

第3章 JBICアプライザルミッションの概要

第3章 JBIC アプレイザルミッションの概要

3.1 調査目的

JBICでは1999年3月及び12月に日本政府に対して実施された円借款供与要請を受け、2001年12月に事前調査ミッションを派遣した。この結果を受け、JICAとの連携D/D案件として実施すべく2002年2月23日～3月10日にアプレイザル(審査)ミッションを派遣し、ウ国政府と協議を行った。

現地における業務分担としては、JICA調査団がJICAの開発調査全体スキームの説明、連携D/Dに係る入札図書等の作成工程及びその他の技術協力内容の協議を行い、JBIC調査団が円借款に係る各種手続きの説明、事業審査に必要となるタンケント火力発電所の情報及び環境影響評価に係る各種情報の入手・協議を行うこととした。

3.2 調査結果概要

3.2.1 実施体制

詳細設計、入札図書棟作成、詳細環境影響評価等についてはJICAの技術協力案件として実施する。入札評価、施行管理、環境影響モニタリング等についてはウ国政府が円借款資金を用いて雇用予定のコンサルタントが実施し、コントラクターは事前資格審査(P/Q)付きの国際競争入札によるフルターンキー契約を予定する。

3.2.2 環境影響評価

旧電力電化省が実施した環境影響評価(EIA)を、ウ国政府の自然保護委員会が1999年8月に承認済みである。ただし、本事業の詳細設計に基づいて詳細なEIAを作成し、再度承認を得ることが条件付けられており、ウズベクエネルギーは本承認を得た後に入札を公示することとした。また詳細EIAは原則公開するものとする。

なお、本事業は既存設備を環境負荷の少ない最新設備に更新することから、環境負荷は軽減される見込みであり、発電所構内の遊休地を事業サイトとするので住民移転も生じない。

3.2.3 留意点

本案件はJICA、JBICの連携D/D事業であり、関係者間におけるスケジュール調整等の連絡を密に取りつつ進めていく必要がある。

JBICアプレイザルミッションにおいては、F/Sが前提とする設備構成(ガスタービン、蒸気タービン及び発電機(1基)を同軸で連結)を変更し、両タービンを発電機2機に各々連結する構成とすることをウ国政府は要望している。この点は連携D/Dによる設計時に詳細を検討の上決定予定である。

事業設備の運用・維持管理については、ウ国における初のガスコンバインドサイクル発電設備となることから、適切な運用のため、ア)コントラクターによる運転開始後の現地技術指導、イ)タンケント火力発電所の運転要員の設備製造工場における技術指導、ウ)当初5ヶ年分程度のスペアパーツ供給を予定している。さらに、ウズベクエネルギーは設備を適切に運営するために必要な予算を確保すること、財務省等が電気料金政策等において適切にサポートすることをコミットしている。

ウ国電力セクターの民営化動向については、2001年2月の閣僚会議令によりウズベクエネルギー配下の火力発電所を2005年までに株式会社化すること(タンケント火力発電所については2003年を予定)、及び株式の一部(最高49%)を民間所有とする形(残り51%はウズベクエネルギーが所有)での民営化について定めており、注意しておくことが必要である。タンケント火力発電所の民営化に係る決定については、実施前に日本側へ連絡し同意を得るものとしている。

第4章 関連資料

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4.1 質問票

ウ国における電力セクター及び環境影響等の現状を把握するため、以下の質問票をウズベクエネルギーに渡している。回答については S/W 調査団派遣前までに別途入手する予定である。

-電力セクターに係る質問票

-環境に係る質問票

**Questionnaire on Tashkent Power Plant Modernization Project
For JBIC Appraisal Mission**

February 7, 2002

Japan Bank for International Cooperation

1. Current Situation of Power Sector

1.1. Electric Power Demand

1.1.1. In general, the growth rate of power demand and the growth rate of GDP are correlated. In Uzbekistan, GDP recovered and has continued positive growth rate, after its bottom in 1995. On the other hand, the power demand in 1991 at 44,958GWh was dropped to 39,466.5GWh in 1995, and still at the same level in 2000, that is, 39,767GWh. How do you analyze and evaluate this discrepancy of trends ?

1.1.2. The power demand in the industrial sector was dropped from 22,714GWh to 17,500GWh during 1991 to 2001, and the power demand in the commercial sector was dropped from 4,305GWh to 2,000GWh. Low demand in these sectors seems to be the main reason of low demand in overall power sector. How do you analyze and evaluate this?

1.1.3. Please provide us with the power demand in each region with sectoral distribution for 10 years. (Please fill the following Table1)

Table:1 Regional and Sectoral Distribution of Power Demand (GWh)

Region	Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Tashkent	Residential											
	Commercial											
	Agricultural											
	Industrial											
	Total											
[Other regions]	Residential											
	Commercial											
[Overall country]	Agricultural											
	Industrial											
	Total											

1.1.4. The Feasibility Study in 1999 forecast the power demand in 2000 at 43,100GWh, and in 2010, 54,100GWh. The actual power demand in 2000, however, was 39,466GWh that is much lower

than the forecast. It shall be reasonable that you revise accordingly the forecast for 2010. You explained us that the forecast for 2010 has remained same at 54,100GWh. Please explain why. Please explain how do you estimate future power demand.

1.1.5. Please fill in the following Table 2 regarding monthly maximum power demands.

Table: 2 Monthly maximum power demand (MW)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Remarks
1997													
1998													
1999													
2000													
2001													

1.2. Electric Power Supply

1.2.1. Please up-date Table 3-15 and Table 3-16 of the Feasibility Study (F/S). We regard these tables are essentially important to see justification of new investment plan that shall correspond to reasonable forecast of the maximum power demand. Also please calculate the same data for previous 10 years, from 1990 to 1999. Because heating plants were transferred from Uzbekenergo to each regional government, please exclude the heating plants from the tables.

1.2.2. Does Uzbekenergo directly transact the international trade of electricity? Please explain relevant regulation regarding the trade as well as tariff level, method of payment. And also provide us with the annual turnover for the export and import of electricity from 1991 to 2001.

1.3. Institutions of Power Sector

1.3.1. Section 2 of Decree NoVII-2812 dated February 22, 2001 states that SJSC Uzbekenergo is an open joint-stock company, while section 4 of Decree No93 dated February 24, 2001 states that all shares of SJSC Uzbekenergo are the state property, and cannot be sold or alienated in any other way. This two section of decrees do not seem to agree. Please clarify.

1.3.2. Please explain financial relationship with state budget and Uzbekenergo. Does Uzbekenergo pay tax or dividends to the government, or receive any subsidy from the government for current expenditure or investment expenditure? In case of this project, JBIC is to provide finance to the government; then what would be the financial arrangement between Uzbekenergo and the government?

- 1.3.3. Please explain the extent of Uzbekenergo's autonomy in terms of electricity tariff level. How the tariffs for electricity are decided?
- 1.3.4. According to section 5 of Decree NoVII-2812 dated February 22, 2001, an independent state agency for the power industry supervision (Uzgosenergonadzor) is to be established. Has the Uzgosenergonadzor already established? What is the relationship of Uzgosenergosadzor with the government? What is the extent of Uzgosenergonadzor to supervise the activities of Uzbekenergo?
- 1.3.5. Section 1 of Decree No93 dated February 24, 2001 states that maximum number of personnel of Uzbekenergo is 66. Is this means that number of staff of Uzbekenergo is 66? Please clarify. Please provide us with number of employee at each section of organization chart in Appendix 2 of the decree.
- 1.3.6. Section 3 of Decree No93 dated February 24, 2001 states that authorized capital stock of Uzbekenergo was to be formed by May 2001. Please explain us the asset value as well as that of Tashkent Power Plant.
- 1.3.7. According to the Decree No93, Tashkent TPP became a subsidiary company of Uzbekenergo. Does Tashkent TPP have independent financial accounting from Uzbekenergo? Please explain financial relationship of Tashkent TPP and Uzbekenergo.
- 1.3.8. Section 3 and Appendix 4 of Decree No93 dated February 24, 2001 state that Tashkent TPP will be privatized in 2002 by selling its shares. What is your program of this privatization process?
- 1.3.9. Which of Uzbekenergo or Tashkent TPP will be the responsible organization that executes "Tashkent Power Plant Modernization Project"? Which of them, if Tashkent TPP were privatized? In light of implementation of this project, what will be the financial relationship between Uzbekenergo and its subsidiary, Tashkent TPP?
- 1.3.10. Section 4 of Decree No93 states that subsidiary companies of Uzbekenergo carry out their activities on terms of zero profitability. Does this means that the electricity price of Tashkent TPP against Tashkent MEPN, that of Tashkent MEPN against Tashkent city EPNE and Tashkent EPNE, and that of Tashkent city EPNE and Tashkent EPNE against and users, shall be set at levels that will not allow any net profit to these subsidiary companies?
- 1.3.11. We understand that Uzelectoset and Uzenergosbyt have already been established as subsidiary companies of Uzbekenergo. Has the incorporation of Tashkent TPP as a subsidiary company

of Uzbekenergo already been completed? Please explain legal status of these companies, as well as financial relationship of these companies with Uzbekenergo.

1.3.12. Please explain role and function of Uzenergosbyt. What is the revenue source of Uzenergosbyt?

1.4. Power Sector Policy of Uzbekistan

1.4.1. Despite of our request by our letter in December 2002, we have not yet received "Resolution of Cabinet Ministers (27/12/2000) on the program of expansion and rehabilitation of power generating facilities for year 2001-2010". Please submit it with its English translation.

1.4.2. According to the above-mentioned resolution, how is the proposed Tashkent Power Plant Modernization Project justified in the development plan of power sector? We suppose that the resolution authorizes the proposed project as is in line with governments development program of the power sector.

1.4.3. In your answer to our previous questionnaire, the resolution mentioned above states the policy to introduce and develop alternative power sources. What this alternative power source mean?

1.5. Development Plan of New Generating Facilities

1.5.1. We understand that Uzbekenergo plan to increase the generating facilities by the capacity of 2,367 MW in total by 2010. Please explain current status of the development plan by updating the table below (Table 3-14 in F/S). Because we understand heating plants were transferred to regional governments, please delete "heating plant" from the table. If there are any additional projects, please reflect them on the table.

Table3:

	Plant Type	Planned Capacity (MW)	Initial Operation Plan	Financer	Supplier of Main Equipment (Country)	Current Situation
Talimar. GRES	Steam Gas	800	2003	Uzbekenergo	? (Russia)	Under Procurement of Generation Unit.
Mubarek Cogeneration Plant	Steam Gas	97	2006-2008	Supplier (Insured by Hermes)	? (Germany)	?

Tashkent GRES	Gas Combine d Cycle	370	?	?	?	To be appraised by JBIC in Feb. 2001
Navoi GRES	Steam Gas	2 x 150	2003-2004	?	?	?
N-Abgr. GRES	Steam Gas	240	-	-	-	Canceled
Heating Plants	-	-	-	-	-	Heating Operation is succeeded from Uzbekenergo to each regional government.

1.6. Tariff

1.6.1. Which organization is in charge of collecting the electric tariff from end users?

1.6.2. Please explain how the collected tariff is distributed among Uzbekenergo, power plants, transmission companies, distribution companies, and operators such as Uzenergosbyt. Taking example of Tashkent TPP, Tashkent MEPN, Tashkent city EPNE and Tashkent EPNE, and end users, please describe tariff level of electricity among each of them.

1.6.3. Please also explain the case before and after the incorporation of the subsidiaries.

1.6.4. According to your answer for our previous questionnaire, tariff for 88.1% of total sales were collected in 2000. Please provide us with the calculation method, and explain why remaining 11.9% was not collected.

1.6.5. According to your answer for our previous questionnaire, discounted tariff is applied to teachers, retired workers for preschool, veterans, the invalids of World War II, workers of labor fronts in wartime. Please explain how much are these discounted tariff, and what is the ratio of sales by the discount tariff among the total sales of electricity.

1.6.6. We understand that in case Uzbekenergo changes the tariff, the new tariff shall be proposed to Ministry of Finance and Cabinet Ministers to obtain their approval. Please verify this and explain the detail procedure to change the tariff.

1.6.7. We understand the tariff is decided based on the fuel cost and the operation cost. Please explain calculation method that takes these costs into consideration for decision of the tariff level.

1.6.8. According to your answer to our previous questionnaire, the average tariff increased from 3.76Sum/KWh to 4.93Sum/KWh between 2000 and 2001. Are there any programs or policy for future level of the tariff? Please complete the table below by filling the blank columns and revise the category if necessary.

Table1: Electricity Tariff

	Group	1995	1996	1997	1998	1999	2000	2001
1	Industry (over 750kVA)						3.48	5.90
2	Industry (under 750kVA)						6.19	10.00
3	Agriculture						3.97	6.45
4	Public Transportation						5.76	9.35
5	Public organizations, Street lighting						4.29	7.75
6	Commerce						15.99	26.90
7	Residential (with electric stove)						3.51	3.25
8	Electric Heating, Hot Water Supply, Air conditioning						17.26	26.90
9	Advertisement						58.71	92.00
10	Power Stan Use						3.84	5.90
	Average (weighted by sales amount)						3.76	4.93

Unit : Sum/kWh

2. Tashkent Thermal Power Plant (Tashkent TPP)

2.1. Outline

2.1.1. We understand that Tashkent TPP consist of 1,351 staff in 11 departments, which include 560 operation staff, 535 maintenance staff, 82 office staff, 89 junior service staff, and 85 support staff. Five teams that consist of 14 staff each operates the plant in five shifts; two operators in the central control room and one operator for each unit. Maintenance staff work in four shifts on the other hand. Please verify these an understanding and provide us with the correct number if necessary. And please explain the job description of junior service staff.

2.1.2. In order to clarify obsolescence of the generation units, please fill in the table below, which compare the condition of the units at present and the time at initial operation.

Table4: Unit Condition

Unit No.	Item	Unit	Current Condition	Initial Condition	Remarks
1	Capability of generation	MW		150	
	Boiler efficiency	%			
	Gross thermal efficiency	%			
	Net thermal efficiency	%			
	Heat rate	kcal/kWh			
2	Capability of generation	MW		150	
	Boiler efficiency	%			
	Gross thermal efficiency	%			
	Net thermal efficiency	%			
	Heat rate	kcal/kWh			
11	Capability of generation	MW		155	
	Boiler efficiency	%			
	Gross thermal efficiency	%			
	Net thermal efficiency	%			
	Heat rate	kcal/kWh			
12	Capability of generation	MW		155	
	Boiler efficiency	%			
	Gross thermal efficiency	%			
	Net thermal efficiency	%			
	Heat rate	kcal/kWh			
Average (1-12)	Capability of generation	MW		155	
	Boiler efficiency	%			
	Gross thermal efficiency	%			
	Net thermal efficiency	%			
	Heat rate	kcal/kWh			

2.1.3. Please provide us with flow diagram of boilers and turbines of existing plant. Please provide us with specification of boilers and turbines of existing plant.

2.1.4. If you have any other operation data that show oldness and rottenness of the existing plant, please provide it for us.

2.2. Fuel

2.2.1. We understand that fuel is supplied to Tashkent TPP through the pipeline extended from two gas fields, Bukhara and Shurtan. Tashkent TPP contracts with the transporter, Uztransgaz, and the gas price is changed every year. Please fill in the following table which provide estimated gas deposits, allocated annual gas amount, gas consumption amount, contract price, and total annual production amount from the gas fields.

Table2: Shurtan (Estimated deposits:)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Allocated Amount										
Actual Consumption										
Price (Sum/million m3)										
Total Gas Production										

Table3: Bukhara (Estimated deposits:)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Allocated Amount										
Actual Consumption										
Price (Sum/million m3)										
Total Gas Production										

2.2.2. Please provide us with the gas consumption amount (Nm³/h) of each existing unit and the new unit at rated output and capable output. (Capable output means current maximum output of existing units which may be deteriorated from the initial condition.)

Table4: Gas Consumption by unit

	Gas consumption at rated output (Nm ³ /h)	Rated output (MW)	Gas consumption at capable output (Nm ³ /h)	Capable output (MW)
Unit 1		150		150
Unit 2		150		150
Unit 3		150		150
Unit 4		150		150
Unit 5		150		150
Unit 6		155		155
Unit 7		165		165
Unit 8		165		165
Unit 9		150		150
Unit 10		165		165

Unit 11		155		155
Unit 12		155		155
Sub Total		1,860		1,860
New unit		370 class	-	370 class
Grand Total		2,230		2,230

2.2.3. If the grand total amount in above table exceeds the annual allocated gas amount, please explain the countermeasure for the gas shortage.

2.2.4. Do you operate all the 12 units at rated output at the same time?

2.2.5. Regarding the gas pipeline, please answer the followings.

- When was the pipeline constructed?
- Is there any necessity or concrete plan for repairing or reconstruction of the pipeline?
- Please provide us with a map which shows the route from gas fields, Shurtan and Bukhara, to Tashkent TPP, including the alternative pipelines, if any.
- Please provide us with length, size, pressure, and amount of gas the pipelines.

2.2.6. Please explain whether the amount of gas supply is enough to operate existing and new power generating units throughout a year. If the gas supply is sufficient, please explain why you use oil for about 20 % of total fuel input. We especially concern whether the gas supply in winter season would be insufficient for the new unit because of high demands of gas for domestic use.

2.2.7. Please explain whether the gas supply is sustainable and enough, in terms of deposit of Shurtan gas throughout the project life of 30 years.

2.2.8. The following table shows the gas quality. Please review and correct them if necessary.

Table5: Gas Quality

	Main field	Alternate field	Remarks
Gas field	Bukhara	Shurtan	
CH ₄	93.73	91.40	
C ₂ H ₆	3.51	4.14	
C ₃ H ₈	0.90	0.87	
C ₄ H ₁₀	0.18	0.23	
C ₃ N ₁₂	-	-	
CO ₂	1.29	2.56	

N ₂	0.39	0.74	
H ₂ S	-	0.06	
High heat value (kcal/m ³)	9041	9008	
Low heat value (kcal/m ³)	8233	8133	
Density	0.733	0.754	

2.2.9. We understand that natural gas is the only fuel to be supplied to the new unit. If not, please explain your plan as to the variety of fuels and their quality.

2.3. Water

2.3.1. We understand cooling water is taken from Bozsu canal. Where does Bozsu canal come from? Please provide us with a map that overviews the canal.

2.3.2. We understand that canal water are mainly used for irrigation, please provide us with record of distribution of water utilization of Bozsu canal by sector, for recent ten years if possible.

2.3.3. We understand Tashkent TPP (or Uzbekenergo?) concludes agreement with Department of Chirchik River's Right Bank Inter-District for utilization of the canal water, and with Suvakova for clean water. Please answer the followings regarding those two organizations respectively.

2.3.4. What is the role and function of these two organizations?

2.3.5. What regulations authorize them to approve Tashkent TPP (or Uzbekenergo?) to utilize the water?

2.3.6. What organizations supervise those two organizations?

2.3.7. Following table describes the amount of water consumption by water sources and purposes of consumption. (The data is based on your answer for our previous questionnaire.) Please review and update the table below. If you do not have exact data, please fill by estimation.

Table6: Water Use (m³/h)

	Purpose	New unit	Total existing units	Total water use (After project)
Clean Water	Utilities		120.7	
	Boiler feed water (make-up)		188.4	
	Total		309.1	
Canal Water (Bozsü Canal)	Make-up of steam-water cycle		225.0	
	Turbine cooling		201,600	
	Total		201,825	

2.3.8. Following table is the summary of the water supply agreement. (The data is based on your answer for our previous questionnaire.) Please fill in the blank column and update the data if necessary.

Table7: Water supply agreement condition (before project)

	Agreement No.	Agency in charge	Supply amount	Date of agreement
Clean water	No. 135 (1/10/2001)	Suvakova	2,716,000(m ³ /year)	October 01, 2001
Canal water		Department of Chirchik River's Right Bank Inter-District	1,830,350,000(m ³ /year)	

2.3.9. Regarding the water supply agreement after the project, please describe your plan by filling in the following table.

Table8: Water supply agreement plan (after project)

	Agreement in charge	Supply amount	Your view as to perspective of such agreement
Clean water	Suvakova	(m ³ /year)	
River water	Department of Chirchik River's Right Bank Inter-District	(m ³ /year)	

2.4. Transmission Line

2.4.1. Please explain whether the capacity of relevant transmission lines is enough under the condition of rated output, and the short circuit capacity after the new unit is installed. We understand that the expansion of the transmission lines is not included in the scope of this project. However, the total generation capacity of Tashkent TPP will increase by 370MW tentatively until existing two units stop their operations. In case the capacity of transmission line is insufficient after the project, please explain the countermeasure such as to limit the total of output, etc.

2.4.2. Please provide us with your schedule of expansion and up-grade plans of relevant transmission lines with technical specification, if any.

2.5. Earthquakes

2.5.1. Please explain about ISI with comparison to other international measure.

2.5.2. According to F/S, Tashkent city is categorized as level 9 of ISI. What was the biggest earthquakes, interns of ISI, around Tashkent in past? Did the existing units stand up to the earthquake?

2.5.3. Do you think you will need additional geological survey before the construction of new unit?

2.6. Weather Condition

2.6.1. Following tables show the weather condition at Tashkent TPP. Please review them and fill the blank column.

Table9: weather condition

Item	Unit	Maximum	Minimum	Average
Temperature	°C	40	-30	13.5
Humidity	%			58.8
Wind velocity	m/s	25		10
Atmospheric pressure	hPa			
Rainfall (day)	mm			
Rainfall (year)	mm			405
Flood level	GLm*			

*GLm: Ground Level meters (sample GL+1.5m)

Ground level of the site	m (above sea level)	501m
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	Spring	Summer	Autumn	Winter
Wind direction	From north	From south	Vary	Vary

2.6.2. Are there any special weather conditions, such as strong wind, freeze, etc., which could influence implementation of the project? Please reflect them on to the planed project implementation schedule, and provide it to us.

2.7. Facilities to be commonly used among several units.

2.7.1. Regarding the equipments shared among several units in Tashkent TPP, we understand that only the wastewater treatment equipment, as shown in the table below, is planned to be shared with the new unit. Please verify this understanding, and review the table below and correct if necessary.

Table10: Share-used equipment used by existing units and the unit of this project

	Capacity of equipment	Amount used by exiting units	Amount used by unit of this project	Total amount
Waste water treatment equipment	120 (t/h)	120 (t/h)	160 (t/h)	280 (t/h)

2.7.2. According to your answer, the total amount (280 t/h) to be used by existing and the new units exceeds capacity of the wastewater treatment equipment (120 t/h). Please explain your countermeasure. Do you consider it necessary to include expansion of capacity of wastewater treatment equipment in scope of the proposed project?

2.7.3. In the table below, please list up your plans to repair share-used equipments which will be used not only by the new unit but also by the units to be installed by succeeding future projects.

Table11: Shared equipments to be used by unit of this project and following the project

	Capacity of equipment	Amount used by unit of this project	Amount used by units installed in the future	Total amount

3. Outline of the Project

3.1. Project Objective

3.1.1. Please verify the statement below that describe objective of the project.

The Tashkent Thermal Power Plant, locating suburb of capital city of Tashkent, is one of the principal power plant in Uzbekistan, which has around 17% of country's total capacity of power generation. The facilities of the plant, which were constructed during 1963 and 1971, are traditional steam-turbins type, and have become superannuated. The efficiency of power generation is lower, and emission of CO₂, NO_x and SO_x are larger, than modern type of generation system.

This project is to construct a new modern generation facilities in the site of Tashkent Thermal Power Plant, which will substitute a part of operation of existing generation units, and thus aims at i) stable supply of electricity to Uzbekistan including especially the capital area of Tashkent and ii) reduction of airborne emission of CO₂, NO_x and SO_x.

3.2. Scope and Design

3.2.1. Please explain detail scope of this project.

3.2.2. We understand that, in order not to drop out put level of Tashkent TPP, you plan to stop operation of existing two units (unit 11 and 12) after the project, not before the project. Is this correct understanding?

3.2.3. Please explain why you select 370MW class for the new Combined Cycle Plant? We assume that 370MW is economically most viable because the cost of a plant with bigger capacity would be cheaper in general. According to past international experience, the exhausted gas from 250 MW class gas turbine can generate 120MW by the combined steam turbine.

3.2.4. We consider that single-shaft type equipment is simpler to operate and maintain than multi-shaft type, and therefore, the single-shaft type is more suitable for Uzbekistan who operates Combined Cycle Plant for the first time, as is assumed in the feasibility report. Please explain your opinion.

3.2.5. Please explain why, after introduction of new unit, you will stop operation of Unit 11 and 12 that is comparatively new among the units in Tashkent TPP. We suppose that is because Unit 11 and 12 are also old enough to be replaced. And if you stop operation of Unit 1 and 2 and demolish them in future for a subsequent project, it should be difficult to rearrange the control room.

3.2.6. Please provide us with the following flow diagrams. Items with ## should indispensably be answered.

- Heat balance diagram
- GT (Gas Turbine) flow diagram
- HRSG (Heat Recovery Steam Gas Boiler) process diagram
- Steam turbine process flow diagram
- Generator process flow diagram
- Cooling water flow diagram
- Fuel flow diagram (from unloading to the boiler)
- Combustion air flow diagram
- Flue gas emission flow diagram
- Treatment water process flow diagram
- DM (Deminerizer) plant process flow diagram
- Waste water treatment process flow diagram
- Auxiliary power single flow diagram
- Switchyard single flow diagram (including interrupted capacity) (##)
- Control & instrument diagram
- Environment monitoring equipment diagram (air, water)
- Water balance diagram (including waste water) (##)

3.2.7. Please provide us with the following basic specifications. Items with ## should indispensably be answered.

- Gas turbine (type, combustion temp, capacity, suppliers) (##)
- HRSG (type, SH (Super Heater) and RH (Reheater) outlet temp, pressure, main steam flow)
- Steam turbine (type, HP (High pressure) and LP (Low Pressure) inlet temp, pressure, rpm)
- Generator (capacity, power factor, rated voltage, cooling method)
- Main transformer (type, capacity, primary voltage, secondary voltage)
- Control & instrument equipment (CRT automatic operation or Digital control)
- Treatment water equipment (type, capacity, water quality)
- DM plant (type, capacity, water quality)
- Waste water treatment (type, capacity or water quality)

3.3. Financial Plan

- 3.3.1. JBIC would finance at maximum 85% of the total project cost, or the entire foreign currency cost. The remaining must be financed by Uzbekistan side as the counter part fund. How and who will finance the counter part fund? Is it Uzbekenergo or the government who secure the budget for the counter part fund?
- 3.3.2. Who can commit that the counter part fund shall be surely secured for the implementation of the project?

3.4. Project Implementation

- 3.4.1. In response to the letter from H.E. Elyor Ganiyev, Minister of Foreign Economic Relations, to Ms. Kyoko Nakayama, Japanese Ambassador in Uzbekistan, dated July 13, 2001 which request technical assistance for engineering design of the project by JICA (Japan International Cooperation Agency), we have arranged with JICA to provide such assistance. Accordingly we are revising project implementation schedule as Attachment 1 that include JICA's technical assistance. Please review and verify it. Please also take into consideration any special conditions such as weather conditions for construction stage.
- 3.4.2. Regarding the transportation plan, please answer the followings.
- We understand you have a plan to transport the relevant equipment by railway besides the two plans shown in F/S. Please complete the table below regarding the transportation route.
 - As for Plan3, are there any restrictions for transportation of heavy equipments regarding weather conditions, road conditions etc.?
 - Please provide us with maps that show each transportation routes.

Table 12: Transportation Plan

From	To	Distance (km)	Transportation	VIA
Plan 1 (Only available from April to early in September)				
Ilychevsk (Ukraine)	Turkmenbashy (Turkmenistan)		Ship	Black Sea Caspian Sea
Turkmenbashy (Turkmenistan)	Tashkent Power Plant (Uzbekistan)		Truck	? (Route)
Plan 2 (Only available for equipments under 50 t)				
Antwerp (Belgium)	? (Russia)		Truck	? (Route)
?	?		Truck	? (Route)

(Russia)	(Kazakhstan)			
?	?		Truck	? (Route)
(Kazakhstan)	(Uzbekistan)			
?	Tashkent Power Plant		Truck	---
(Uzbekistan)	(Uzbekistan)			
Plan 3 Is there any restriction regarding weather condition, route condition, etc.?				
? (Far East)	Tashkent Power Plant			---
	(Uzbekistan)			

3.5. Organization

3.5.1. What organization will be the executing agency of this project? The executing agency will be responsible for the implementation of this project; such as, procurement of consultant and contractor, supervision, test, commissioning, etc. Is Uzbekenergo the organization who conclude relevant contracts with consultant and contractor? Or, is it Tashkent TPP, the subsidiary company of Uzbekenergo? Please explain the organization who take responsibility in execution of the project.

3.5.2. Regarding the executing agency, please answer the followings.

- Which department or subsection of the executing agency will be directly in charge of the implementation of the project? Or, do you plan to establish any special unit for project implementation?
- Who and how many staff do you plan to assign for the project implementation unit? Please consider the organization structure of the unit and provide it with us.
- The staff who is responsible for daily management of the project should have capability of English communication with JBIC. Can you secure such staff? JBIC holds a series of seminars on procedures of JBIC's ODA Loans every year at JBIC head office, which would be useful for the project manager to get familiarize with JBIC's procedures for implementation of the project. Capability of English communication is a requisite to attend the seminar.

3.6. Revenue and Expenditure

3.6.1. Please provide us with financial statements of Uzbekenergo for past 5 years and year 2002, including annual budgets and records of revenues and expenditures.

3.6.2. Please provide us with financial statements of Tashkent TPP for past 5 years and year 2002, including annual budgets and records of revenues and expenditures.

3.7. Operation and Maintenance

- 3.7.1. Please consider how to set up organizational structure for operation of new combined-cycle system, in terms of staffing, training and budgeting; and explain us.
- 3.7.2. Please consider how to maintain the new combined-cycle system in terms of staffing, training and budgeting; and explain us.
- 3.7.3. In order to be accountable to Japanese tax payer who fund JBIC for its finance, JBIC has a policy to set performance indicators for every project, which will be open to the public. The indicators consist of operation and effect indicators. Their target figures will enable you and JBIC consistent monitoring and evaluation throughout the project implementation. In this regard, we have provided the operation and effect indicators as Attachment 2. Please review them, consider how to collect data for those indicators, and explain your consideration.

END

Implementation Schedule of Tashkent Power Plant Modernization Project

Year	1st Year												2nd Year												3rd Year												4th Year												5th Year												6th Year												
Month	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
Progress Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73
A. JICA's Technical Cooperation (engineering design, etc.)																																																																									
1. Pledge (Official Commitment)	[Gantt bar from month 1 to 12]																																																																								
2. JICA's Scope of Work (S/W) Mission	[Gantt bar from month 1 to 12]																																																																								
3. Selection of Consultant by JICA	[Gantt bar from month 1 to 12]																																																																								
4. Inception Report, Site Survey, Engineering Design for Tender	[Gantt bar from month 1 to 12]																																																																								
5. PQ Document Preparation	[Gantt bar from month 1 to 12]																																																																								
6. Tender Document Preparation	[Gantt bar from month 1 to 12]																																																																								
7. Further technical cooperation (tbd)	[Gantt bar from month 1 to 12]																																																																								
B. Selection of consultant for bid evaluation & supervision																																																																									
1. Invitation to Consulting Firms (1.5M)	[Gantt bar from month 1 to 12]																																																																								
2. Evaluation of Consulting Firms(2M)	[Gantt bar from month 1 to 12]																																																																								
3. JBIC's review of evaluation result (1M)	[Gantt bar from month 1 to 12]																																																																								
4. Contract Negotiation with selected consultant (1.5M)	[Gantt bar from month 1 to 12]																																																																								
5. JBIC's review of contract (1M)	[Gantt bar from month 1 to 12]																																																																								
6. Letter of Commitment (1M)	[Gantt bar from month 1 to 12]																																																																								
7. Commencement of Consultant Services	[Gantt bar from month 1 to 12]																																																																								
C. Selection of contractor (1 contract package)																																																																									
1. Submission of PQ document to JBIC and its review (1M)	[Gantt bar from month 1 to 12]																																																																								
2. PQ and evaluation (4M)	[Gantt bar from month 1 to 12]																																																																								
3. JBIC's review of evaluation result (1M)	[Gantt bar from month 1 to 12]																																																																								
4. Submission of tender document to JBIC and its review (1M)	[Gantt bar from month 1 to 12]																																																																								
5. Tender Announcement and Tender Floating (3M)	[Gantt bar from month 1 to 12]																																																																								
6. Evaluation of Bids Proposal (3M)	[Gantt bar from month 1 to 12]																																																																								
7. JBIC's review of evaluation result (1M)	[Gantt bar from month 1 to 12]																																																																								
8. Contract Negotiation (1M)	[Gantt bar from month 1 to 12]																																																																								
9. JBIC's review and concurrence of contract (1M)	[Gantt bar from month 1 to 12]																																																																								
10. Letter of Commitment (1M)	[Gantt bar from month 1 to 12]																																																																								
D. Construction work																																																																									
1. Civil Structure & Architecture																																																																									
a) Intake and Discharge Structure	[Gantt bar from month 1 to 12]																																																																								
b) Equipment Foundation	[Gantt bar from month 1 to 12]																																																																								
c) G/T and S/T House	[Gantt bar from month 1 to 12]																																																																								
2. Piping and Mechanical Construction (31M)																																																																									
a) Gas Turbine and Auxiliaries	[Gantt bar from month 1 to 12]																																																																								
b) HRSG and Auxiliaries	[Gantt bar from month 1 to 12]																																																																								
c) Steam Turbine and Auxiliaries	[Gantt bar from month 1 to 12]																																																																								
d) Electrical and Control Equipment	[Gantt bar from month 1 to 12]																																																																								
3. Overall Trial Operation (4M)																																																																									
4. 220kV Switchyard																																																																									
a) Control & Protection Panel	[Gantt bar from month 1 to 12]																																																																								
b) Switch Gear	[Gantt bar from month 1 to 12]																																																																								
5. Defect Liability Period																																																																									

Operation and Effect Indicators

Please Fill in Data for the 370MW New Unit . Not for whole the Tashkent Power Plant.

Targets could be revised once detailed specifications be fixed after consultants' detailed design and the selection of a supplier.

Name of Indicator	Unit	Definition	Target	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1. Operation Indicator													
Maximum Output	MW	Maximum Generated Output during a year. *	370MW										
Annual Net Generated Output	GWh	= Gross Generated Output (GWh) - Auxiliary Use (MWh)											
Capacity Factor	%	= {Annual Gross Generated Output (GWh) / Rated Output (MW) x 8,760 (hours)} x 100 *	65%										
Availability Factor	%	= {Annual Operation Hours / 8,760 (hours)} x 100											
Auxiliary Use Rate (Station Use Electricity Rate)	%	= {Annual Auxiliary Power Use (MWh) / Annual Gross Generated Output (GWh)} x 100											
Gross Thermal Efficiency	%	= {Annual Gross Generated Output x 860 (kcal/kWh) / Annual Fuel Consumption (kg or kl) x Fuel Heating Value (kcal/kg or kcal/kl)} x 100 **											
Forced Outage Hours (by Human Accidents)	hours	Forced Outage Hours by Human Accidents.											
Forced Outage Hours (by Machine Troubles)	hours	Forced Outage Hours by Machine Troubles.											
Forced Outage Times (by Human Accidents)	times	Forced Outage Times by Human Accidents.											
Forced Outage Times (by Machine Troubles)	times	Forced Outage Times by Machine Troubles.											
Planned Outage Hours	hours	Planned Outage Hours by planned maintenance works.											
Planned Outage Times	times	Planned Outage Times by planned maintenance works.											
2. Effect Indicator													
NOx Reduction Rate	%	= {Annual NOx Emission from New Unit (t) / Annual Gross Generated Output by New Unit (MWh) } / {Annual NOx Emission from Existing 12 Units / Annual Gross Generated Output by Existing 12 Units} ***											
CO2 Reduction Rate	% (per kWh)	= {Annual CO2 Emission from New Unit (t) / Annual Gross Generated Output by New Unit (MWh) } / {Annual CO2 Emission from Existing 12 Units / Annual Gross Generated Output by Existing 12 Units}											
SO2 Reduction Rate	% (per kWh)	= {Annual SO2 Emission from New Unit (t) / Annual Gross Generated Output by New Unit (MWh) } / {Annual SO2 Emission from Existing 12 Units / Annual Gross Generated Output by Existing 12 Units}											
Dust Reduction Rate	% (per kWh)	= {Annual Dust Emission from New Unit (t) / Annual Gross Generated Output by New Unit (MWh) } / {Annual Dust Emission from Existing 12 Units / Annual Gross Generated Output by Existing 12 Units}											
Fuel Consumption Reduction Rate	% (per kWh)	= {Annual Fuel Consumption by New Unit (kcal) / Annual Gross Generated Output by New Unit (kWh)} / {Annual Fuel Consumption by Existing 12 Units / Annual Gross Generated Output by Existing 12 Units}											

* Assumed to be 85% (Chap.9.1.2; F/S)

** Please Use low heat value.

*** The denominator shall be a fixed figure calculated by a latest past record before the project.

Questionnaire
on
Tashkent Power Plant Rehabilitation Project
(Environmental issues)

[Instructions for filling up this questionnaire]

1. Please put an circle onto Yes / No and fill out your answer in the parenthesis ().
2. In case the space provided for your answer is not enough, please attach additional sheet for answer.

February 2002

[Section 4: Questions on Programs]

Question	Answer
<p>(8) With respect to the present monitoring program on air quality, could you provide us the following information:</p> <p>a. Location of sampling (Please show on the map)</p>	
<p>(9) With respect to the present monitoring program on discharged water quality, could you provide us the following information:</p> <p>a. Parameters to be measured ()</p> <p>b. Location of sampling (Please show on the map)</p> <p>c. Frequency of measurement: ()</p>	

[Section 1. Policy, Administrative, and Legal Framework of implementing Project]

Question	Answer
<p>(1) With respect to environmentally-related laws and ordinances in Uzbekistan and/or Tashkent city, could you provide us the following information?</p> <p>a. The name and full text of the state law that prescribe the standard on water quality. ()</p> <p>b. The name and full text of the state law that prescribe the standard on air quality. ()</p> <p>c. The name and full text of the state law that prescribes the procedure of disposing hazardous solid wastes or refuse. ()</p> <p>d. The name and full text of the state law that prescribes the standard on noise. ()</p>	
<p>(2) With respect to the legal framework on environment in Uzbekistan and/or Tashkent city, could you provide us the following information?</p> <p>a. Types of projects required for Environmental Impact Assessment: ()</p> <p>b. Procedure for obtaining environmental licensing from the regulatory agencies ()</p> <p>c. Types of documents required to be submitted for obtaining the license ()</p> <p>d. Environmental items and study components required to be included legally in the Ecological Consequences (EIA report) ()</p>	
<p>(3) Which agency is responsible for the following role in Uzbekistan and/or Tashkent city?</p> <p>a. Setting of standard of water quality ()</p> <p>b. Setting of standard of air quality ()</p> <p>c. Setting of standard on noise ()</p> <p>d. Evaluation of monitoring results on water quality ()</p> <p>e. Evaluation of monitoring results on air quality ()</p>	

[Section 2: Status of the Environmental Impact Assessment (EIA) for this project]

Question	Answer
<p>(4) Is Uzbekenergo required any other permission than EIA from authorities when implementing this project? If yes, please list up the name of the permission and the authorities.</p>	<p>Yes Name of the permission: () Name of authorities () No</p>

[Section 3: Public Relation and Consultation]

Question	Answer
<p>(5) Have the local residents (including women) been notified about the project?</p>	<p>Yes No</p>
<p>(6) Are the project documents/information available to the public? Has Uzbekenergo organized any public hearing meeting with the local residents? If yes, please provide the following information.</p> <ul style="list-style-type: none"> - When was the meeting organized? (When) - The number of local residents who participated the meeting. (people) - Comments from local residents. () 	<p>Documents/information disclosure - Yes - No Not yet, but it is planned (When :) Public meeting - Yes - No Not yet, but it is planned (When :)</p>
<p>(7) Is there any person or household that might be affected by the implementation the project? If yes, how many people might be affected by the project?</p>	<p>Yes (people) No</p>

4.2 環境影響評価

1999年8月に旧電力電化省(ウズベクエネルギー)が実施した環境影響評価(EIA)結果に対する、自然保護委員会の承認レターを添付する。

**State Committee for Nature Preservation
Republic of Uzbekistan**

Date: August 03, 1999
Ref. No.: 18/124

Attn.: Mr. Fedorin G.
Director of NIPPI
Teploelectroproject

cc: Mr. T.I. Irgashev
Chairman of
Tashoblkompriroda

**CONCLUSION
of State Ecological Expertise**

Subject - Tentative statement on environmental impact of Tashkent Power Plant Modernization Project with installation of combined cycle power unit

Customer - Ministry of Power Industry and Electrification of the Republic of Uzbekistan

Contractor - Scientific-Research and Design Institute (NIPPI) Teploelectroproject

First stage materials, concerned with ecological aspects of the Feasibility Study for Tashkent Power Plant modernization project, prepared by Japanese External Trade Organization (JETRO) under support of Mitsubishi Corporation within the framework of the Program on development of atmospheric and environmental research were presented for expertise.

Existing Plant is situated in Kibray district of Tashkent region near north-eastern suburb area of capital city of the Republic.

The Feasibility Study on modernization of Tashkent Power Plant has been prepared in accordance with the Resolution of Cabinet of Ministers No. 214 dated 04.05.99 and conforms to the draft of Concept on development of electric and thermal power industry in Uzbekistan till 2010.

At present capacity of the power plant is 1860 MW, the power is generated by 12 condensation type energy units, using natural gas and oil fuel, average capacity of each unit is 155 MW. All units are installed within the period from 1963 till 1971, the units are deteriorated and worn out, and have low efficiency compared with combined cycle units.

In the Feasibility Study it is proposed to replace step by step twelve existing power units with nine high effective steam and gas turbine units (SGTU) of combined cycle with capacity of 370 MW each. Total capacity of the plant will increase up to 3330 MW.

Gas

The project is stipulated to be implemented in following stages: in 2003 a single Steam Gas Turbine Unit (SGTU) will be put into operation in addition to existing 12 units, in 2008 one more SGTU will be installed, and in 2013, 2017 and 2021 - two Units per each shown year with simultaneous dismantling of old Units. On the last stage of modernization, in 2024 it is stipulated to install the ninth Steam Gas Turbine Unit.

Authors showed that area effected by discharges from Tashkent Power Plant at present cover nearly the whole territory of capital city. Calculated maximum concentrations of nitrogen and sulfur dioxides run up to 2-4 values of Maximum Allowed Concentration (PDK). Spreading area of the admixtures with concentration exceeding 0,5 of Maximum Allowed Concentration has a radius of 28 km from the plant and covers the territory of 2461 sq. km. Sulfur dioxide makes main contribution (79,5 %) into pollution of atmosphere and nitrogen dioxide makes 20,5 %.

Bozsu channel is used for supplying Tashkent Power Plant and its sewage collector with technical water. Authors have studied a quality of water before it is discharged from Tashkent Power Plant in the first transit and after the disposal - in the second transit. It was determined that water composition along with the stream is deteriorating. Concentration of all ingredients is increasing, and excess content of phenols and oil products is revealed. Thermal contamination of stream is also observed, with temperature increase by 6-9 °C after discharge of water from Tashkent Power Plant.

Hydro-biological factors in the second transit are worsened compared with the first transit, which indicates more high organic contamination level.

Analysis of subsoil water condition have showed that their depth varies from 0,2 till 8,2 m. During the period of maximum rise of subsoil waters their occurrence has been observed at 1-1,5 m. The most high level of subsoil water is observed in the areas of location of main building, oil facilities, railroads, supplying and derivation channels and chemical water treatment facilities. Subsoil waters are weakly mineralized, having sulfate-hydrocarbonate-calcium type of salinization, pH value is close to neutral, under oil pouring pallets increased concentration of oil products were observed.

Nearly in all subdivisions of the Plant: during repairment of units, in electrical shop, chemical, fuel-transport shop, repair-building area most of solid waste products are formed in connection with use of oil:

- a solid residual, remaining after the cleaning of waste water in order to remove RVP and convection heating surfaces of units;
- scrap and washing-off, formed at high temperature vanadium corrosion of steam superheater and other heat equipment;

At present time air-tightness of slurry pond is violated and urgent reconstruction is required.

Realization of the project on increasing the capacity of the Plant by replacing of existing power units with SGTU will be accompanied by decrease in discharges and waste products from the Plant.

Steam Gas Turbine Units will operate using natural gas as a fuel.

At the first phase of reconstruction (installation of the first SGTU) harmful substances emission will decrease by 3183,2 gr/sec (or 6435,15 ton/year). After completion of the last phase of reconstruction harmful substances emission will be reduced by 39,7 times (expected level is 425,7 gr/sec), annual emissions will be reduced by 4,2 times (expected level is 11493,9 ton/year).

Drainage after modernization will be executed through three outputs. However disposal of thermally polluted water into Bozsu channel will be reduced by 1,52 times due to reduction of water amount used for cooling of heat equipment.

Capacity of existing devices for water preparation (WPD) is sufficient for supplying the station with enhanced power output, however, considering depreciation of the equipment, reconstruction of equipment is required.

As a result of reconstruction, the volume of solid vanadium-containing toxic waste substances shall be reduced due to curtailment, and later, total exclusion of oil fuel.

The Feasibility Study stipulates to provide separate chimney for each SGTU (9 chimneys), the height of which is not indicated. By calculation method the authors of ecological survey report have shown that when nine SGTU with individual chimney will be operated and emission of nitrogen dioxide will be 25 ppm. vol. (51 mg/nm³) the height of chimney must be 290 m in order to meet quota 0,12 Maximum Allowed Concentration.

In process of expertise of the project alternative variant has been worked out stipulating for connecting one SGTU to individual chimney with the height 120 m., and the rest eight SGTU - to existing three chimneys with the height 120 m. In order to meet quota on harmful substances concentration it is necessary to reduce emission of nitrogen dioxide to 29 mg/nm³.

State Committee for Nature Preservation (Goskompriroda) has approved an alternative variant with emission parameters not exceeding quota 0,12 Maximum Allowed Concentration, and with height of chimney not exceeding existing chimneys (120 m.).

At the next stage of design engineering it is necessary to develop a Statement on Ecological Consequences, making special emphasis on bringing all emissions, water discharges and waste disposals from Tashkent Power Plant in accord with the requirements of normative documents.

First Deputy Chairman of Board

Mr. H. Sherimbetov

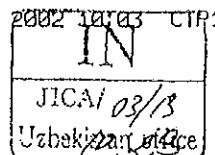
4.3 M/M への補足レター

2002年3月1日に取り交わした M/M の解釈について、ウズベクエネルギーより補足レターが3月12日に送付されてきたため、JICAよりレターを3月22日に返送した。本レターを添付する。

O'ZBEKISTON RESPUBLIKASI
"O'ZBEKENERGO"
DAVLAT-AKSIYADORLIK KOMPANIYASI



REPUBLIC OF UZBEKISTAN
"UZBEKENERGO"
STATE JOINT-STOCK COMPANY



12.03.2002 № J5-01-21/512

№ _____

Руководителю Группы
изучения по формированию
проекта JICA

Господину Ш. Нагатани

Кас.: Протокола переговоров по
изучению формирования проекта
для модернизации Ташкентской ТЭС

Уважаемый господин Нагатани!

При обсуждении основных целей изучения ДП по JICA на переговорах между Группой изучения по формированию проекта и Узбекской стороны было предложено, что все документы, подготовленные в рамках ДП подлежат изучению, согласованию и одобрению Узбекской стороной.

Это предложение Узбекской стороны было принятой Вами и Группой.

Однако, при подготовке Вашей стороной протокола переговоров на английском языке данное предложение отсутствует.

В связи с вышеизложенным просим Вас дополнить последний абзац подпункта (1) пункта 1 следующим:

«С этой точки зрения, все документы, подготовленные в рамках ДП, подлежат изучению, согласованию и одобрению Узбекской стороной».

Просим парафировать измененную с учетом вышеизложенного вторую страницу данного протокола и направить в ГАК «Узбекэнерго».

С уважением,

Первый заместитель
Председателя правления



Г. Толмачев

O'zbekiston Respublikasi, 700000, Toshkent sh.,
Xorazm ko'chasi, 6.
Tel.: (998-71) 133-98-25, Faks: (998-71) 136-27-00,
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Translated by JICA Uzbekistan Office (伝訳)

Date: 12 March 2002 Ref № ГТ-01-21/512

TO: Team Leader for study mission of JICA projects
Attn: Mr. Nagatani

Ref: Minutes of Meeting on project formulation for the Tashkent TPP

Dear Mr. Nagatani

While discussion on Development Study (D/D) during the negotiations between Study Mission and Uzbek Authorities it was proposed that all documents prepared in frame of D/D has to be studied and approved by the Uzbek side.

You and your team have accepted this proposal of the Uzbek side.

However, this proposal is not shown in the Minutes of Meeting prepared by you.

In this connection we would like you to add the last paragraph by following sentence:

"From this point of view all documents prepared in the frame of D/D, to be studied and approved by the Uzbek side".

We would like you to add this sentence to the second page of Minutes of Meeting and send it to the "Uzbekenergo".

Sincerely Yours,

First Deputy
Chairman of the Board

G. Tolmachyov



Japan International
Cooperation
Agency

Shinjuku Maynds Tower Building
2-1-1, YOYOGI, SHIBUYA-KU, TOKYO 151-8558, JAPAN
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Date: March 22, 2002
Ref No. MP/3-22009

To: Mr. G. Tolmachyov
First Deputy, Chairman of the Board, Uzbekenergo
Cc: Mr. Ganiev E. M.
Minister of FER

Re: Minutes of Meeting on project formulation for the Tashkent
TPP

Dear Mr. Tolmachyov

We received your letter on March 12, 2002 regarding the sentence you would like to add in our Minutes of Meeting. We would like to inform you in this letter that our team has understood your letter's intention and to approve your request.

Please also note that both Uzbekistan side and our team have agreed that intention of the following sentence is included in the Minutes of Meeting dated March 1, 2002. "All documents prepared in the frame of D/D, to be studied and approved by the Uzbekistan side."

Furthermore, Our team has recognized that the sentence written in second paragraph of chapter 4 in the Minutes of Meeting could express the meaning of your request. "The D/D Study team given a contract by JICA should ask confirmations of the Uzbekistan side as well as of the Japanese relative organization on its progress and result of the Study."

We agree that this letter shall be treated as the memorandum for the supplementary revision to the Minutes of Meeting on project formulation study for the Tashkent TPP dated March 1, 2002.

Sincerely yours,

Leader, Project Formulation Study Team of JICA
Shobu NAGATANI

ウズベキスタン共和国
タシケント火力発電所近代化事業詳細設計調査
予備調査報告書

2002年6月

国際協力事業団
鉱工業開発調査部

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第1章 予備調査の概要

第1章 予備調査の概要

1.1 要請の背景・経緯

ウズベキスタン国の発電所は旧ソ連時代に建設されたものが大半であり、多くは建設後 30 年以上が経過し老朽化が進んでいる。本件の対象となるタシケント発電所も、1963 年から 1971 年にかけて 150-165MW×12 基(計 1860MW)が相次いで建設されたもので、最も古いユニットは建設後 40 年近くが経過している。これらの設備は老朽化が進んでおり、同国経済の心臓部である首都圏において、電力の安定的な供給に支障が生じる恐れがある。また、同発電所の発電効率は最近のガスコンバインドサイクル発電所に比べて低いため貴重なエネルギー資源が十分に有効活用されておらず、加えて大気汚染物質による公害の影響も懸念されている。

かかる背景及び 1999 年 2 月の JETRO による F/S の結果を受け、ウズベキスタン国政府はタシケント発電所に新式のガスコンバインドサイクル発電設備を導入したいとして、1999 年 3 月、12 月に日本政府に対して円借款の供与を要請し、また 2001 年 7 月には詳細設計に係る JICA の技術協力を要請した。

JICA はこれを受け、JBIC との連携 D/D として協力を実施すべく、2002 年 2 月に鉱工業プロジェクト形成基礎調査団を派遣し、先方関係機関との協議及び現地調査を通じて、要請の背景と内容及び開発調査の実施可能性を確認するとともに、協力内容について検討した。その結果、既存資料と JBIC アプライザルミッション結果のレビュー、地盤支持力と冷却水・排水及び天然ガス等の現状調査、詳細設計、入札に必要な図書書の作成及び環境影響評価を実施することとした。加えて、既存発電設備を含むタシケント火力発電所の操業診断及び改善提言(設備運営、補修計画、財務、組織、環境等の分野)を行うこととした。

本事業はタシケント市の中心から約 20km 北東に位置するタシケント発電所構内にガスコンバインドサイクル発電設備 1 基(370MW 級)を新設するものであり、ガスタービン、排熱回収ボイラ、蒸気タービン、発電機等から構成される。燃料はウズベキスタン国内のブハラとシュルタンからの既設のパイプラインにより送られている天然ガスを用いるものである。

なお、本発電設備の新設に伴い、既設発電設備 2 基(全 12 基中)を停止する予定である。

1.2 調査の目的

本案件は、タシケント火力発電所にガスコンバインドサイクル発電設備を導入するにあたり、必要となる入札図書等の作成を行うものである。また、既存発電設備を含む発電所全体を調査したうえで運営改善に係る提言を行い、技術移転をあわせて行う。

本件予備調査の実施により、ウズベクエネルギー及び関係機関との間で本格調査の実施方針及び範囲、実施方法を具体化し右内容に関し双方が合意した場合には S/W の締結を行う。

1.3 団員構成

長谷 尚武(団長/総括)	:JICA 鉱工業開発調査部資源開発調査課課長代理
小倉 晃治(技術協力政策)	:外務省経済協力局開発協力課事務官
大野 克久(技術協力行政)	:経済産業省貿易経済協力局資金協力課係長
後藤 光(調査企画)	:JICA 鉱工業開発調査部資源開発調査課
吉川 修平(火力発電計画)	:田中水力機械製作所
松崎憲四郎(環境影響評価)	:イーアンドイーソリューションズ

Ms. Natasha Karkotskaya(露語通訳):現地雇上

※JBIC より藤森敬志調査役が同行

1.4 調査日程

日順	月日		行程	宿泊地
1	6月6日(木)		出国(成田NH915/17:50→バンコク22:15)	バンコク
2	6月7日(金)	午後	移動(バンコク HY532/07:40→タシケント12:00) JICA 事務所との打合せ 大使館表敬	タシケント
3	6月8日(土)	全日	タシケント火力発電所現地踏査 団内打合せ	タシケント
4	6月9日(日)	全日	団内打合せ	タシケント
5	6月10日(月)	全日	ウズベクエネルギー等*との協議	タシケント
6	6月11日(火)	全日	ウズベクエネルギー等*との協議	タシケント
7	6月12日(水)	全日	ウズベクエネルギー等*との協議	タシケント
8	6月13日(木)	全日	S/W、M/M 署名交換 報告書取りまとめ作業	タシケント
9	6月14日(金)	午前 午後	現地再委託先等調査 JICA 事務所、大使館報告	タシケント
10	6月15日(土)		移動(タシケント HY231/06:45→フランクフルト10:20) 移動(フランクフルト NH210/20:30)	機中
11	6月16日(日)		成田着(→成田14:35)	

*必要に応じ対外経済関係省及び内閣府を含む

(注)JBIC 藤森調査役は6月13日夜の便で帰国

1.5 対処方針

以下の事項について協議を行い、合意事項についてはS/W及びM/Mを締結する。

1.5.1 本格調査開始に係る手続きの確認

本格調査(入札図書の作成等)を開始するためには、本予備調査団によるS/Wの締結が必要であることを説明する。またS/W締結後に本格調査を実施するコンサルタントの選定手続きをJICAにて行うため、本格調査開始までに最短でも3ヶ月の期間が必要であることとの理解を得ることとする。(プロ形で締結したM/Mにも記載済み事項)

1.5.2 瑕疵担保責任について

JICAの瑕疵担保責任の免責については既に前回のプロ形調査時に了解済みであるが、その後2002年4月23日付けの口上書により政府間で既に合意されていることを確認する。

1.5.3 ウ国側のS/W署名者について

署名者はウズエクエネルゴ及び対外経済関係省とするが、前回プロ形調査時の経緯を踏まえ、本件実施に関し権限を有している内閣府(副首相)との協議も行うこととする。

1.5.4 ガスコンバインドサイクル発電設備の軸方式及び冷却方式について

JBIC アプレイザルミッションで結論が持ち越しとなっている①軸方式、②発電機の冷却方式について、日本側は当初計画した総事業費を超えずかつ世界的に実績があり、メンテナンス容易な方式とすべく協議を行う。本予備調査にて合意に至らなかった場合は、結論は本格調査に持ち越すこととなるが、本格調査にて各方式のメリット、デメリットを明確にしたうえで、インセプションレポート説明後1ヶ月程度の期間内にウ国側と合意を図ることをM/Mに明記する。(方式を早い段階で決定し、入札図書類は1方式のみ作成する)

1.5.5 建設予定地について

建設予定地については場所の確認とともに、地盤調査の必要性を確認する。

1.5.6 入札図書等の作成について

新設ガスコンバインドサイクル発電設備の入札図書作成に必要な作業項目(基本設計、詳細設計、積算、仕様書、入札書類の作成等)について確認する。また既存発電設備との接続(燃料、電源、制御等)においては既存資料、データが重要であるため、その有無確認と本格調査時の提出依頼を行う。

入札図書の承認手順については、ドラフトが完成(JICAの承認実施)した段階でウ国側の承認を受け、次いでJBICの承認を得るためのサポートをJICA側が実施するフローであることを確認する。(なお入札図書はJBICガイドラインに沿うこと、及び関係機関と連携を図りながら作成することとする。言語は英語とするが、露語版作成については要協議)

1.5.7 環境影響評価の実施について

本案件の初期EIAは1999年8月にウ国自然保護委員会により承認されているが、入札図書作成段階の基本及び詳細設計を踏まえて詳細EIAを行う必要がある。よって自然保護委員会及びJBICガイドラインに合致する詳細EIA報告書を作成するため、ウ国側体制、調査項目、調査方法、スケジュール等を協議のうえ確認する。報告書は英語版とするが露語版の要否を確認する。

なお、詳細EIAの実施主体はウ国側において測定を含め実施されるものであり、JICA側の位置付けはEIAが適切に作成され事業が円滑に実施されるよう支援することであることを確認する。データ収集に関しては本格調査に先立ちウ国側で実施しておくこととする。

1.5.8 現地再委託調査について

本格調査においては、新設設備の設置地盤調査及び土木建築設備の設計工程を現地再委託として実施することを想定している。このためウ国側より適切とされるコンサルタントの紹介を受け、本予備調査期間中に訪問のうえ情報収集を行う。

1.5.9 既設設備を含めたタシケント火力発電所の操業診断、改善提言の実施について

2002年2月のプロ形調査において、設備運営、補修計画、財務、組織、環境の5分野に係る操業診断、改善提言を行うことをM/Mで合意しているが、本業務の実施にあたっての実施可否(データ有無)及びウ国側の体制等(各分野の責任者等)を確認する。

本予備調査におけるタシケント火力発電所の現地踏査時には、主に設備運用、補修計画、環境の観点から調査を行うこととし、財務、組織を含めた全5分野については本格調査時に必要となる資料、データの有無確認、提供依頼を行う。

1.5.10 技術移転方法について

本格調査時の現地作業においてカウンターパートと共に業務を行うことで技術移転を図ること、また必要に応じて1名を日本におけるカウンターパート研修に招聘することが可能であること、ドラフトファイナルレポート協議時にセミナーを行うことを提案し、先方のニーズを確認する。

1.5.11 調査用資機材について

本格調査の実施に当たっては、入札図書作成のためにCAD、プリンタ、コピー機、モバイルフォン及びFAX等の機材調達が必要であり、これら機材の現地調達の可否について確認する。

1.5.12 ウ国側の便宜供与事項について

本格調査の円滑な実施のために、ウズベクエネルギー及びタシケント火力発電所内の執務スペース、車輛、通訳、通信回線等の確保が必要であり、これらの便宜提供の可否について確認する。

1.5.13 他ドナー等の動向

ウズベキスタン国においては、アジア開発銀行(ADB)が電力セクターに関するレポートを作成中とのことであり、必要に応じて関連機関の情報収集及び意見交換を行う。

1.5.14 安全管理情報の収集について

本件調査対象地域はウズベキスタン国の首都タシケントであり、現時点で特筆すべき危険情報は得られていない。しかし本格調査時には調査団の長期滞在が予想されることから、現地大使館、現地JICA事務所、先方関連機関等に対し、連絡体制等の安全管理に関する情報について確認する。