

Credit No. 2339 - Japan -
Japan Atomic Power Company - \$35,210,000

74200 o. iii. c.

There being no objection by the National Advisory Council on International Monetary and Financial Policies, the Board of Directors, Mrs. May abstaining, authorized establishment of a line of credit of \$35,210,000 in favor of Japan Atomic Power Company, to assist in financing the purchase and exportation to Japan of United States equipment, materials, nuclear fuel, and related services required in connection with the construction and initial operation of a nuclear power plant at Tsuruga, Japan.

The resolution attached to these minutes as Exhibit C was thereupon adopted.

Credit No 2340 - Japan -
The Bank of Tokyo, Ltd. - \$75,000,000

There being no objection by the National Advisory Council on International Monetary and Financial Policies, the Board of Directors authorized establishment of a line of credit of \$75,000,000 in favor of The Bank of Tokyo, Ltd., with interest at the rate of 5-3/10% per annum, to assist in financing the purchase in the United States and exportation to Japan of raw cotton of U. S. growth, including waste, during the crop year beginning August 1, 1966.

The resolution attached to these minutes as Exhibit D was thereupon adopted

6/30/66 P6

RESOLUTION

WHEREAS, Japan Atomic Power Company (hereinafter called "JAPCO") has requested Export-Import Bank of Washington (hereinafter called "Eximbank") to establish a credit in favor of JAPCO in the amount of Thirty-Five Million Two Hundred Ten Thousand Dollars (\$35,210,000) to assist it in financing the purchase from General Electric Company (hereinafter called "GE"), General Electric Services Company, Inc. (hereinafter called "GETSCO") and other suppliers of equipment, materials, nuclear fuel, and related services of United States manufacture or origin and the exportation thereof to Japan, all as required in connection with the construction and initial operation of a nuclear power plant at Tsuruga, Japan (hereinafter called "Project"); and

WHEREAS, the establishment of such a credit will facilitate exports and imports and the exchange of commodities between the United States and Japan;

NOW, THEREFORE, BE IT RESOLVED, That the establishment of a credit in favor of JAPCO is hereby authorized in an amount not to exceed Thirty-Five Million Two Hundred Ten Thousand Dollars (\$35,210,000) against which Eximbank, acting independently or through the agency of one or more commercial banks, will make advances from time to time to assist JAPCO in financing the purchase and exportation to Japan of United States equipment, materials, nuclear fuel, and related services required in connection with the construction and initial operation of the Project, subject to the following terms and conditions:

1. Allocations under Credit and Repayment Terms.

- a. Up to \$10,000,000 of the Eximbank credit shall be available for the purchase, conversion, and enrichment of uranium in the United States (fuel portion of Eximbank credit). The fuel portion of the Eximbank credit shall be repayable in 10 approximately equal semiannual installments, beginning October 1, 1970, plus interest at the rate of 5-1/2% per annum, payable semiannually.
- b. Up to \$25,210,000 of the Eximbank credit shall be available for financing the purchase from GE and GETSCO of United States equipment, materials, and services, including fabrication of the initial fuel core, and the exportation thereof to Japan (equipment and service portion of Eximbank credit), subject to the following conditions:

FILES

- (1) JAPCO shall make cash payments to GE and to GETSCO of at least 10% of the contract price of the respective contracts.
 - (2) GE and GETSCO shall each extend a credit in favor of JAPCO of at least 15% of the contract price of the respective contracts.
 - (3) JAPCO shall repay the aggregate of the GE and GETSCO credits and the equipment and service portion of the Eximbank credit in 32 approximately equal semiannual installments beginning October 1, 1970, plus interest at the rate of 5-1/2% per annum, payable semi-annually. The GE and GETSCO credits shall be repaid out of the first 12 semiannual installments.
2. Guarantee. The indebtedness of JAPCO to Eximbank, GE and GETSCO shall be unconditionally guaranteed by the Japan Development Bank.
 3. Conditions Precedent to Utilization of Credit. Prior to utilization of the Eximbank credit, JAPCO shall submit in form and substance satisfactory to Eximbank:
 - a. Assurances of availability of United States dollar exchange needed to service the Eximbank, GE and GETSCO credits.
 - b. Conformed copies of contracts between JAPCO and GE and between JAPCO and GETSCO.
 4. Availability. Disbursements under the credit shall not be made subsequent to March 31, 1970, except to the extent that a duly authorized officer of Eximbank may consent in writing.
 5. Other Terms and Conditions. Such other terms and conditions as Eximbank may deem advisable.

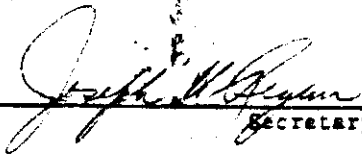
RESOLVED FURTHER, That the President, First Vice President or a Vice President be and he is hereby authorized to execute such agreement or agreements and to take such other action as he may deem necessary or convenient to carry this resolution into effect; and

RESOLVED FURTHER, That the Treasurer or an Assistant Treasurer be and he is hereby authorized to make disbursements from time to time

in accordance with the terms of this resolution and any agreement or agreements executed pursuant hereto.

I, Joseph H. Regan, Secretary of Export-
Import Bank of Washington, hereby certify that the foregoing is a true
and correct copy of a resolution adopted by the Board of Directors of
said Bank on the 30th day of June, 1966.

IN WITNESS WHEREOF, I have hereunto set my hand and the seal of
said Bank this 14th day of July, 1966.


Secretary

REPORT TO THE BOARD OF DIRECTORS

June 6, 1966

Re: Japan - Loan Application of
Japan Atomic Power Company
Tsuruga Nuclear Station - \$13,810,000

Exchange Rate: 360 Yen = \$1.00 Fiscal Year: APRIL 1 - MARCH 31

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Exhibits

- A - Capital Stock, Distribution of Shares - March 31, 1966
- B - Estimated Cash Flow
- C - Projected Balance Sheet

FILE COPY

*2 copies to J.A.P.C.
Japan Atomic Power Co.
Japan Development Bank
Approved 6/30/66*

Japan Atomic Power Company (JAPC) has requested Eximbank's assistance in financing the cost of equipment, material, and services to be purchased from General Electric Company (GE) and General Electric Technical Services Company, Inc. (GETSCO) required in the construction of a nuclear electric power generating plant; and the cost of nuclear fuel required for initial operations. The United States dollar loan assistance is requested in two parts, the first for \$25,210,000 to cover 75% of the U. S. equipment and services purchased from GE and GETSCO and 100% of freight costs on U. S. vessels; and the second for \$10,000,000 to cover costs of fuel to be acquired in the United States; making a total Eximbank credit of \$35,210,000. The nuclear power plant, to be known as the Tsuruga Station, will be the first to be built in Japan using a U. S. reactor fueled by enriched uranium.

JAPC was established in 1957 as a joint effort of the Government of Japan and private industry to develop nuclear power for industrial purposes. The only project undertaken by JAPC to date is a natural uranium plant located at Tokai, northeast of Tokyo; the reactor and generating equipment are of British manufacture and use natural uranium supplied by the Atomic Energy Authority of Britain. Design modifications during the construction period and mechanical faults in design and construction have delayed completion. To assist the Company to meet added expenses caused by delayed start-up, the nine electric power companies which hold a stock interest in JAPC have agreed to extend a \$30.0 million contribution in aid of construction to JAPC over a five-year period.

The Tsuruga Station is well adapted to the requirements of the Japanese electric companies and the output can be readily absorbed by the Japanese high voltage interconnected system to which it will be connected. This plant will also provide reliable data which will be useful in the construction and operation of future nuclear plants in Japan.

Although first cost of the nuclear station is over two times the cost of a similar size conventional oil burning plant, it is anticipated that fuel cost over the life of the plant will be appreciably less. As a result, costs for the nuclear plant are expected to be 1 mill per kwh greater than for an oil burning plant and about equal to a coal burning plant in Japan.

GE and its service company, GETSCO, have pioneered in the development of the boiling water reactor (BWR) nuclear station and are well-qualified to design, supply, and construct the proposed station. The GE and GETSCO contracts will utilize the consulting firm, Ebasco Services Incorporated,

and together these companies can provide an effective turn-key job, with GE having full responsibility for equipment being supplied both in the U. S. and Japan, and guaranteeing plant output.

JAPC has developed a highly capable nuclear staff, and this staff will receive additional training from GE, both in the U. S. and Japan, in BWR operation.

The cash flow forecast contained in the feasibility report of the project, prepared by Ebasco for GE, is based on retirement of dollar loans for U. S. equipment and services, including fabrication of first core fuel, in 32 semiannual installments and retirement of dollar loans for nuclear fuel in 10 semiannual installments, both to begin October 1, 1970, 10 months after expected plant start-up. JAPC has agreed to make cash payments of 10% of the GE and GETSCO contracts, and these suppliers have indicated a willingness to participate in the loan financing up to 15% of the contract price for their equipment and services, such participation to be retired from proceeds of the first 12 semiannual installments.

The Japan Development Bank has offered its unconditional guarantee of the obligations of JAPC. Such guarantee is considered by the staff as the strongest available other than that of the Government, since the Japan Development Bank is strong in itself and is a Government institution. In addition to the guarantee, the active financial and constructive support of the nine power companies in Japan, the five major industrial combines of Japan, and the Japanese Government can reasonably be expected.

There is reasonable assurance of repayment of the loan requested with the guarantee offered. The credit is recommended.

Recommendations

It is recommended that a credit in favor of Japan Atomic Power Company (JAPC) be authorized in the amount of \$35,210,000 to assist it in financing the purchase and exportation to Japan of United States equipment, materials, nuclear fuel, and related services required in connection with the construction and initial operation of a nuclear power plant at Tsuruga, Japan (Project); subject to the following conditions:

1. Up to \$10,000,000 of the Eximbank credit shall be available for the purchase, conversion, and enrichment of uranium in the United States (fuel portion of Eximbank credit). The fuel portion of the Eximbank credit shall be repayable in ten approximately equal semiannual installments, beginning October 1, 1970, plus interest at the rate of 5 1/2% per annum, payable semiannually.
2. Up to \$25,210,000 of the Eximbank credit shall be available for financing the purchase from General Electric Company (GE) and General Electric Technical Services Company, Inc. (GETSCO) of United States equipment, materials, and services, including fabrication of the initial fuel core, and the exportation thereof to Japan (equipment and service portion of Eximbank credit), subject to the following conditions:
 - a. JAPC shall make cash payments to GE and to GETSCO of at least 10% of the contract price of the respective contracts.
 - b. GE and GETSCO shall each extend a credit in favor of JAPC of at least 15% of the contract price of their respective contracts.
 - c. JAPC shall repay the aggregate of the GE and GETSCO credits and the equipment and service portion of the Eximbank credit in thirty-two approximately equal semiannual installments beginning October 1, 1970, plus interest at the rate of 5-1/2% per annum, payable semiannually. The GE and GETSCO credits shall be repaid out of the first twelve semiannual installments.
3. The indebtedness of JAPC to Eximbank, GE and GETSCO shall be unconditionally guaranteed by the Japan Development Bank.

1. Prior to utilization of the Eximbank credit, JAPC shall submit in form and substance satisfactory to Eximbank:

2. Assurances of availability of United States dollar exchange needed to service the Eximbank, GE and GETSCO credits; and

3. Conformed copies of contracts between JAPC and GE and between JAPC and GETSCO.

4. Availability. Disbursements shall not be made under the Eximbank credit after March 31, 1970.

John Jordan 

R. L. Lurensky 

W. K. Graves 

W. W. Glick 

Direct Loan
Private Borrower
100% Reserve

The Applicant

Japan Atomic Power Company (Nihon Genshiryoku Hatsuden, K. K.), hereinafter referred to as "JAEC" or the "Company," was established in November 1957 with headquarters in Tokyo. The Company was formed with the support of the Government of Japan to pioneer and encourage commercial nuclear electric power generation in Japan and with the financial and technical assistance of Japan's nine private electric power companies, the Electric Power Development Company (a wholly owned Government corporation), and five large industrial combines interested in atomic power development for industrial purposes. A statement of stock ownership by holders as of March 31, 1966, is shown in Exhibit A. In summary, the nine electric power companies held 47.3%, the Electric Power Development Company held 20.0%, the five groups of industrial companies, all leaders in Japanese industry, held 23.7%, and the balance of 9% was held by about 80 other shareholders.

When established, the Company had an authorized capital of \$11.1 million and paid-in capital of \$2.8 million. Authorized capital has since been increased to \$55.6 million, and as of March 31, 1966, \$37.5 million had been paid in through annual stock purchases by the above-mentioned stockholders.

Annual offers of stock to present stockholders are planned through 1970, at which time paid-in capital stock is expected to be \$61.4 million; authorized capital will be increased to provide for this issue.

The Board of Directors and principal officers of JAEC were chosen from the nine power companies in Japan. Mr. Daigoro Yasukawa, Chairman of the Board, was formerly with Kyushu Electric; Dr. Tamaki Ipponmatsu, Director and President, was with Kansai Electric; and Mr. Kenzo Sasamori, Director and Executive Vice President, was with Tokyo Electric.

Financing and Terms Requested

JAEC has requested the Bank, by letter dated April 15, 1966, to assist in financing equipment, materials, and services to be purchased in the United States, required in the construction of a 357 mw nuclear electric power generating plant to be known as the Tsuruga Nuclear Power Station, and the initial nuclear fuel core with spares. The U. S. dollar loan assistance is requested in two parts, the first for \$25,210,000 to cover 75% of the U. S. equipment and services purchased from General Electric Company (GE) and General Electric Technical Services Company, Inc. (GETSCO), together with 100% of freight costs on U. S. vessels; and the second for \$10,000,000 to cover costs of fuel to be acquired in the United States and its processing and enrichment.

GE has been asked by JAPC to sponsor the application and has proposed the following financing plan to cover cost of U. S. equipment, material, and services to be furnished under the GE and GETSCO contracts.

Financing Plan of U. S. Dollar Cost
Exclusive of Fuel Financing
(Thousands of U. S. Dollars)

GE Contract

Equipment and Services	\$23,854
Fuel Fabrication	<u>6,125</u>
Total GE Contract	29,979

<u>GETSCO Contract (dollar portion only)</u>	<u>2,182</u>
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Total Dollar Contracts	<u>\$32,161</u>
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Financing Plan

Total GE and GETSCO Contracts	\$32,161
Less 10% Cash by JAPC	<u>3,216</u>
Balance of Contract to Be Financed	28,945
Plus U. S. Ocean Freight	<u>1,089</u>

Financed Portion	<u>\$30,034</u>
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GE Participation - 15% of Contract Price	\$ 4,497
GETSCO Participation - 15% of Contract Price	327
Balance Eximbank Financing Requested	<u>25,210</u>

Total Financing	<u>\$30,034</u>
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The staff recommends that the \$30,034,000 loan requested for equipment, services, and ocean freight, which includes the participations of GE and GETSCO, be retired in 32 approximately equal semiannual installments of \$938,562 each, with repayment to begin October 1, 1970, and the indebtedness to GE and GETSCO to be paid off in the first 12 installments at \$402,000 each. The staff also recommends that the \$10 million credit requested for fuel to be purchased in the United States be retired in 10 equal semiannual installments beginning October 1, 1970. Under the recommended plan, Eximbank would receive principal repayments of \$3,073,124 annually during the first five years and \$1,073,124 during the sixth year and \$1,877,124 annually during the last 10 years.

Handwritten notes:
 33,000
 31,877
 11

Tsuruga Station

The Tsuruga Station will be located on the Tsuruga Peninsula facing the Sea of Japan, approximately eighty miles north and east of the city of Osaka, in a relatively unpopulated area. The site is approximately five miles from where the Kansai Electric Power Company is constructing its first nuclear power station utilizing a pressurized water reactor.

The Tsuruga Station will utilize a boiling water reactor (BWR) in which saturated steam is produced in the reactor vessel. The fuel assemblies in the initial core will have an average enrichment of 2.17% since fuel elements of 1.49% and 2.39% enrichment will be utilized. Approximately 20% of the fuel assemblies will be replaced each year, and these replacements will have an average enrichment of 2.49% utilizing fuel elements of 1.77% and 2.64% enrichment. The reactor vessel, fuel assemblies and controls, and all critical nuclear components will be manufactured in the United States.

The turbine generator will be a very large tandem compound double-flow machine operating under saturated steam conditions of 965 psia and 542° F. Due to the critical requirements of equipment of this size operating under these conditions, the turbine generator will also be manufactured in the U. S. The remainder of the equipment, which is largely conventional, will be manufactured in Japan.

The contract with GE covers all equipment and design services as well as initial fuel fabrication to be supplied in the United States. A substantial part of the conventional requirements of the power station falls within the GETSCO contract and will be procured in Japan by GETSCO under GE specifications with yen currency. Maximum escalation of 4.5% in dollar costs and 5% in yen costs is included in the contracts.

JAPC will supply the site and carry out initial site preparation. It will also provide the necessary administrative buildings and warehousing, inland transportation and insurance, and the necessary power transformers.

A breakdown of estimated costs to be incurred under the contracts and total cost of the project are summarized below:

ESTIMATED COSTS
IN DOLLARS

	Payable in U.S. Dollars	Payable in Japanese Yen Converted to \$	Notes
General			
Equipment	5,238		5,238
Nuclear	1,361		1,361
Submarine Contract	7,742		7,742
Engineering	1,267		1,267
Spare Parts	6,121		6,121
Fuel Fabrication	531		531
Other			
Total GE	29,970		29,970
GETSCO Contract			
Buildings & Structures		7,123	7,123
Equipment (spare parts incl.)		14,654	14,654
Engineering	2,152	2,227	4,409
Construction		2,304	2,304
Other		52	52
Total GETSCO	2,152	26,360	28,512
JAPC Supplied			
Land & Buildings		5,983	5,983
Equipment		2,858	2,858
Construction		4,237	4,237
Overhead Charge		4,648	4,648
Interest During Construction		6,230	6,230
Contingencies		4,343	4,343
Miscellaneous		323	323
Total JAPC		28,622	28,622
Nuclear Fuel	10,000		10,000
Freight and Insurance	1,089	1,607	2,696
Total Estimated Costs	\$43,250	\$56,595	\$99,845
\$/Kw	\$34.15	\$175.54	\$309.65

1/ Estimates include escalation; exclude "potential stretch cost of \$2,297,000 (see pages 9 and 10 for explanation of "stretch")".

Cash requirements by years over the construction period, including for the first core and fuel fabrication costs, have been estimated as follows:

Construction Costs

(Thousands of U. S. Dollars at ¥360 = \$1.00)

Year Ending March 31	U. S. Funds	Japanese Funds	Total
Prior to 1965	\$ -	\$ 2,820	\$ 2,820
1966	-	2,036	2,036
1967	4,313	10,650	14,963
1968	7,121	12,935	20,056
1969	25,314	15,208	40,522
1970	6,502	12,944	19,446
Total	\$43,250	\$56,593	\$99,843

Cost of first core fuel requirements, estimated at \$10.0 million, included in payments to be made in the year ending March 31, 1969. Fabrication costs included above will be payable in the years ending March 31, 1969, and 1970, estimated at \$3,216 thousand and \$2,909 thousand, respectively.

**Projected Timing of Procurement
and Processing of Fuel**

January - December 1968	Purchase ore (U_3O_8) and convert to UF_6 for delivery to AEC
January 1969	Procure enriched uranium from AEC for delivery to GE, San Jose plant
January - July 1969	Fabrication of enriched uranium by GE
August - September 1969	Deliver fabricated fuel to plant site
December 1969	Expected completion date of Tsuruga Station.

Production Capability

Nominal gross design rating for the station is 322 mw and under GETSCO contract a net electrical output of 307 mw is warranted at the high voltage terminals of the main step-up transformer. Due to liberal design standards, past experience has shown that the capability of such a station can, in practice, be considerably increased when equilibrium

has been reached in the reactor core. It is therefore anticipated that the station will have a gross output of 357 mw and a net output of slightly over 340 mw. To permit utilization of this additional potential capability of "stretch" the turbine generator set and its accessory equipment have been designed to permit carrying an electrical load of 357 mw. The increased capability, however, may not be fully demonstrated until a number of operational tests have been completed and the core is approaching equilibrium which will require approximately five years after initial start-up. As to payment for the stretch capability, the contract provides that JAPC will pay GETSCO \$70 per kilowatt of capability demonstrated within a three-year period in excess of 309 mw up to a maximum of 340 mw. This stretch payment is also subject to maximum escalation of 4.5% and, if the full amount is required, would represent an additional payment to GETSCO of \$2,297,000. This amount, however, is not included in the current cost estimate. JAPC may request an additional credit for this purpose when and as the stretch is demonstrated.

The output of the Tsuruga Station is to be fed into the Japanese high voltage network and consumed in the Central Region consisting of the Kansai, Chubu, and Hokuriku electric power systems. The energy will be sold at the high voltage bus bars and will be transported over an approximately 75-mile 275 kv transmission line to the Konan substation of Kansai near Kyoto. This transmission line will be constructed and owned by the Kansai Company and in operation prior to initial start-up of the Tsuruga Station. From the Konan substation there are high voltage connections to the other electric companies in the Central Region.

The three electric power companies in the Central Region have signed a preliminary agreement with JAPC to take the rated output of Tsuruga based on an 80% plant factor, or 7,000 hours per year full load operation. Based on the warranted output of the station, this would represent 2,149 million kwh annually, or 2,380 million kwh if the full stretch capability is attained. Individual contracts will be negotiated with each of the three power companies prior to start-up of the plant under which it is anticipated that Kansai will take approximately 60%, Chubu 30%, and Hokuriku 10% of the net output. The output of the Tsuruga plant will represent only about 2% of the Central Region requirements and can be readily absorbed in high load factor operation.

Nuclear Fuel and Fuel Costs

Slightly enriched uranium is the nuclear fuel used in a boiling water reactor. The processing of this fuel starts with uranium concentrate (U_3O_8), commercially referred to as yellow cake, which is converted to a gaseous form (uranium hexafluoride, UF_6), and enriched to increase the proportion of burnable material. The process of enrichment is performed in the U.S. at this time only by the AEC. The enriched material produced

by AEC is also in a gaseous form and must be converted to uranium dioxide (UO_2) which is then pelletized and encased in zirconium or stainless steel. The process of converting the gas to a solid and its subsequent encasement is referred to in the trade as "fabrication" and is restricted in the United States to AEC licensees. The final result is a zirconium tube containing fissionable, pelletized fuel. These tubes are grouped to form the nuclear fuel core. Forty-nine tubes form a fuel assembly and there are 308 fuel assemblies required in the core of the Tsuruga reactor.

The core, an integral part of the reactor, has to be loaded into the reactor at the outset of its operations. Approximately once every year, one-fifth of the core is replaced by new fuel assemblies. The amount of enriched uranium required for the first core plus six spare assemblies is now calculated to be 136,000 pounds of average 2.17% enrichment. It will require about 700,000 pounds of U_3O_8 to produce the required amount of enriched uranium.

Use and trade in atomic materials for industrial purposes, the production of plutonium in the reactor, and the unused nuclear fuel after withdrawal from the reactor are subject to international control and safeguards, more fully described under the heading, "International Atomic Energy Agency Safeguards," starting on page 14.

The Company intends to purchase yellow cake (U_3O_8) directly from U. S. producers, to contract for the conversion of the ore into hexafluoride (UF_6) with Allied Chemical Corporation at its Metropolis, Illinois, plant (the only concentration and conversion plant currently licensed in the United States), and then to contract with U. S. AEC for toll enrichment.

After enrichment, the fuel will be shipped by JAPC to GE's plant in San Jose, California, for fabrication by GE and shipment to Japan. The cost of fuel from purchase of ore through enrichment by U. S. AEC and shipment to San Jose is to be borne by JAPC under direct contracts between it and the various contractors. This cost is not included in the GE or GETSCO contract.

Fabricated fuel will be required at the Tsuruga site in September of 1969. To meet this delivery, JAPC must arrange for delivery of enriched uranium to San Jose by January 1969. The contracts for the purchase of uranium ore and its processing and enrichment under contracts with Allied Chemical and U. S. AEC will be on a cash on delivery basis.

Based on present prices, the cost of enriched uranium to be supplied to GE for fabrication is estimated at approximately \$9.5 million, as follows:

	Million Dollars	
Mining companies - for concentrate (U_3O_8)	\$4.0	(105) = 4.2
Allied - conversion from U_3O_8 to UF_6	1.0	1.1
AEC - for enrichment of UF_6	<u>4.5</u>	<u>4.7</u>
	\$9.5	10.0

These costs are based on current estimated quantities and without specific knowledge of the concentrate to be supplied, which could affect other costs, particularly conversion. In order to provide for these contingencies, JAPC is requesting a credit of \$10 million.

Total fuel costs over the 20-year life of the plant, based on current U. S. AEC sales price of enriched uranium, have been estimated at \$84.1 million, with a residual value estimated at \$7.9 million, as shown in the following cost breakdown by core loadings:

Summary of Fuel Costs,
Including Fabrication Costs,
Over a 20-Year Period for
Tsuruga Station
(U. S. Dollars in Thousands, at \$360 = \$1.00)

	<u>First Core</u>	<u>Second Core</u>	<u>Equilibrium Cores</u>	<u>Final Core</u>	<u>Total</u>
Fuel Costs					
Enriched Uranium	\$ 9,978	\$12,058	\$27,777	\$12,058	\$61,871
Fabrication Costs	6,494	5,817	12,406	5,323	30,040
Less Residual Value	- 1,029	- 1,182	- 2,440	- 3,204	- 7,855
Total Costs of Fuel Used	\$15,443	\$16,693	\$37,743	\$14,177	\$84,056
Calculation of Residual Value					
Value of Unused U-235 Plus Plutonium Generated	\$ 2,789 <u>2,584</u>	\$ 2,724 <u>2,811</u>	\$ 6,035 <u>6,511</u>	\$ 5,322 <u>2,209</u>	\$16,870 <u>14,115</u>
Total Value	5,373	5,535	12,546	7,531	30,985
Less Cost of Processing:					
Transportation	1,186	1,181	2,747	1,192	6,506
Reprocessing	2,567	2,550	5,945	2,575	13,637
Conversion	328	328	761	331	1,748
Other Costs	263	294	653	229	1,439
	<u>4,344</u>	<u>4,353</u>	<u>10,106</u>	<u>4,327</u>	<u>23,180</u>
Residual Value	\$ 1,029	\$ 1,182	\$ 2,440	\$ 3,204	\$ 7,855

Fuel ownership by JAPC and processing through the above steps are permitted under the U. S.-Japan Bilateral Agreement for Cooperation Concerning Civil Uses of Atomic Energy. While under this agreement substantial amounts of enriched uranium can be made available by the U. S. to Japan, the agreement anticipated the requirements of experimental and research reactors and not the requirements of large commercial power reactors. Under this existing agreement, however, the requirements for the first core of the Tsuruga Station could be supplied. A revision of the bilateral is presently being negotiated between the United States and Japan and will provide for the increased supply of enriched uranium required for the continuous operation of large commercial nuclear power stations.

It may also be pointed out that the present agreement contains a clause that restricts ownership of enriched uranium made available thereunder to the Government of Japan until such time as private ownership in the United States would be permitted. On August 26, 1964, the Atomic Energy Act of 1954 was amended to permit private ownership by authorizing the U. S. AEC to enter into contracts to enrich uranium owned by domestic licensees and, hence, foreign entities. Thus, from the date of this amendment, private ownership of enriched uranium is permitted under the current bilateral with Japan.

In Japan there is no legislation governing ownership of enriched uranium. The Cabinet adopted a resolution at the time of execution of the U. S.-Japan bilateral restricting ownership of enriched uranium procured from the United States to the Government of Japan in keeping with the terms of the bilateral. Now that private ownership is permitted in the United States, it is expected that the Japanese Cabinet will amend its resolution, and this amendment is expected within the next twelve months.

The August 1964 amendment of the Atomic Energy Act authorized U. S. AEC to enrich uranium owned by private entities in the United States and abroad, referred to as "toll" enrichment. However, the amendment prohibits delivery of enriched uranium under toll enrichment contracts prior to January 1, 1969, although the U. S. AEC may enter into contracts for enrichment prior thereto. Toll enrichment contracts between AEC and domestic licensees may be for periods up to 30 years. Contracts with foreign purchasers may be made for periods in accordance with the appropriate Agreement for Cooperation between the United States and the foreign nation or nations involved.

In general, toll enrichment contracts will cover delivery schedules for both feed material and enriched uranium, chemical form and specifications of material, charges for enrichment services as published in the Federal Register, ceiling on charges, customers' option to acquire tails material, responsibility for meeting specifications, termination conditions and procedures, and delivery of title. In addition, "Customers' Requirements Contracts" are also to contain provisions relative to quantities and enrichment requirements, and purchase of enriched uranium in lieu of enriching services.

International Atomic Energy Agency Safeguards

The International Atomic Energy Agency (IAEA) was established in 1957 with headquarters at Vienna to promote the peaceful use of atomic energy and at the same time to prevent diversion of atomic fuel to military use. Since establishment, the international group of 57 nations has developed:

1. Standard codes for safety and health;
2. Regulations for shipment of radioactive materials;
3. Regulations governing disposal of radioactive wastes;
4. Standards of measurements and calibration;
5. Control of materials and equipment.

Natural uranium is not a weapons material; neither is the slightly enriched uranium used in the big power reactors in the United States and elsewhere. In a reactor, plutonium, a weapons material, is separated from the enriched uranium and can be readily and cheaply released for diversion. Thus, nuclear reactors are the most feasible and effective place at which to establish control. Here the incoming fuel elements can be counted and sampled; the power level of the plant can be checked; the production of plutonium estimated; the spent fuel elements can again be counted and sampled and disposition thereof can be controlled.

There is a further practical point that favors reactors as a sensible point to begin control. The fuel going into a reactor is expensive, and the spent fuel coming out is both valuable and hazardous to health. Furthermore, the safe and efficient operation of a reactor requires complete and continuous knowledge of the number of fuel elements in the reactor, their original composition, and the amount of uranium and plutonium in them at any given time. Therefore, prudent operation of a reactor requires extensive and accurate recordkeeping and instrumentation. The kinds of material inventories and operating records necessary for prudent management have in them all or most of the information required for materials control from the point of view of safeguards. In a well-run plant, visiting inspectors have little more to do than to verify the accuracy of existing records and make spot checks of samples of material.

How IAEA Safeguards Are Applied

The IAEA safeguards system is a statement of principles and proposed practices that serves as a basis for formal agreements between the Agency and member states for the administration of safeguards. Only after such agreements have been negotiated and signed do safeguards actually go into effect.

There are three ways in which this system can be applied:

- (1) If the Agency itself substantially assists a country to build a reactor, that reactor must by statute be under Agency safeguards;
- (2) If one country helps another to build a reactor, the two can ask the Agency to administer safeguards;
- (3) A country can unilaterally request the Agency to safeguard one or several of its reactors.

The principle of international control has been accepted by most of the countries of the world and IAEA inspection is becoming increasingly prevalent.

U. S. Participation

All bilateral agreements which the U. S. has made with another country have contained provisions requiring U. S. AEC inspection of foreign installations in which U. S. reactors or reactor fuels are employed. However, in January 1963 the U. S. AEC adopted a policy of transferring the administration of safeguards to IAEA as new agreements are concluded or as existing agreements are renewed.

The U. S. AEC is also considering a change in its regulations to permit IAEA inspection of the reprocessing of virtually all the plutonium produced in U. S. civilian power reactors. As a first step, the Chairman of AEC, Glenn T. Seaborg, announced on March 1, 1966, the U. S. has agreed to place Nuclear Fuel Service, Inc., under IAEA inspection. This privately owned reprocessing plant, located near Buffalo, will reprocess all fuel from the Yankee Atomic Power Company in Rowe, Massachusetts.

Japan Participation

In September 1963 Japan agreed to IAEA inspection and transferred the safeguards under the U. S.-Japan bilateral agreement to the IAEA. Japan also proposes to transfer safeguards under the Japan-United Kingdom and the Japan-Canada bilateral agreements to IAEA.

Freight Cost

Shipment of equipment, material, and fabricated fuel from U. S. ports to the plant site will be the responsibility of GE, which will engage Mitsui & Company (U.S.A.), Inc., a U. S. company wholly owned by Mitsui Bussan K. K. of Japan, to act as freight forwarders. The cost of shipment to be made in vessels of U. S. registry is estimated at \$1,089,000, which is in addition to the \$29,979,000 for equipment and services covered by the GE sales contract and is to be paid by JAPC against invoices for actual costs incurred. JAPC has requested the Bank to finance 100% of these costs. Freight costs on vessels of Japanese or third country registry, if permitted by the U. S. Maritime Administration, will be paid directly by JAPC in U. S. dollars from its cash resources.

Insurance

JAPC is required by Japanese law to be insured up to \$13,889,000 per station against liabilities resulting from nuclear accidents. In addition, the Government will provide at a low premium an equal amount of liability insurance.

Japan Development Bank
 Summary Balance Sheet
 (Millions of U. S. Dollars)

	March 31 <u>1965</u>	March 31 <u>1965</u>
ASSETS		
Cash and Balances with Other Banks	\$ 3.4	\$ 6.3
Government Securities	23.2	29.0
Loans and Discounts	2,577.0	2,880.6
Bank Premises	7.5	8.0
Other Assets	7.8	6.9
Unamortized discount on external U. S. dollar loan bonds	<u>2.3</u>	<u>3.0</u>
Total Assets	<u>\$2,621.2</u>	<u>\$2,933.8</u>
LIABILITIES		
Funded Debt	\$1,682.7	\$1,945.3
Reserve for Losses	76.6	85.1
Other Liabilities	<u>57.5</u>	<u>78.8</u>
Total Liabilities	1,816.8	2,109.2
CAPITAL ACCOUNTS		
Capital Stock	649.9	649.9
Retained Earnings	<u>154.5</u>	<u>174.7</u>
Total Capital Accounts	<u>804.4</u>	<u>824.6</u>
Total Liabilities and Capital Account	<u>\$2,621.2</u>	<u>\$2,933.8</u>
Contra Accounts:		
Undisbursed Foreign Borrowings		
Contingent Liabilities for Guarantees	\$ 359.7	\$ 423.6
Total Income for the Year	\$ 162.1	\$ 180.8
Net Profit	\$ 52.9	\$ 52.5
Net Profit to Capital Accounts	6.6%	6.3%
Net Profit to Total Income	32.7%	28.9%
Total Capital as a Percent of Total Liabil.	44.3%	39.1%
Reserve for Loan Losses to Loans Outstanding	3.0%	3.0%

Commercial Atomic Energy

All clearances by appropriate agencies of the Government of Japan have been obtained by JAPC.

United States Embassy Clearance

Our Embassy in Tokyo perceives no political or other objections to this credit.

Financial Considerations

JAPC was established in 1957 to foster the commercial development of nuclear power in its initial stages and to lay the foundation for future development of nuclear power by the electric utility companies of Japan. To do so, it will import large nuclear reactors, construct nuclear power stations, charge these stations in cooperation with the electric power system of Japan, wholesale electric power produced, train engineers, encourage the domestic production of equipment for nuclear power plants, and promote related industries and activities.

JAPC today is a joint effort of the Government of Japan and private industry to foster an orderly development of nuclear power for industrial purposes. The newness of this operation, the fact that the company is not presently producing, and the lack of historical operating records negate comparisons with other electric utilities.

The only project undertaken by JAPC to date is a natural uranium power station located at Tokai, 80 miles northeast of Tokyo on the Pacific Coast. The reactor and generating equipment were purchased from General Electric Company, Ltd., U. K., under a contract entered into on December 22, 1959. The station is equipped with a Calder Hall type reactor, four steam raising units, and two turbo-generators with a gross design rating of 166 mw and a net station design capability of 158.5 mw.

The original cost of the Tokai Station with the first fuel core was estimated at \$97.2 million. Design modifications during the construction period for safety and greater efficiency increased this cost and it is now estimated that cost at completion will amount to \$129.2 million. JAPC presently believes the plant will be ready for commercial operations in mid-July 1966; it was originally expected to be in commercial operation by August 1964. The delay in start-up was caused by faults in construction and design. Imported steel plates for the pressure vessel developed hydrogen cracks and had to be replaced with Japanese plates. Other causes included changes in the fuel charge and discharge facilities and tubing cracks in the steam generating units. Cost of correcting these failures is to be borne fully by General Electric of England and, in addition, the contract contains

... included damage clause in an amount not to exceed 5% of the contract price. No action has been taken as yet by J.E.C. to recover losses in operating terms.

The cost of completing the Toka Station and the loss in operating revenue resulting from delayed start-up have depleted the Company's resources. To assist J.A.C. to meet expenses, the utility shareholders electric power companies have committed a \$30 million contribution to be applied to the cost of the installation. The contribution will be advanced over a two-year period beginning in the current fiscal year in \$6 million annual increments.

The current weakness of the Company is reflected in its March 1970 balance sheet shown below and compared with the Company's projected balance sheet for March 31, 1970, and 1973. Scheduled payments of \$10 million for stock subscription over the next four years, the \$30 million contribution referred to above, and depreciation planned at an accelerated rate over the forward period are expected to strengthen the Company's position by 1970. If projected plant operations are realized, the Company should be in a manageable financial position by 1973, with a 60/40 debt/equity ratio, and a good position by 1976, with a 48/52 ratio.

Japan Atomic Power Company
Comparative Balance Sheet
Millions of Dollars as of 1960 = \$1.00

As of March 31	1966 (Actual)	1970	1975
ASSETS			
Current Assets			
Cash and Deposits	\$ 1.3	\$ 2.8	\$ 9
Materials and Supplies	2.1	2.6	14.6
Other Current Assets	.2	.1	.1
Total Current Assets	<u>3.6</u>	<u>5.5</u>	<u>15.6</u>
Investments & Deferred Accounts	2.5	.4	.4
Fixed Assets			
Electric Utility Plant	.8	230.2	230.2
Less: Depreciation	<u>.1</u>	<u>42.1</u>	<u>85.4</u>
Net Electric Utility Fixed Assets	.7	188.1	144.8
Construction in Progress	129.4	-	-
Total Fixed Assets	<u>130.1</u>	<u>188.1</u>	<u>144.8</u>
Total Assets	<u>\$136.2</u>	<u>\$194.0</u>	<u>\$160.8</u>
LIABILITIES			
Current Liabilities			
Accounts and Taxes Payable	\$ 3.2	\$.4	\$ 1.2
Short-Term Debt	4.9	-	5.7
Current Maturities	<u>9.2</u>	<u>14.9</u>	<u>10.0</u>
Total Current Liabilities	<u>17.3</u>	<u>15.3</u>	<u>17.4</u>
Fixed Liabilities			
Long-Term Debt	73.5	123.3	79.4
Long-Term Accounts Payable	7.9	.1	-
Employees' Retirement Reserves	<u>.8</u>	<u>.2</u>	<u>.3</u>
Total Fixed Liabilities	<u>81.4</u>	<u>123.6</u>	<u>79.7</u>
Capital			
Common Stock	37.5	61.4	61.4
Earned Surplus	<u>-</u>	<u>(6.3)</u>	<u>2.3</u>
Net Worth	<u>37.5</u>	<u>55.1</u>	<u>63.7</u>
Total Liabilities and Net Worth	<u>\$136.2</u>	<u>\$194.0</u>	<u>\$160.8</u>
Long-Term Debt as a Percent of Net Fixed Assets	62.6%	65.6%	54.8%
Debt-Equity Ratio	72/28	72/28	60/40
Depreciation Reserve - Percent of Utility Plant	(N.A.)	18.3%	37.1%

See detailed Projected Balance Sheet over a 10-year period, attached, Exhibit 1.

There follows a breakdown of JAPC's Long-Term Debt, Long-Term Accounts Payable, and Miscellaneous Funded as of March 31, 1968, exclusive of current liabilities of \$9,177,000, a large portion of which has been provided by General Electric of England and the U. K. Atomic Energy Authority. These companies have granted deferments of principal payments amounting to \$4,728,000, which is all due during JAPC's current fiscal year. The deferred payments have been spread over the remaining life of the credit without extending the final maturity date of the two loans. This change is not reflected in the March 31, 1968, Balance Sheet as negotiations were not completed at the time.

Debt Outstanding as of March 31, 1968

		Amount in \$ Millions	Security
<u>Long-Term Debt</u>			
Loans	Government-Owned Bank		General
	6.5% - 1972-1984	123.613	Mortgage
	Other Japanese banks		
	8.395% - 8.76% - 1967-1973	8.802	None
	8.7% - 9.125% - 1967-1972	10.812	None
Foreign Loans	General Electric Co., Ltd. (U.K.)		
	The Bank of England official discount rate plus 1/2% - 1967-1973	29.284	None
Long-Term Accounts	U. K. Atomic Energy Authority		
	No interest - 1967-1971	7.867	None
Miscellaneous	Housing Loan Corporation -		
	7.0% - 1967-1980	46	Land & Bldg.
	6.5% - 1995	21	Land & Bldg.
Total		<u>201.445</u>	

Rates and Return on Investment

As a wholesale distributor, JAPC will sell power under long-term contracts covering the entire production of each plant. The sales are to be made at rates approved by the appropriate Ministry of the Japanese Government, and are to be based on a fair return on invested capital, about 7% per annum. A contract between JAPC and Tokyo Electric Power Company covering the entire output of the Tokai Station over a seven-year period was signed on

March 17, 1966, at a flat rate of 12.6 mills per kWh. The rate was determined by calculating the average annual cost, including approximately 7% return on invested capital over a seven-year period.

Based on the estimated total cost of \$129,227,000 and a net station capability of 158.5 MW operating at an annual plant factor of 80%, the cost of energy from the Tokai installation in the first year of operation, giving no effect to the \$30 million contribution, is estimated at 17.9 mills per kWh, which will drop to 16.2 mills per kWh during the fifth year of operation and to 13.0 mills during the seventh year. During this five-year period, the cost will be adjusted downward by the \$30.0 million contribution, which will serve to reduce energy cost in the first year to 12.5 mills per kWh, and to 10.3 mills per kWh by the fifth year. The average adjusted cost in mills per kWh over the seven-year period is calculated at 12.7 mills.

Project Cost of Energy of Tokai Nuclear Station
(Thousands of U. S. Dollars at \$360 = \$1.00)

<u>Item</u>	<u>Average Annual Cost Over Seven-Year Contract Period</u>
Fixed Charges	
Depreciation 1/	\$ 5,787
Interest	4,743
Fixed Asset Tax	500
Insurance	411
Return on Capital	2,166
Total Fixed Charges	<u>13,587</u>
Fuel Replacement Cost	2,892
Production Costs, Other	<u>1,911</u>
Total Cost	\$18,390
Energy Cost/Mills kWh	16.6
Contribution in Aid of Construction 2/	<u>4,286</u>
Adjusted Total Cost	\$14,104
Adjusted Cost/Mills kWh	12.7

1/ Includes plant and initial fuel costs.

2/ The contribution is payable in five annual installments of \$6.0 million each. For the purpose of arriving at the above average, the \$30.0 million is spread over a seven-year period.

On October 11, 1965, JAEC entered into preliminary contracts with Kansai Electric Power Company, Chubu Electric Power Company, and Tokai Electric Power Company to wholesale to these three power companies the entire production of the Tsuruga Station. A detailed contract with each company setting forth the price at which power will be sold, the amount to be sold to each, and the term in years will be concluded prior to completion of the Tsuruga Station.

Average annual cost of energy to be produced by the Tsuruga Station over a five-year period has been projected at 8.33 mills per kwh, calculated as follows:

Projected Cost of Energy of Tsuruga Nuclear Station
(Thousands of U. S. Dollars at ¥360 = \$1.00)

<u>Item</u>	<u>Average Annual Cost Over Five-Year Period</u>
<u>Fixed Charges</u>	
Depreciation of Plant	\$ 3,731
Interest	5,906
Fixed Asset Tax	337
Insurance	456
Return on Capital	<u>2,222</u>
Total Fixed Charges	10,652
<u>Fuel Costs, including Depreciation</u>	<u>4,569</u>
<u>Other Production Costs</u>	<u>2,678</u>
Total Cost of Energy	\$17,899
Energy Cost/Mills kwh	8.33

While the total cost of energy from the Tsuruga plant is estimated to be about one mill per kwh higher than for a modern, large-size, oil burning, steam power station in Japan, it is expected that the use of larger units, the increased use of components built in Japan, and advancements in the art will result in nuclear power stations being economical for base load operation.

Projected Income

To date, JAEC has had no operating revenue and only small amounts of interest and nonoperating revenue. Projected revenue over a forward 10-year period is to be derived from commercial operations of Tokai nuclear power station which is expected to begin in mid-1966; from the \$30 million

contribution in aid of construction; and operation of Tsuruga nuclear power station which is expected to begin by January 1970. Revenue from these sources is projected as follows:

Sources of Revenues
(Thousands of U. S. Dollars at \$360 = \$1.00)

Year Ending March 31	Tokai Station	Contribution in Aid of Construction	Other	Tsuruga Station	Total
1967	\$ 8,592	\$ 6,000	\$ 42		\$14,634
1968	13,826	6,000	42		19,868
1969	14,096	6,000	42		20,138
1970	14,157	6,000	42	18,507	38,706
1971	14,157	6,000	42	18,507	38,706
1972	14,157		42	18,507	32,706
1973	14,157		42	18,507	32,706
1974	14,157		42	18,507	32,706
1975	14,157		42	18,507	32,706
1976	14,157		42	18,507	32,706

Projected annual revenue from the Tokai Station is based on an annual output of 1,108,170 mwh at 12.8 mills per kwh. Revenue from the Tsuruga Station is based on an annual output of 2,149,073 mwh at 8.6 mills per kwh. The substantial difference in revenue per kwh reflects the great difference in cost of construction of the two stations per kw. The Tokai Station final cost is estimated at \$129 million for an annual production of 1,108,170 mwh whereas the Tsuruga Station will cost an estimated \$100 million for nearly double annual production of 2,149,073 mwh.

The fuel charged to operating expenses for the Tsuruga Station will be relatively minor in the years 1970-1973 as cost of the first fuel core is to be treated as a capital investment. Thereafter, fuel expenses for Tsuruga will increase as subsequent cores are to be enriched to a higher and more costly percentage of U-235, and fuel replacement is charged to operating expenses. As a result, the operating profit, as shown in the following projected income statements for selected years, will be lower in 1976 than in earlier years.

Statements of income for the years ending March 31, 1967, 1970, 1973, and 1976 are summarized below:

Japan Atomic Power Company
 Projected Income Statement
 (Thousands of U. S. Dollars at \$360 = ¥1.00)

Year Ending March 31	1967	1970	1973	1976
Revenues				
Revenues from Sales of Energy	\$ 8,592	\$19,554	\$32,664	\$32,664
Interest & Other Revenues	42	42	42	42
Contribution in Aid of Constr.	<u>6,006</u>	<u>6,000</u>	-	-
Total Revenues	14,634	25,596	32,706	32,706
Expenses and Taxes				
Operating & Maintenance Exp.	1,522	6,029	8,011	12,275
Depreciation	9,212	11,479	13,330	8,534
Fixed Assets Tax	-	453	948	886
Enterprise Tax	219	383	489	489
Corporation Tax	-	-	<u>1,120</u>	<u>2,220</u>
Total Expenses and Taxes	10,753	18,344	23,898	24,384
Gross Income	3,681	7,252	8,808	8,322
Interest (Other than Capitalized)	4,445	6,227	6,524	4,268
Amortization of Capital Stock, Organization, and Other Expense	<u>1,809</u>	<u>44</u>	-	-
Total Income Deductions	6,253	6,271	6,524	4,268
Net Income	\$ (2,572)	\$ 981	\$ 2,284	\$ 4,054
Operating Ratio	74.8	71.7	73.1	74.0
Gross Income as a % of Capitalization	2.5%	3.8%	5.5%	6.5%
Interest Coverage	0.8	1.2	1.5	2.5
Debt Service	0.9	0.9	0.9	1.1

Depreciation Policy

JAPC will depreciate Tokai plant and equipment over a 20-year period from start-up of operations on a straightline basis. The first core of fuel for the Tokai Station, estimated to cost \$11.6 million, will also be depreciated on a similar straightline basis.

The first core fuel cost for the Tsuruga Station, estimated at \$10.0 million (exclusive of fabrication costs estimated at \$1.1 million), will be depreciated over the life of the fuel (approximately five years). Fabrication cost of the first core of fuel for this plant is included in the GE contract and has been treated, therefore, as a capital investment in the depreciated plant.

In these depreciations of plant the Company will charge depreciation during the eight-year period beginning April 1, 1966, which is largely covered in the early years by the \$30.0 million contribution. Depreciation over the ten-year period beginning April 1, 1966, through March 31, 1976, including both regular and special, is planned as follows:

Depreciation JAPC Installations and Fuel
(Millions of U.S. Dollars at \$160 = \$1100)

Year Ending March 31	Straightline	Excess over Straightline ^a	Total	Projected Depreciable Property	Depreciation as a % of Depreciable Property
1967	\$ 4.4	\$ 4.8	\$ 9.2	\$65.1	14.1%
1968	3.9	3.4	11.3	129.5	8.7%
1969	3.8	4.2	10.0	129.5	7.7%
1970	4.9	4.6	11.1	179.1	6.2%
1971	5.3	6.7	16.2	228.6	7.1%
1972	6.3	5.2	13.7	228.6	6.0%
1973	6.5	4.8	13.3	228.6	5.8%
1974	6.5	.5	6.0	228.6	2.6%
1975	6.5	0	6.0	228.6	2.6%
1976	6.5	0	6.0	228.6	2.6%

Projected Interest Charges and Coverage

Interest costs include interest on long-term debt, long-term accounts payable, and short-term debt, exclusive of interest charged to construction. Interest charged to income and times earned are projected as follows:

Times Projected Interest Earned
(Thousands of U. S. Dollars at \$360 = \$1.00)

Year	Interest Charges Other Than Capitalized	Net Income		Times Interest Earned
		(a) Before Interest and Corporate Taxes	(b) Before Interest, Tax and Special Depreciation	
1967	4,445	3,681	4,487	0.8
1968	6,034	2,742	8,154	0.9
1969	5,642	4,333	8,322	0.8
1970	6,227	7,292	10,355	1.2
1971	8,936	12,870	15,006	1.4
1972	7,774	10,158	10,158	1.3
1973	6,524	9,928	9,928	1.5
1974	5,860	10,722	10,722	1.9
1975	4,950	10,734	10,734	2.2
1976	4,268	10,522	10,522	2.5

Debt Service

Income before interest and depreciation projected over a 10-year period from April 1, 1966, is estimated at \$195.7 million; debt service at \$202 million, or 97% of coverage. A breakdown of debt service by years over the projected period is shown in the cash flow forecast, Exhibit B. The Company will need to raise approximately \$60 million during the next four years to meet Tauruga construction costs over and above the requested Eximbank-GE-GETSCO loan assistance. During this period, capital stock sales will provide approximately \$24 million. The balance is to be financed with domestic borrowings, principally long-term loans from Japanese commercial banks and the Japan Development Bank.

The Company does not plan to pay dividends prior to the year ending March 31, 1974, and is exempt from corporation tax through March 31, 1972. Funded debt will be retired at the average annual rate of \$11.3 million over

the 10-year period exclusive of short-term loans. With short-term obligations included, annual debt retirement averages \$14 million over the period. This high rate of debt retirement will rapidly reduce the debt-equity ratio which reaches a projected high of 75/25 as of March 31, 1969, and improves to an anticipated 48/52 by March 31, 1976. A projection of the Company's financial growth over the 10-year forward period is summarized in Exhibit C.

Other Planned Nuclear Power Stations in Japan

Kansai Electric Power Company, serving the Osaka area, has been on ground on the construction of a 600 mw nuclear power station to be located on the Tsuruga Peninsula not far from the JAEC Tsuruga plant in Fukui Prefecture. The station will have two reactors of 300 mw each. The first unit is expected to start operations in March 1970 and the second unit by 1972. Kansai has placed its order for the first unit with Westinghouse.

Tokyo Electric Power Company has its plans well developed and has selected a site for a 950 mw nuclear station to be located not far from JAEC's Tokai Station on the Pacific Coast northeast of Tokyo. The station is planned with two reactors, the first a 350 mw unit to go on line in October 1970 and the second a 600 mw unit to be in service by October 1972.

Chubu Electric Power Company has announced plans to construct a 250 mw nuclear power station in Mie Prefecture on the Pacific Coast due south of Nagoya. The unit is expected to be in operation by October 1970.

Economic Comments

Up to the spring of 1963, developments in the Japanese economy followed a cyclical pattern well-known from previous experience. In 1963, an expansion of demand and output induced a substantial deterioration in the balance of payments. The Government reacted by imposing restrictive measures, mainly in the credit and monetary fields, which were progressively strengthened from December 1963 to March 1964. The rise in imports was halted and this, combined with an extremely strong recovery of exports, brought foreign trade into equilibrium by the middle of 1964. The Government then started to relax restrictions and expansionary policies were gradually introduced during the first half of 1965.

However, contrary to previous experience, the economy failed to respond to a reversal of policies. During the fiscal year ended March 31, 1966, the Japanese gross national product increased about 3% in real terms as compared with an 11% increase the previous year. The prime factor accounting for this reduced rate of growth was a drop in private equipment investment, which declined as sales dropped and unused plant capacity continued to depress the economy.

Japan's Balance of Payments
on a Foreign Exchange Basis for
Calendar Years 1963, 1964 and 1965

(in Millions of U. S. Dollars)

	1963	1964	1965
<u>Current Account</u>			
Exports	\$5,358	\$6,579	\$8,310
Imports	5,565	6,476	8,231
Trade Balance	- 207	103	1,079
Invisibles Balance	- 355	- 461	- 634
<u>Current Account Balance</u>	<u>- 572</u>	<u>- 353</u>	<u>745</u>
<u>Capital Account</u>			
Long-Term	471	378	155
Short-Term	184	98	391
<u>Capital Balance</u>	<u>655</u>	<u>476</u>	<u>546</u>
Errors & Omissions	- 46	- 197	- 101
<u>Additions or Subtraction to Reserves</u>	<u>+ 37</u>	<u>- 79</u>	<u>+ 98</u>

Japan's international reserves at the end of March 1966 were \$2.2 billion, the highest total in Japanese history.

Japan and the United States as major trading partners have a great identity of basic interests. Both are highly interrelated in market and financial relationships. Thus, both countries have a mutual interest in the prosperity and well-being of the other. Financial market trends in one country greatly affect the economic well-being in the other. For example, steps toward cheaper money in Japan have been slowed by increases in the interest rates and the tightening of funds available in the United States and European money markets, thus restricting Japanese monetary anti-cyclical policies and forcing the Japanese to make greater use of fiscal policy, e.g., budget deficits and tax reductions.

...of industrial indicators shows the view that Japan is...
 ...the beginning of an upswing after a period...
 ...and production will show a gain to some extent although inventories will...
 ...remain a drag on the economy.

It may be that the maintenance of a stable factory production growth...
 ...in Japan will require more active industrial policies than the...
 ...Government has been accustomed to. It is reasonable to believe...
 ...that Japan's balance of payment situation will prove amenable to the...
 ...objectives of domestic economic stabilization and growth. Thus, the main-...
 ...tenance of a high and growing rate of exports with a corresponding rise in...
 ...the growth of imports will be vitally important to the maintenance of...
 ...Japan's external economic equilibrium, and in the past the Japanese have...
 ...demonstrated this ability to export.

Exhibit Exposure in Japan and Refinancing

The Bank's exposure in Japan of \$694.3 million on June 30, 1965,
 is compared below with a projected exposure of \$711.7 million on June 30,
 1966, and \$790.7 million on June 30, 1967.

(In Millions of Dollars)

	June 30, 1965	June 30, 1966	June 30, 1967
<u>Short-Term</u>			
FCIA	\$ 5.9	\$ 1/	\$ 1/
<u>Medium-Term</u>			
Aircraft Credits	6.3	2/	2/
Aircraft Guarantees	107.6	93.9	194.0
Other Guarantees-3/	128.8	213.7	241.3
FCIA	3.9	2.1	2.1
Other	75.3		
Total Medium-Term	322.1	316.7	337.4
Total Short- and Medium-Term	328.0	317.7	337.4
<u>Long-Term Capital Loans</u>	366.3	394.0	453.3
Total	\$694.3	\$711.7	\$790.7

1/ No projection made.
 2/ Included with Long-Term Capital Loans.
 3/ Includes Commodity Credits.

The \$79.5 million increase from \$100 million to \$179.5 million during the coming year represents \$100 million in projected commitments, including \$40.0 million each on Kansai and Toyo Electric Power Corporations, \$75.0 million for a cotton credit, and \$16.5 to 33.0 million in repayments in fiscal 1967 of \$121.5 million.

A projected schedule of retirement of debt outstanding as of June 30, 1966, by fiscal year is shown below. It is projected that by the end of three quarters of Japan's current debt to EMB bank should be repaid.

Japan
 Projected Debt Retirement by Fiscal Years
 As of June 30, 1966
 (Millions of Dollars)

EXPOSURE	Development	Guarantees			Insurance		Total	Outstanding Balance
	Credits	Aircraft	Cotton	Other	MF	ST		
Exposure 6/30/66	\$394.5	\$95.9	\$162.5	\$56.2	\$2.1	-	\$741.2	\$711.2
RETIREMENT								
Fiscal Year								
1967	\$ 31.2	\$17.9	\$ 60.0	\$12.4	\$.6	-	\$122.1	\$589.1
1968	38.8	17.5	96.3	12.4	.6	-	165.6	423.5
1969	38.1	16.8	6.2	12.4	.6	-	74.1	349.4
1970	34.5	14.6	-	12.4	.3	-	61.8	287.6
1971	31.5	12.8	-	6.6	-	-	50.9	236.7
1972	29.3	10.5	-	-	-	-	39.8	196.9
1973	28.5	5.8	-	-	-	-	34.3	162.6
1974	24.2	-	-	-	-	-	24.2	138.4
1975	22.0	-	-	-	-	-	22.0	116.4
1976	20.9	-	-	-	-	-	20.9	95.5
1977	18.6	-	-	-	-	-	18.6	76.9
1978	13.7	-	-	-	-	-	13.7	63.2
1979	12.9	-	-	-	-	-	12.9	50.3
1980	12.9	-	-	-	-	-	12.9	37.4
1981	12.1	-	-	-	-	-	12.1	25.3
1982	11.2	-	-	-	-	-	11.2	14.1
1983	7.3	-	-	-	-	-	7.3	6.8
1984	2.4	-	-	-	-	-	2.4	4.4
1985	2.4	-	-	-	-	-	2.4	2.0
1986	2.0	-	-	-	-	-	2.0	-
Total	\$394.5	\$95.9	\$162.5	\$56.2	\$2.1	-	\$741.2	

Japan Atomic Power Company
 Capital Stock
Distribution of Shares - March 31, 1956

The Capital Stock consists entirely of common stock, each share with a par value of ¥10,000 (\$27.78).

<u>Shareholders</u>	<u>Number of Shares</u>	<u>Percentage</u>
<u>9 Electric Power Companies</u>		
Tokyo	280,411	20.8
Kansai	176,847	13.1
Chubu	49,956	3.7
Kyushu	44,365	3.3
Chugoku	29,271	2.2
Tohoku	16,196	1.2
Hokkaido	14,850	1.1
Hokuriku	13,500	1.0
Shikoku	<u>13,500</u>	<u>1.0</u>
Sub-Total	638,906	47.3
<u>Electric Power Development Company</u>	270,000	20.0
<u>5 Atomic Industrial Groups</u>		
Daiichi Group	72,235	5.4
Sumitomo Group	69,775	4.9
Tokyo Group	60,763	4.3
Mitsubishi Group	59,843	4.4
Mitsui Group	<u>60,901</u>	<u>4.5</u>
Sub-Total	319,517	23.7
<u>32 Other Shareholders</u>	<u>121,577</u>	<u>9.0</u>
Total	<u>1,350,000</u>	<u>100.0%</u>

Japan Atomic Power Company
Estimated Cash Flow
(Thousands of U.S. Dollars at Y360 = \$1,000)

Atchafalaya

1967 1968 1969 1970 1971 1972 1973 1974 1975

(Construction Period)

(Post-Construction)

	1967	1968	1969	1970	1971	1972	1973	1974	1975
Current Liabilities	5,681	2,742	5,333	7,252	12,870	10,158	9,928	11,258	11,087
Current Assets	9,212	11,268	10,034	11,479	16,248	13,717	13,330	9,046	8,337
Net Change	3,531	8,526	4,701	4,227	3,378	3,559	3,402	(2,190)	(2,750)
Company Funds	18,449	19,566	19,923	25,954	29,118	23,875	23,258	20,504	19,624
Long Term Debt - Domestic	4,621	6,437	23,832	5,872	17,774	2,778	5,723	3,779	2,778
Short Term Debt	11,112	6,390	9,445	10,555	1,477	2,778	5,723	3,779	2,778
Long Term Funds	17,400	4,167	5,834	16,427	19,643	2,778	5,723	3,779	2,778
Current Liabilities	219	297	301	383	380	489	1,609	2,273	2,492
Current Assets	100	688	64	495	47	47	47	8	618
Net Change	119	615	237	188	333	442	1,162	2,265	1,874
Sheet Accounts	36,768	37,630	39,399	43,320	49,745	47,189	50,637	52,410	55,559
Long Term Debt - Domestic	1,100	4,745	4,745	4,745	7,587	10,462	9,764	4,951	4,531
Short Term Debt	1,988	1,992	1,989	1,982	4,723	7,275	6,374	5,489	5,487
Term Accts Paybl (A/E-UK)	4,445	2,622	2,622	2,622	2,533	89	-	-	-
Term Debt	7,533	1,667	4,167	5,834	14,843	17,826	18,916	15,763	13,816
Amortization	6,253	11,024	13,521	15,191	8,956	7,774	6,524	5,660	4,960
Net Debt Service	13,786	6,034	5,642	6,227	23,799	25,600	25,440	21,423	18,776
Fixed Assets	19,858	20,058	40,522	19,446	1,120	1,120	1,794	2,003	2,003
Net Change	1,203	55	294	298	406	580	439	1,600	2,273
Current Assets	1,309	216	294	298	406	580	439	1,600	2,273
Current Liabilities	44	44	44	44	406	580	439	1,600	2,273
Sheet Accounts	36,200	37,376	39,078	41,206	47,301	43,102	45,065	46,699	49,549
Long Term Debt - Domestic	(32)	254	(679)	2,114	2,444	(3,913)	(429)	(289)	10
Short Term Debt	1,114	1,082	1,536	657	2,771	5,215	1,302	873	585
Net Change	1,087	1,336	657	2,771	5,215	1,302	873	585	594

Fuel purchased less fuel charged to operating expense.
Amortization of \$1.8 million of capital stock, organization and other expenses.

San Antonio Power Company
 Projected Balance Sheet
 Dollars at 1960 = \$1.00

	1967	1968	1969	1970	1971	1972	1973	1974	1975
Current Assets	1,082	1,330	657	2,771	5,215	1,302	873	586	594
Prepaid & Fuel Amortization	2,469	2,469	2,469	2,585	5,707	10,632	14,653	14,112	13,144
Accounts Receivable	1,125	431	488						
Inventory	116	116	118	117	91	88	84	57	50
Other Current Assets	4,790	4,354	3,732	5,473	11,013	12,022	15,610	14,777	13,544
Fixed Assets	413	413	413	413	413	413	413	414	413
Utility Fixed Assets	130,488	130,488	130,498	230,211	230,211	230,211	230,211	230,211	230,211
Prepaid & Fuel Amortization	9,350	20,618	30,652	42,131	58,379	72,096	85,426	94,472	103,009
Accrue Utility Fixed Assets	121,138	109,670	99,836	188,080	171,832	158,115	144,785	135,739	127,602
Work in Progress	19,819	39,877	80,399	180,235	188,080	171,832	158,115	144,785	135,739
Fixed Assets	140,957	149,747	180,235	188,080	171,832	158,115	144,785	135,739	127,602
Liabilities	146,271	154,569	184,402	193,966	183,258	170,550	160,808	150,929	141,491
Payable & Accrued Taxes	233	316	321	406	580	469	1,609	2,273	2,492
Term Debt	1,667	4,167	5,894			2,778	5,723	3,378	3,315
Deferred	17	17	17	17	17	17	17	17	17
Payroll-Funded Debt	9,357	9,355	9,357	14,843	17,826	16,138	10,040	40,036	8,701
Current Liabilities	11,274	13,852	15,529	15,529	18,423	19,422	17,389	16,106	13,908
Other									
Equity	86,565	92,657	119,202	123,322	103,588	89,454	79,417	64,380	67,679
Accounts Payable	7,866	5,244	2,622	89					
Accounts Funded Debt	49	46	43	40	57	35	30	29	25
Employees' Retirement	61	94	127	166	213	260	307	354	401
Fixed Liabilities	24,541	29,041	121,994	123,817	105,838	89,747	79,754	69,763	61,108
Stock	43,059	48,613	54,171	61,394	61,394	61,394	61,394	61,394	61,394
Reserves	(2,603)	(1,219)	(7,292)	(6,211)	(3,397)	(13)	2,771	3,483	4,511
Surplus	40,456	47,394	46,879	55,083	58,997	61,381	63,665	65,060	65,314
Capital	148,271	170,565	184,402	193,966	183,258	170,550	160,808	150,929	141,491
Liabilities & Capital	146,271	154,569	184,402	193,966	183,258	170,550	160,808	150,929	141,491
	7/2/20	7/2/21	7/5/25	7/2/28	8/8/32	6/4/36	6/1/40	7/5/44	8/2/48