USSR judges West European public opinion. The Soviet Union has long tried to influence the West European public on domestic West European issues, most recently in campaigns to prevent deployment of the "neutron bomb" and of LRTNF. This experience may lead the Soviets to believe that they can assess which groups would be most sensitive to the economic losses posed by difficulties with the natural gas arrangements and how politically influential these groups are. The West European public as a whole, sensitized by the Middle East oil cutoffs of the past, might be very concerned about a prospective loss of Soviet gas.

Natural Gas Weapon

Soviet ability to use its potential natural gas lever successfully would depend both on the European political will to resist and on two technical considerations—the relatively short-term factor of national and regional strategic gas reserves and the midterm availability of alternative supplies of gas and other energy sources in the world market. Recognizing that the project entails risks, the West Europeans are taking some steps to protect themselves from Soviet supply interruptions. Plans to expand storage capacity are being formulated, for example. Stronger government initiatives, however, will be required to provide the cushion needed to avoid serious repercussions from a complete Soviet cutoff. Ultimately, some sort of mechanism for sharing shortages in the event of a supply disruption will have to be devised.

Internal Supply Cushion. West European countries are exploring ways to limit their vulnerability to interruptions in Soviet gas supplies should the pipeline project be completed. Dutch gas reserves are the best bet. The Dutch are already creating additional surge capacity in the huge Groningen field, which could serve as a partial offset to reduced Soviet deliveries. Even this additional capacity, however, would probably be sufficient to meet only a small portion of West European winter demand in the absence of Soviet gas supplies. Other West European countries with domestic gas production may opt to drill additional producing wells to create surge capacity that could then be used in the event of a shortfall. Only small amounts, however, could be forthcoming from such an effort.

While additional gas from Norway's Statfjord field will probably begin flowing to continental Europe by 1987, leadtimes are such that further large deliveries from more northerly gasfields are not likely before 1990.

The Europeans are also planning to increase stockpiling capacity

French officials are also seeking to expand underground natural gas storage to roughly 30 percent of expected gas consumption. France also has the capability of storing LNG at two import locations for use in peak shaving and in meeting shortfalls. Excess volumes of gas during seasonal or other declines in demand can also be reinjected into domestic gasfields and used for offsetting future shortages.

The existing capacity of West European gas consumers to switch to alternative fuels during a gas supply shortfall is unknown. Conversion from gas to oil is relatively simple, however, requiring only an oil storage tank, a pipeline to the furnace, and a different nozzle. In Belgium, all industrial gas users are required to maintain dual energy systems and to switch to alternative

sources when temperatures drop below a certain level. Roughly 15 percent of French gas deliveries are on interruptible contracts.

[redacted]

Diversifying Supplies. Although the West Europeans appear more sanguine about the implications of dependence on Soviet gas than do Japan and the United States, they agree that diversification of sources is important in denying the Soviets an opportunity to use gas supply to push for concessions on other economic or security issues.

[redacted]

It is not yet clear what degree of diversification the West Europeans will be able to maintain in the 1980s. Continued expansion of LNG production could mean that ocean-transported gas, primarily from LDCs, could be much more important than Soviet pipeline gas. Algeria, for example, has the capability to rival the USSR as a supplier to Western Europe over the next five to 10 years if it used both LNG and the trans-Mediterranean pipeline to fulfill existing and proposed contracts. The West Europeans, however, face major uncertainties in connection with gas imports from LDCs. Anti-Western political upheavals like the Iranian revolution could lead to suspension of projects that are now under consideration.

Such developments could influence the proportion of Soviet and non-Soviet gas in total West European imports and thus affect prospective Soviet leverage. For example, a shortfall in projected North or West African gas could lead to competitive bidding for that gas among several West European countries. If the leading West European country were not able to persuade the Netherlands or Norway to meet its additional needs for gas, it might turn to the USSR for increased supply. In addition, if current US negotiations with Algeria portend a more active US role in the LNG market, there could be competition between the United States and its European allies for African gas. To the extent that this competition weakened West European prospects for obtaining non-Soviet gas, it could strengthen West European incentives to cooperate with the Soviet Union.

[redacted]

Outlook

The Soviet ability to capitalize on a changing world gas market will depend both on West European and broader allied energy planning and on the availability of alternatives to Soviet gas in the world market. The Soviets probably believe that the West Europeans are capable of establishing gas reserves and a gas and oil surge production capacity. They realize that Western Europe, like Japan, is counting on increased world production of LNG in the 1980s.

The Soviets are also aware that during past oil shortages the West Europeans have often failed to cooperate, either among themselves or with Japan and the United States. The Soviets may judge, therefore, that the Western countries lack the cohesion and strategic perspective to address energy security issues collectively and that they are unlikely to pay the economic and political costs necessary to counter the vulnerability arising from their dependence on imported gas. The Soviets also know that there are political and economic uncertainties associated with increased gas production in LDCs and that the USSR has a reputation for reliability in energy supply that could appear increasingly reassuring to the West Europeans. For these reasons the likelihood is strong both that the Soviets fully recognize the potential for subtle exploitation of the developing natural gas relationship and that they will attempt to use it.

Appendix A

Details and Status of the Project

The gas export project entails construction of a trunkline from the Yamburg gasfield in West Siberia to West Germany, a distance of approximately 5,000 kilometers. The pipeline will be almost totally dedicated to export. It will have a capacity of 4.8-5.8 billion cubic feet per day (cf/d), depending on whether it is a single or double line. The gas will be distributed among at least six West European countries—West Germany, France, Italy, the Netherlands, Belgium, and Austria. The East European countries across which the pipeline travels reportedly will receive roughly 20 percent of the exported gas as a transit fee. [redacted]

Timing and Costs

The Soviets have not yet announced the route—whether it will parallel the Northern Lights trunk system (see map) about half of which would be in the permafrost zone, or a more southerly path, thus minimizing the area of permafrost to be traversed. Recent difficulties in constructing trunklines along the mountainous southernmost route, however, may persuade Moscow to select yet a third but unknown alternative. The pipeline's route across Eastern Europe to West Germany is also unknown, although a path through Czechoslovakia via Uzhgorod seems the most likely. [redacted]

Soviet indecision regarding trunkline route and capacity prevents an accurate estimate of the project's foreign exchange costs and the credits needed to cover imports of pipe, compressors, and other components. Given these uncertainties, [redacted] the hard currency costs will range up to $14 billion. The upper range [redacted] assumes an annual 15-percent inflation rate for the pipe and equipment costs and the construction of two 56-inch (1,420 mm) lines with a capacity of approximately 5.8 billion cf/d. If the Soviets opt for a single 56-inch line, capacity would total 4.8 billion cf/d and the costs would be closer to $10 billion. Interest charges during construction will be approximately $3 billion if the more expensive project is chosen. [redacted]

Bringing the pipeline to full capacity probably will take at least four years from contract signing. If negotiations are completed this summer or fall, gas deliveries would not begin before 1986. Even this assumes no unusual delays. If all Western equipment is delivered on time and accompanied by substantial technical advice, the Soviet pipelaying effort probably will still fall behind schedule because of long persistent problems—particularly a serious shortage of skilled labor and severely inadequate infrastructure. The export line project apparently is included in the Soviets' 1981-85 trunkline construction plans and will be competing for skilled labor needed for the domestic lines. [redacted]

Status of Negotiations

Although discussed for a long time, the current proposal has gained considerable momentum within the past year. An earlier Soviet plan, North Star, was designed as a joint US-USSR project to pipe gas from the giant Urengoy field in West Siberia through a 2,400-kilometer pipeline to Murmansk, where the gas would have been liquefied for shipment by tanker to the east coast of the United States. When US Government approval and Eximbank financing were not forthcoming in 1976, the US consortium turned to Western Europe as a source of equipment and financing and as a customer for part of the gas. Disagreement over gas prices and uncertainty regarding US liquefied natural gas (LNG) import policy, however, led to an indefinite shelving of the project in 1977. [redacted]

According to the Soviet Gas Ministry, the pipeline's completion is a major objective of the 11th Five-Year Plan (1981-85). Soviet negotiators have had preliminary talks with all interested European parties on all aspects of the project. Discussion of the current deal

picked up steam following last summer's Moscow summit between West German Chancellor Schmidt and President Brezhnev. Although progress has since been halting, Soviet officials believe that few economic problems stand in the way of the project. The combination of Western governments' willingness to grant sizable concessionary credits and business eagerness for equipment orders have encouraged this view. [redacted]

Financing

Although no credit agreements have been initialed, the Soviets appear well on the way to lining up perhaps $16 billion in Western financing for the deal, the bulk of which would be a mixture of official and officially backed credits. Of the total, the six principal West European participants have indicated they may provide $13 billion in credits. [redacted] Western credit offerings exceed the estimated hard currency cost of the pipeline—even with a built-in inflation factor of 15 percent a year. [redacted] the Soviets may be trying to protect themselves against cost overruns. In any event, Moscow would be under no obligation to draw all the credits. [redacted]

[redacted] consortium of 30 banks prepared to offer a credit of $5 billion. The key issue for the consortium is to obtain a return approximating market rates (about 15 percent) while appearing to accommodate Soviet demand that interest rates not exceed 7.75 percent. [redacted]

Gas Pricing

Another major outstanding issue is gas pricing. Discussions with major West European customers last fall ended with the Soviets backing off a demand for delivered gas prices at parity with oil, which at the present average OPEC price of $35 per barrel would be about $6 per thousand cf. Even so, Moscow did manage to obtain a substantial jump in the price of gas under existing contracts—from less than $2.80 per thousand cf, which generally prevailed in early 1980, to more than $4 per thousand cf, or from about $16 per barrel of oil equivalent to approximately $23. [redacted] the USSR eventually will settle on a gas price that is 75 percent of parity with crude oil, but this seems unlikely given trends in recent gas price agreements. Norway, for example, has recently concluded a deal that essentially results in a crude price parity by the mid-1980s. [redacted]

Impact on Soviet Hard Currency Earnings

Gas exports as a source of Soviet hard currency earnings have grown markedly in recent years. In 1980, the USSR exported 2.1 billion cf/d to Western Europe

b1
b3

valued at about $3 billion, up from $100 million in 1975. The volume of gas deliveries in 1980 rose 20 percent over 1979 but foreign exchange earnings more than doubled because of higher gas prices. Gas export earnings in 1981 will increase to perhaps $4 billion, even though export volume will be almost unchanged. Soviet gas exports under current agreements are near their peak of 2.4 billion cf/d scheduled to be reached by 1985. [redacted]

The Soviets project that the proposed gas export pipeline will be operating at full capacity by 1985. Assuming they are correct, which we doubt, the USSR would be exporting for hard currency 6.3-7.0 billion cf/d or 1.1-1.2 million b/d oil equivalent—roughly the same volume of oil exported to hard currency countries in 1979-80 (see table A-2). If gas prices achieve parity with crude oil by 1985, hard currency earnings from gas at 1980 oil prices would reach $15-19 billion, about matching combined earnings from exports of oil and gas in 1980. By 1990, gas export earnings would be in the $19-24 billion range. [redacted]

Table A-2

Billion 1980 US $

USSR: Oil and Gas
Hard Currency Exports

	1980	1985 a	1990 a
Total	17.5	15-19	19-24
Oil	14.5	0	0
Gas	3.0	15-19	19-24

a Assumes no oil exports; gas price parity with crude oil, and full deliveries under the gas pipeline project by 1985.

[redacted]

Table A-3

Billion cf/d

USSR: Production of Natural Gas

	1975	1980	1985 a	1990 a
Total	28.0	42.1	58.0-61.9	66.7-70.6
West Siberia	3.6	15.8	31.9-35.8	43.5-47.4
Of which				
Urengoy c	0	5.8	17.4-13.5	21.3-17.4
Yamburg c	0	0	3.9-9.7	9.7-15.5
Other	24.4	26.3	26.1	23.2

a Plan for USSR total and West Siberia total.
b Estimates. West Siberian total estimated by applying roughly current rates of growth for the region to both ends of 1985 plan range.
c Estimates for 1985 and 1990 indicate possible magnitudes of Yamburg and Urengoy contributions, overall growth, rather than precise amounts.

[redacted]

Gas Industry Impact

The Soviets are counting on rapid increases in natural gas output to help meet growing domestic energy needs as well as existing export commitments. If the project goes through, Soviet planners are counting on gas output of about 60 billion cf/d by the mid-1980s, rising to 70 billion cf/d by the start of the 1990s (see table A-3). All of the growth in output will have to come from development of the Urengoy and Yamburg fields in West Siberia. The Soviets will be able to increase the level of natural gas production likely in the mid-1980s by about the amount they would ship through the pipeline. Initially, the project will not enhance the Soviet ability to increase production for domestic use because the enormous resource requirements of the export pipeline, especially skilled manpower, will drain resources from other oil and gas projects. Installing the pipeline along a northerly permafrost route would require more skilled labor and other specialized resources than would following a more southerly route. Over the longer run, the technology transfer associated with the project—possibly including the construction of compressor repair plants and the development of critical infrastructure—should increase production for domestic use. [redacted]

High-quality Western equipment for extraction and transport of West Siberian gas would constitute a major benefit to the Soviet gas industry. Specifically, the deal would enable the USSR to purchase Western Arctic-design equipment for gas extraction and processing, including wellhead assemblies and drill pipe, which the USSR has difficulty in manufacturing. The Soviets probably will remain unable to mass-produce quality large-diameter line pipe during much of the 1980s. [redacted]

Manufacture of inferior specialty steels has made Soviet pipe inadequate for high-pressure gas transmission or for use in corrosive or high-stress environments such as the West Siberian Arctic. The high pressures possible with Western pipe mean a significant rise in throughput capacity for a given investment in steel. As for compressors, Soviet pipeline compressor technology is probably 20 to 30 years behind state-of-the-art technology in the West. The USSR has no equivalent to Western 22-megawatt second-generation aircraft derivative compressor units nor to any 26-megawatt industrial-type units, both of which could be critical to successful operation of the pipeline. [redacted]

The gas industry would benefit from the project even after the pipeline's completion. For example, Western pipelayers, earthmovers, and related equipment would continue to be used for laying domestic trunklines. The construction equipment could also be used in other civilian industries or in military construction projects. If a compressor repair plant were part of the package, as suggested by the Soviets, the USSR could make a quantum jump in their lagging compressor technology by reverse engineering the purchased compressors. Beyond this, the export pipeline would improve the domestic pipeline network if the Soviets dropped part of the line's throughput in the European USSR.[1] [redacted]

Even without the pipeline deal, the Soviets would have to import considerable amounts of gas equipment to carry out the remaining portion of the gas development program. The USSR, for example, would still need pipe, compressors, and associated equipment for expansion of its domestic distribution system. As long as the USSR continues to sell oil in the West, it can afford these purchases. By the mid-1980s, however, foreign exchange constraints would limit Soviet access to such equipment unless the pipeline project is under way. The Soviets will be unable to produce substantial amounts of large-diameter line pipe, the costliest gas-related import, until the late 1980s at best. Pipe imports have been averaging 1.5-2.0 million tons per year at an annual cost of $750 million to $1 billion. [redacted]

[1] If the pipeline followed a northern route, the possibility would not be as great as if the route followed a more southerly direction, where it could be linked more expeditiously with existing lines. [redacted]

Appendix B

Equipment and Hard Currency Costs

Soviet indecision regarding the pipeline's route and capacity has permitted only rough estimates of hard currency costs. The project's basic foreign exchange expenditures will be for large-diameter pipe, compressor stations, and ancillary equipment and engineering services for the pipeline and the Yamburg gasfield (see table B-1). [redacted] modified reported current prices for those items in two ways. (1) Because the Soviets are seeking concessionary financing at interest rates below current market rates and EC guidelines, Western suppliers of equipment and services will adjust their final sales prices upward to provide the same yield as could be earned in the West. Our estimates assume a 15-percent price markup to reflect this action. (2) A 15-percent annual rate of price inflation has also been included to reflect increased prices at the time of equipment delivery. [redacted]

Table B-1 Billion US $

Project Hard Currency Requirements

	Single Pipeline [a]	Dual Pipeline [b]
Total	10.2-11.4	11.9-13.8
Pipe	3.5-4.7	5.2-7.1
Compressors	3.7	3.7
Other	3.0	3.0

[a] 100 atmospheres pressure.
[b] 75 atmospheres pressure.

[redacted]

Pipe

The amount of large-diameter (56-inch) pipe needed is the project's largest variable and will depend on the pipeline's length, its operating pressure, and whether one or two lines are required. Pipe purchases consequently could range from 3.4-7.0 million tons, as indicated in table B-2. A two-line system at the lower throughput pressure of 75 atmospheres would require only about 50 percent more pipe than a single 100-atmosphere line, since less thick pipe walls are necessary. The pipeline's length probably will fall within 4,500 to 5,500 km, depending on whether a northern or longer, southern route is chosen. Given the resulting range of tonnage, and inflation over a three-year delivery period, hard currency expenditures of $3.5-7.1 billion in pipe imports would be required. [redacted]

Compressors

Compressor costs probably will not vary widely with the pipeline's length or capacity. Roughly the same amount of compressor power would be needed whether a single or dual line were built and whether the pipeline followed a northern or southern route. Only the number of gas turbine compressor units would differ substantially, depending on whether industrial or aircraft designs were used (see table B-2). A combination of compressor types probably would be required. Lighter weight aircraft models would predominate on a northern, permafrost route while industrial models probably would provide the majority of throughput capacity for a southern line. Most combinations, however, would fall between 5,000- and 5,500-MW capacity. A compressor equipment price reflecting inflation over a four-year delivery period would produce only a small difference in costs, with a median of approximately $3.7 billion. [redacted]

Additional Costs

This category is more difficult to estimate because little information is available. The Soviets have indicated a need for several hundred pipelayers, probably a similar number of earth movers, an extensive computerized pipeline telecommunications and telemetry system, and field development equipment for the Yamburg field, such as drill pipe and well completion equipment built to Arctic specifications. The project probably also would require several hundred wellhead

Table B-2

Pipeline Requirements

Pipe (million metric tons)		
	Single Line (100 atm)	Dual Line (75 atm)
Length (kilometers)		
4,500	3.4	5.1
5,500	4.6	7.0

Compression Units Required *		Number of units	
	Power Ratings (Mega-watts)	Single Line (100 atm)	Dual Line (75 atm)
Type of gas turbine drive			
Industrial	26	210	210
Aircraft (first generation)	15	290	340
Aircraft (second generation)	22	250	250

* Number needed if all compressor power for given line were provided by type of turbine drive listed

[redacted]

assemblies, ball valves, and perhaps transport vehicles designed for operation in swampy terrain. Virtually no information on costs of Western engineering services, which perhaps could include some on-site construction work, are available. [redacted] of $3 billion for the above items could be in the ballpark.

[redacted]

The Bottom Line

Total estimated hard currency costs for the project of $10-14 billion are lower than some figures provided both in the press and [redacted] by industry. They also are less than the approximately $16 billion in total Western credits tentatively offered so far. Some of the higher estimates probably include Soviet domestic, non-hard-currency expenditures that would add an equivalent of several billion dollars to the total cost. The initial credit offerings, moreover, may be reduced as specific contracts are worked out to eliminate overlapping offers of equipment and services. A Soviet attempt to arrange more concessionary financing than needed for the project is nonetheless a possible explanation of the gap between credit offerings and probable hard currency costs. Another possible cost variation could result if the project involved construction at staggered intervals of both a northern and a southern line. The total hard currency requirements, however, would probably still fall within the upper end of the $10-14 billion range. [redacted]

Appendix C

Soviet Energy Data

Table C-1

Billion Cubic Feet Per Day

USSR: Natural Gas Exports

	1975	1980 [a]	1985 [b]		1990 [b]	
			Without Pipeline	With Pipeline	Without Pipeline	With Pipeline
Total	1.9	5.4	6.6	11.5-12.4	6.6	11.5-12.4
Eastern Europe	1.1	3.2	4.1	5.1-5.3 [c]	4.1	5.1-5.3 [c]
Czechoslovakia	0.4	0.9	1.0	1.0-2.2 [d]	1.0	1.0-2.2 [d]
East Germany	0.3	0.6	0.6	0.6-1.2 [e]	0.6	0.6-1.2 [e]
Poland	0.2	0.5	0.8	0.8-1.4 [e]	0.8	0.8-1.4 [e]
Bulgaria	0.1	0.6	1.0	1.0	1.0	1.0
Hungary	0.1	0.4	0.4	0.4	0.4	0.4
Romania	0	0.1	0.1	0.1	0.1	0.1
Yugoslavia	0	0.1	0.2	0.2	0.2	0.2
Western Europe	0.8	2.2	2.5	6.4-7.1 [f]	2.5	6.4-7.1 [f]
West Germany	0.3	0.8	1.1	2.1	1.1	2.1
Italy	0.2	0.6	0.7	1.3	0.7	1.3
Austria	0.2	0.3	0.2	0.5	0.2	0.5
Finland [g]	0.1	0.1	0.1	0.1	0.1	0.1
France	0	0.4	0.4	1.3	0.4	1.3
Belgium	0	0	0	0.6	0	0.6
Netherlands	0	0	0	0.5	0	0.5

[a] Estimated.

[b] "Without Pipeline" estimates assume deliveries under existing trade agreements.

[c] Estimated East European total assumes deliveries under current agreements plus 1.0-1.2 billion cf/d from the pipeline project. "With Pipeline" estimates assume achievement of full capacity of export pipeline (20 percent of pipeline capacity of 4.8-5.8 billion cf/d), with the increment going either to Czechoslovakia or divided equally between Poland and East Germany. Actual allocations of the additional gas may vary. Columns do not sum to totals due to variations in possible delivery allocations.

[d] Range assumes Czechoslovakia receives either no additional gas or 1.2 billion cf/d from project.

[e] Range assumes either no additional gas or receipt of half of 1.2 billion cf/d from projects.

[f] Estimated range from West European total assumes delivery of 80 percent of pipeline capacity of 4.8-5.8 billion cf/d. The allocation among individual countries corresponds only to the lower pipeline capacity, which would deliver almost 3.9 billion cf/d. Use of two lines in the project could raise West European imports under the project to 4.6 billion cf/d.

[g] Finland does not pay hard currency for Soviet gas.

Table C-2

USSR: Total Primary Energy Production a

Energy Source	1970		1975		1980		1985		1990	
	mb/doe b	Percent	mb/doe	Percent	mb/doe	Percent	mb/doe	Percent	mb/doe	Percent
Total	37.8	100.0	22.7	100.0	27.8	100.0	30.1-29.1	100	41.9 29.9	100
Oil	7.1	39.9	9.8	43.2	12.1	43.5	11.0-10.0	37-34	9.0 7.0	28-23
Natural gas	3.3	18.5	4.8	21.1	7.2	25.9	9.4	31-32	11.5	36-38
Coal	6.1	34.3	6.6	29.1	6.7	24.1	7.0	23-24	7.8	24-26
Hydroelectric power	0.6	3.4	0.6	2.6	0.8	2.9	1.0	3	1.2	4
Nuclear power	NEGL	NEGL	0.1	0.4	0.3	1.1	0.9	3	1.6	5
Other	0.7	3.9	0.8	3.5	0.7	2.5	0.8	3	0.8	3

a Because of rounding, components may not add to the totals shown
b Million barrels per day oil equivalent.

Appendix D

Western Europe: Energy Stake in Pipeline Project

While oil remains the dominant energy source in the six European countries involved in the project, natural gas is becoming increasingly important (see table D-1). Natural gas is consumed principally in the industrial and residential-commercial sectors of the six European nations, but is also used to generate electricity. During the 1970s, the increase in gas consumption was most rapid in the residential sector where it replaced coal and oil in space heating. Gas has also increased its share of energy use in the industrial sector at the expense of coal and oil. The share of natural gas in total energy use by 1990 is projected to remain the same or increase for all countries except the Netherlands (table D-2).

Table D-1

Western Europe: Distribution of Total Primary Energy Consumption [a]

	1979	1990 [b]
Oil [c]	56	43
Natural gas	18	20
Coal	18	17
Nuclear	3	15
Hydroelectric and other	4	5

[a] West Germany, Italy, France, Austria, Belgium, and the Netherlands. Because of rounding, components may not add to 100.
[b] Projected
[c] Inland consumption plus international aviation, marine bunkers, and refinery fuel and losses.

Total natural gas supplies to the six West European countries amounted to some 16.1 billion cf/d in 1980. The Netherlands supplied about half of this total, including exports of 4.7 billion cf/d to other West European countries. Domestic production in West Germany, France, Italy, and Austria accounted for about nearly 4 billion cf/d. The remaining supplies were imported from the Soviet Union, Norway, Algeria, and Libya, with over half of the imports coming from the USSR, via pipeline. West Germany, Italy, France, and Austria received all the Soviet deliveries.

Increased deliveries of Soviet gas in the mid-1980s would help offset an expected decline in Dutch gas shipments. Several Dutch gas contracts are scheduled to expire beginning in 1986, in part because of The Hague's conservationist policies. In any event, deliveries from the Soviet Union could approximate 6.3 billion cf/d, enough to make the USSR the largest single supplier (tables D-3 and D-4). Realization of all pending contracts would boost total gas supplies to these West European countries by some 30 percent by 1990 despite expected declines in Dutch and other domestic supplies.

While seeking more gas from the USSR, several European nations are also negotiating with the Algerians for stepped-up deliveries. The Italians are completing the final phase of construction of an underwater pipeline that will deliver 1.2 billion cf/d of natural gas from Algeria beginning late in 1981. The Algerians also have contracts with France and Belgium to deliver a combined total of 1 billion cf/d of LNG annually beginning in 1982. Another Algerian contract to ship 1.8 billion cf/d of LNG annually to West Germany and the Netherlands by 1985 apparently has been canceled. Some of the contracted volume probably will be forthcoming in the form of pipeline exports through Italy or Spain. (See tables D-5 through D-10.)

Norway and Nigeria are also being looked to for increased supplies. A consortium of firms in West Germany, France, Belgium, and the Netherlands is negotiating for increased imports from Norway that could add as much as 0.4 billion cf/d to combined

Table D-2

Western Europe: Actual and Projected Energy Shares [a]

	Percent of Total Energy Use					Total Energy (Million b/d Oil Equivalent)
	Oil [b]	Gas	Coal	Nuclear	Other	
1979						
West Germany	53	16	27	3	1	5 70
France	60	11	16	5	8	3 79
Italy	68	16	7	1	7	2 96
Netherlands	51	44	5	1	0	1 51
Belgium [c]	56	20	19	5	0	1 05
Austria	48	20	15	0	17	0 52
1985 [d]						
West Germany	46	18	23	10	1	6 76
France	42	16	15	20	7	4 50
Italy	64	18	9	1	6	3 77
Netherlands	46	43	9	1	0	1 57
Belgium [c]	47	21	21	11	0	1 15
Austria	45	15	16	0	24	0 62
1990 [d]						
West Germany	43	17	23	16	1	7 42
France	29	16	14	30	11	4 84
Italy	56	21	12	4	6	4 48
Netherlands	47	41	11	1	0	1 65
Belgium [c]	47	20	21	12	0	1 29
Austria	40	21	14	0	25	0 72

[a] Total primary energy. Because of rounding, components may not add to the totals shown.
[b] Inland consumption plus international aviation, marine bunkers, and refinery losses.
[c] Including Luxembourg
[d] Projected.

Table D-3 — Percent of Total Consumption

Western Europe: Dependence on Soviet Gas

	1979		1990 [a]	
	Gas	Energy	Gas	Energy
West Germany	14	2	29	6
France [b]	0	0	23-28	4
Italy	29	5	29	5
Netherlands	0	0	10	4
Belgium	0	0	32	8
Austria	59	12	82	18

[a] Based on individual government estimates of gas and total energy consumption.
[b] Contracted volumes of Soviet gas were delivered to Italy in exchange for Dutch gas until February 1980.

[redacted]

Table D-4

Western Europe Countries: Dependence on Soviet Energy [a]

	Million b/d Oil Equivalent					USSR Share (Percent)
	Energy Consumption	Energy Imports From the USSR				
		Total	Oil	Gas	Coal	
1979	15.5	1.2	0.5	0.3	0.4	8
1985	18.4	1.6	0	1.2	0.4	9
1990	20.4	1.6	0	1.2	0.4	8

[a] Western Europe countries include West Germany, France, Italy, the Netherlands, Belgium, and Austria.

[redacted]

Table D-5 — Billion Cubic Feet Per Day

Federal Republic of Germany: Natural Gas Supplies [a]

	1979	1980
Total supplies	5.5	5.2
Domestic production	2.0	1.7
Imports	3.5	3.5

Current sources of imported natural gas

	Contract Expiration	1979 Volume	1980 [b] Volume
Netherlands	1986/87/89 1991-94	2.1	2.0
USSR	1990/94/98	0.7	0.8
Norway	1997	0.6	0.7

Potential suppliers

	Initiation	Volume
USSR additional	Late 1980s	1.2
Nigeria (LNG)	1984-85	0.2
Algeria (LNG) [c]	1985	0.8
Norway additional	1987	Negotiating

[a] Because of rounding, components may not add to the totals shown.
[b] Estimated
[c] Algeria has not begun continuation of facilities to complement the projects

[redacted]

Table D-6 — Billion Cubic Feet Per Day

France: Natural Gas Supplies

	1979	1980 *
Total supplies	2.6	2.7
Domestic production	0.8	0.8
Imports	1.8	1.9

Current sources of imported natural gas

	Contract Expiration	1979 Volume	1980 * Volume
USSR [b]	2000	.0	0.4
Algeria	1990, 1998	0.3	0.2
Netherlands	1988	1.3	1.0
Norway	1977	0.2	0.2

Potential suppliers

	Initiation	Annual Volume
USSR additional	Late 1980s	1.0
Algeria (LNG)	1982	0.5
Nigeria (LNG)	1984-85	0.2
Norway additional	1987	Negotiating

* Estimated.
[b] Contracted volumes of Soviet gas were delivered to Italy in exchange for Dutch gas until February 1980

[redacted]

Table D-7 — Billion Cubic Feet Per Day

Italy: Natural Gas Supplies

	1979	1980 *
Total supplies	2.8	2.7
Domestic production	1.3	1.3
Imports	1.5	1.5

Current sources of imported natural gas

	Contract Expiration	1979 Volume	1980 * Volume
USSR	1999	0.8	0.6
Libya (LNG)	1992	0.2	0.2
Netherlands	1994	0.4	0.7

Potential suppliers

	Initiation	Annual Volume
USSR additional	Late 1980s	0.7
Algeria pipeline	1981-85	1.2
Nigeria	1984-85	0.1

* Estimated.

[redacted]

Table D-8 — Billion Cubic Feet Per Day

Netherlands: Natural Gas Supplies

	1979	1980 *
Total supplies	4.4	4.1
Domestic production	9.1	8.5
Imports [b]	0.2	0.3
Exports	4.9	4.7

Potential suppliers

	Initiation	Annual Volume
USSR	Late 1980s	0.5
Nigeria (LNG)	1984-85	0.1
Algeria (LNG) [c]	1984	0.5
Norway additional	1987	Negotiating

* Estimated.
[b] All imports from Norway.
[c] Algeria has not begun construction of facilities to implement contract.

[redacted]

Table D-9 — Billion Cubic Feet Per Day

Belgium: Natural Gas Supplies

	1979	1980 *
Total supplies	1.2	1.1
Domestic production	Small	Small
Imports	1.2	1.1

Current sources of imported natural gas

	Contract Expiration	1979 Volume	1980 * Volume
Netherlands	1987	1.0	0.9
Norway	Unknown	0.2	0.2

Potential suppliers

	Initiation	Annual Volume
USSR	Late 1980s	0.6
Algeria (LNG)	1982	0.5
Nigeria (LNG)	1984-85	0.1
Norway additional	1987	* Negotiating

* Estimated.

[redacted]

Table D-10 — Billion Cubic Feet Per Day

Austria: Natural Gas Supplies

	1979	1980 *
Total supplies	0.5	0.5
Domestic Production	0.2	0.2
Imports	0.3	0.3

Current sources of imported natural gas

USSR	0.3	0.3

Potential suppliers

	Initiation	Annual Volume
USSR additional	Late 1980s	0.3

* Estimated.

[redacted]

supplies by 1987. These countries and Italy have signed a contract with Nigeria to import 0.7 billion cf/d of LNG annually by 1985. Lagos, however, is apparently delaying startup of construction of the liquefaction facility, and imports will probably be delayed until late in the decade. [redacted]

Despite these deals, the emphasis in West European natural gas planning has been toward greater reliance on pipeline gas from the Soviet Union. The West Europeans have long seen the Soviets as a more reliable source of energy supply than the LDCs. This attitude originates in the Suez crisis of 1956, when Western Europe was affected by cutoffs of Middle Eastern oil and turned to the Soviet oil then beginning to enter the world market. The West Europeans have remained steady customers for Soviet oil, which continued to be delivered during the Middle East war

of 1967 and the Arab oil embargo of 1973-74, even though the Soviets verbally supported the Arab action. This favorable image of Soviet reliability in contrast to that of LDCs has been reinforced in the case of gas by revolutionary Iran's cancellation of the Iranian-Soviet-European IGAT-2 natural gas swap, by Algeria's and Libya's suspension of LNG shipments, by Algeria's subsequent cancellation of construction of the Arzew-3 LNG plant, and by what the Europeans considered extreme Algerian and Libyan demands for increases in the price of LNG in 1980. [redacted]

Appendix E

Western Europe: Industrial Stake in Pipeline Project

The pipeline project would be especially important to Western pipe manufacturers. West European and Japanese companies have devoted substantial capacity to meeting Moscow's growing demand. US firms, however, have never produced the 56-inch-diameter line pipe that has become the predominant Soviet gas pipe purchase. The USSR spent an estimated $2 billion in 1979 for approximately 1.7 million tons of large-diameter pipe. West Germany and Japan each supplied roughly 700,000 tons, with France and Italy providing most of the remainder.

[redacted]

If Moscow opts for a dual line at 75 atmospheres, however, West Germany, Italy, France, and Japan might all provide some pipe in order to deliver the total purchase by the contracted date [redacted]

West European firms also have a good chance of winning the compressor station order—the other major equipment purchase of the pipeline project—if US companies remain subject to government bans on such sales to the USSR. Each of the six countries in the pipeline project, except for Austria, has at least one firm or consortium capable of producing industrial or aircraft-type gas turbine compressor units that Moscow could use. Japan and other European countries are also potential suppliers. The Soviets would prefer US compressor models—they are the satisfied consumers of several hundred to date—but Soviet concern about future US economic sanctions that would interrupt compressor delivery has stalled negotiations. Moscow's efforts to line up several European firms to handle the order have also been hampered by Soviet concern over US sanctions policy, since most leading contenders produce at least part of their units under US company licenses [redacted]

[redacted]

Appendix F

Soviet Pipeline Delivery Problems

The Soviet Union will have a hard time preventing occasional supply interruptions, given the risks of technical failure. Soviet pipeline breaks result from both climatic and technical problems. Laying large-diameter lines across thousands of kilometers of natural obstacles, particularly ice-covered mountains, swamps, and permafrost, creates a large potential for both construction errors and operational stresses. Permafrost construction has been particularly troublesome for the Soviets. Permafrost—perennially frozen soil—is subject to severe buckling over time since its surface layer annually melts and freezes. Heat generated by gas transmitted through pipes laid underground can aggravate the problem of melting. The Soviets have attempted to minimize the stress that this places on pipelines but, like the West, have not been entirely successful. Another potential problem is moisture collecting in pipe valves and then freezing, snapping the valves. All gas pipelines coming west from Siberia must traverse hundreds of rivers and ravines, which can increase pipeline stress. Strong Arctic winds can damage pipes laid above ground. [redacted]

The Soviets aggravate matters by paying little attention to performance standards. Plan fulfillment and wage bonuses for pipelaying crews are based on the amount of pipe laid, rather than the quality of work done. As a result, high-quality Western pipe is frequently damaged through careless handling and then left exposed for months before installation, reducing its resistance to corrosion often caused by improper removal from gas of impurities such as water and sulfur. Lines have been improperly welded and buried in permafrost, subjecting the pipe to more stress than is necessary from the ground's thawing and freezing. The Soviets reportedly lost large sections of trunkline along the Northern Lights route because of such faulty installation procedures. Although Soviet pipeline construction in permafrost probably has improved during the last decade, Moscow's refusal to allow Western contractors onsite in the Arctic construction zone would give Western gas importers an assurance against substandard performance [redacted]

Major pipeline ruptures could occur at any time of the year. Repair work on Arctic portions of a trunkline during winter would require at least several weeks. Although the Soviets have claimed that on occasion they have repaired pipelines within a week or two, they acknowledge that the norm is much longer. The frozen ground in winter does aid the movement of repair vehicles and delivery of new pipe and equipment, but those materials still are often slow to arrive on site. If the Soviets install two lines under the export line project, the chances for maintaining at least a reduced gas flow would be greatly enhanced. [redacted]

A serious nonwinter pipe rupture could take several months to repair if it occurred in thawed permafrost or swampy tundra. The lack of surface roads, likely to persist even along the export pipeline, prevents rapid use of repair equipment in that environment. Heavy pipelaying vehicles, for example, can sink into the deep mud, causing serious delays. Such a breakdown, moreover, might produce a double impact on Soviet gas exports, not only reducing deliveries at that time but perhaps hampering above-normal spring or summer shipments, which the Soviets have made in the past to make up for wintertime diversion of gas to domestic needs. [redacted]

Compressor station failures could also reduce exports. Crews operating gas trunklines are judged primarily by the amount of gas they transport annually, rather than for overall performance that would include timely repair and maintenance efforts. The Soviets as a result have let compressor units run without substantial maintenance until major failures have occurred. [redacted] compressor stations

on some of the Soviets' major gas export trunklines have been subjected to such inadequate procedures.

[redacted]

The export pipeline would possess some means of reducing the likelihood of complete shutdowns due to compressor failures. Backup compressors at each station on the line could minimize flow disruptions if a few units broke down. Failure of an entire compressor station would reduce the flow substantially but not halt it if the pipe remained intact, allowing gas to bypass the station. The amount of downtime due to a compressor station failure would depend on the problem and the design of the units. Aircraft-type units that the Soviets have requested could be back on line within 30 minutes. A serious explosion in an industrial-type compressor station could require many months to repair. The export pipeline probably will have stations of both types. [redacted]