

## **2-2-4 Implementation Plan**

### **2-2-4-1 Implementation Policy**

Timing to order the equipment and materials should be met with the implementation schedule of Kazakhstan.

Equipment and materials should be selected taking into due consideration the operation and maintenance plan and the availability of expendables and spare parts.

Equipment and materials shall be selected among products of Kazakhstan, Japan and Russia, comparing technical levels and conditions of operation and maintenance in order to pick up the most appropriate one for Kazakhstan.

Receipt organization of equipment and materials is WRC. The responsible organizations for the construction are RSE Esyl Su and RSE Astana Su.

In order to facilitate future maintenance works, construction materials will be selected from the products in conformity with GOCT as many as possible.

### **2-2-4-2 Implementation Conditions**

The supplier of the project shall dispatch engineers to make an inspection of procured equipment and materials and commissioning on operation and maintenance before handing them over. Japan's side shall pay due attention so that Kazakhstan side would smoothly carry out the procedures of import, custom clearance, vehicle registration, etc, or not.

Kazakhstan's side shall also pay due attention so that import permission, tax exemption, custom clearance arrangement, etc, should be done without delay.

The supplier shall monitor the transportation of equipment and materials, custom clearance and receipt by Kazakhstan side. The supplier shall be requested to pay attention to any accident even after the bond period.

### **2-2-4-3 Scope of Works**

The equipment and materials shall be handed over at the place in Astana designated by WRC. Japan side will take responsibility up to handing over the equipment and materials while Kazakhstan side shall take responsibility of the maintenance after handing over.

Kazakhstan side shall have the responsibility of the construction of deep wells and water transmission facilities. In the course of the construction, Japan side will conduct the technical transfer of well drilling, quality assurance, construction management and maintenance works as “soft component”, although Japan side does not take any responsibility regarding the construction work.

#### **2-2-4-4 Consultant Supervision**

In order to facilitate the procurement works such as tendering, transportation and delivery, the consultant and the supplier will carry out the procurement supervision.

The consultant will conduct the meeting with the supplier, confirm the contents of orders, and inspect the equipment and materials before shipping. The consultant will also supervise the technical transfer and the handover of the maintenance manual to Kazakhstan side.

The supplier shall dispatch an engineer and shall carry out commissioning in time to the arrivals of the drilling rigs and the vehicles.

#### **2-2-4-5 Procurement Plan**

In principle, equipment and materials shall be procured in Kazakhstan in consideration of the availability and the maintenance. However, products of Japan or the third countries would be procured, if they were reasonable in the aspects of the price, the after-sales service and the specification.

Drilling equipment for drinking wells such as drilling rigs, tools, air compressors, etc, is not manufactured in Kazakhstan. The drilling equipment shall be procured from a Japanese manufacturer with appropriate specifications, price, performance and the after-sales services.

Vehicles such as cargo trucks with crane, water tanker, shall be the Russian products, which have high availability of the spare parts and ensure the after-sales services.

Submersible pumps shall be procured from the manufacturers that have the after-sales services and provide the specification in conformity with the design.

Casing pipes and screen pipes for deep wells shall be procured in Kazakhstan. PE pipes for transmission pipes shall be the products of Kazakhstan or Russia, which RSEs are familiar with.

### 2-2-4-6 Implementation Schedule

Equipment and materials shall be procured from Japan, the third countries and Kazakhstan. Procurement from Japan shall take 8 months considering manufacturing, transport and custom clearance. Procurement from the third countries shall need 4.5 months. Tentative implementation schedule is shown below.

**Table 2-17 Implementation Schedule**

		1	2	3	4	5	6	7	8	9	10	11	12
Detail Design	Consulting Agreement	▼											
	Work in Japan	▬	▬	▬									
	Tendering		▬	▬									
Procurement	Manufacturing & Assembling			▬	▬	▬	▬	▬	▬	▬			
	Transportation (from Japan to Kazakhstan)									▬	▬		
	Supply of Materials from third country							▬	▬	▬	▬		
Soft component												▬	▬

### 2-3 Obligations of the Republic of Kazakhstan

Obligations of Kazakhstan are shown below.

- (1) Drilling works of deep well
- (2) Construction works of intake facility
- (3) Embedding works of water transmission pipeline
- (4) Construction and rehabilitation works of distribution reservoir
- (5) Construction and rehabilitation works of elevated tank
- (6) Construction works of pump station
- (7) Construction and rehabilitation works of distribution facility

All the above obligations include construction works and procurement of construction materials such as concrete.

Japanese side will procure the equipment and materials necessary for works of (1) ~ (3). The quantity of equipment and materials is in accordance with this design. Should the shortage in the quantity occur due to the reason such as the design alteration, Kazakhstan side would make it up.

All construction works borne by Kazakhstan are planned counting on the national budget of 2004. WRC prepared the application for the budget and submitted it in 2003.

The entire cost of the Kazakhstan's works including the construction of distribution facility is estimated at 560 million KT, which corresponds to 20 % of the WRC's whole budget of fiscal year 2002. It is supposed to be possible for WRC to budget for the Kazakhstan's works.

## 2-4 Project Operation Plan

### (1) Operation and maintenance of drilling equipment

Both RSE Esyl Su and RSE Astana Su possess department of water supply equipment, construction machinery and vehicles, which have stockyards, workshops and engineers. These departments shall be in charge of the maintenance works of the drilling equipment.

RSEs are planning to establish departments of drilling works. Required assignment is same between both RSEs and is shown in the table below.

**Table 2-18 Personnel Required for Drilling Works**

Item	Engineer	Operator	Assistant
Geophysical survey	Hydro-geological surveyor: 1	-	-
Drilling work	Drilling expert: 1 Mechanical engineer: 1	2	2
Test	Specialist: 1	-	2 (Concurrent with Drilling work)

RSEs are planning the following actions for the maintenance work of the equipment to be procured.

#### RSE "Astana Su"

Astana Su is planning to establish a new department for the maintenance in the division responsible for the operation of existing water facilities such as Seletinsky dam.

## RSE “Esyl Su”

Esyl Su is planning to establish a new department, by means of recruiting necessary personnel from 3 workshops responsible for the construction works of water supply facilities.

Private companies have undertaken drilling works. Should private companies execute the drilling works of the planned 38 wells, it would cost 22.5 million KT<sup>\*1</sup>. In the case that RSEs would carry out the drilling works by themselves, it is estimated at 11.3 million KT (direct expense: 8.0 million KT, personnel expense: 2.3 million KT, indirect cost: 1.0 million KT<sup>\*2</sup>) corresponding to a half of the cost of private companies.

\*1 Referring to the estimate of Kokshetau Hidrogeologia (drilling company)

\*2 Direct Cost: the direct cost (fuel, bentonite, casing pipe, screen pipe, etc) is estimated as 35 % of the cost of private companies.  $22,500,000 \times 0.35 = 7,875,000$ .

Personnel Cost: 4 engineer  $\times 30,000$  KT  $\times 12$  months + 2 operators  $\times 22,500$  KT  $\times 12$  months + 2 assistants  $\times 15,000$  KT  $\times 12$  months = 2,340,000 KT

Management cost: (personnel cost + direct cost)  $\times 10$  % = 1,034,000 KT

### (2) Operation and Maintenance of Water Supply Facilities

After the completion of the construction works, water supply facilities shall be handed over to districts or RSE. Table 2-19 shows the organizations for operation and maintenance by communities.

**Table 2-19 Organizations for Operation and Maintenance**

No.	Community	District	Organization
1	Erejmentau	Erejmentau	GORVODAKANAL of Ereimentaou
2	Turgaj	Erejmentau	TOO “Bulak”
3	Minskoe	Akkol	District office
4	Iskra	Akkol	Waterworks division shall be established
5	Zholimbet	Shortandinsk	District office
6	Valikhanovo	Enbekshildersk	District office Waterworks division shall be established
7	Korneevka	Esiljskij	Sergeevka branch of Esyl Su
8	Ostagan	Shalakina	
9	Aksu	Shalakina	Ishimsky branch of Esyl Su
10	Novopokrovka	Shalakina	
11	Novoi-Shimskij	Tselinnuj	
12	Ulgy	Jambiljskij	Presnovka branch of Esyl Su
13	Kladbinka	Jambiljskij	
14	Maibalyk	Jambiljskij	
15	Kirovka	Jambiljskij	

In Akmola oblast, waterworks shall be under management of district offices. In North Kazakhstan, Esyl Su shall be entrusted the operation and maintenance works by the oblast or district offices. It is under discussion that waterworks should be assets of oblasts or districts.

Numbers of personnel required for new facilities are summarized in the table below. As for Aksu and Novopokrovka, deep wells shall be constructed at the same well field. Furthermore, both communities are located close to each other. So, one team will undertake the operation and maintenance works for both communities.

**Table 2-20 Personnel Required for Community**

No.	Community	Design capacity [m <sup>3</sup> /d]	No. of households	Operation [person]	Management [person]	Total [person]
1	Ereimentau	1,921	-	3	0	3
2	Turgaisky	98	362	3	4	7
3	Minskoye	43	159	2	2	9
4	Iskra	56	208	3	2	
5	Zholymbet	805	990	3	10	13
6	Valihanov	27	100	2	1	3
7	Korneevka	153	566	3	6	12
8	Ostagan	18	67	2	1	
9	Aksu	17	62	3	4	23
10	Novopokrovka	75	277			
11	Novoishimsky	555	1,302	3	13	
12	Ulgy	20	74	2	1	14
13	Kladbinka	46	285	2	3	
14	Maibalyk	23	85	2	1	
15	Kirivka	26	96	2	1	

“Management” of the above table includes manager and personnel for reading water meter and collecting water charges. As for Ereimentau, the existing responsible organization “GORVODAKANAL” has enough personnel for the management.

## **2-5 Approximate Cost of the Project**

### **2-5-1 Approximate Cost of Project Component Covered by Japan**

The total cost estimated including applied budget in the year of 2003 for Project implementation is approximately 962 million Japanese Yen. Breakdown of the cost to be borne by Japan and Kazakhstan is described below, which was estimated on the basis of the conditions mentioned in article (3) below. However, the estimated cost

does not mean the limit of grant to be stipulated in the official Exchange of Notes between both governments.

(1) Approximate Total Cost for Project Implementation

Approximate total cost for Project implementation : Approximately 525 million Yen  
 North Kazakhstan and Akmoa Oblasts : 38 sites (38 wells)

**Table 2-21 Cost Covered by Japanese Side**

Expense Item		Approximate Cost (million Yen)	
Facility	-	0	501
Equipment and Material	Drilling Rig, Drilling Tools, High Pressure Compressor, Crane Truck, Tank Lorry, GPS, Equipment for Workshop, Submersible Pump, Casing Pipe, Screen Pipe, Centralizer, Pipe( PE pipe 63 – 225mm)	501	
Detailed Design• Supervision of Procurement• Technical Guidance		24	

Approximate cost for Project implementation (sub total): 525 million Yen

(2) Cost Covered by Kazakhstan Side

Applied budget for construction 560 million KT (437 million Yen)

(3) Condition for estimation

3-1) Estimated on: July, 2003

3-2) Exchange rate: 1 US\$ = 119.29 Yen  
 1 KT = 0.78 Yen

3-3) Procurement period: The procurement period is within one Japanese fiscal year. Detailed design and procurement period is as shown in implementation schedule.

3-4) Others: The project will be implemented in compliance with Japan's Grant Aid scheme

**2-5-2 Operation and Maintenance Cost**

Cost for the operation and maintenance works is estimated as shown in Table 2-22.

**Table 2-22 Operation and Maintenance Cost and Necessary Water Charge**

No.	Community	O&M cost [KT/month]	O&M cost per m <sup>3</sup>		
			By Community [KT/ m <sup>3</sup> ]	By group (Group-1) [KT/ m <sup>3</sup> ]	By group (Group-2) [KT/ m <sup>3</sup> ]
1	Ereimentau	148,365	7	7	-
2	Turgaisky	98,851	42	42	
3	Minskoye	55,726	54	52	
4	Iskra	68,326	51		
5	Zholymbet	224,448	12	12	
6	Valihanov	45,226	70	70	
7	Korneevka	110,326	30	38	30
8	Ostagan	45,226	105		
9	Aksu	98,851	45	20	
10	Novopokrovka				
11	Novoishimsky	211,722	16		
12	Ulgy	45,226	94	73	
13	Kladbinka	66,226	60		
14	Maibalyk	45,226	82		
15	Kirivka	45,226	72		

The operation and maintenance cost shall be covered by the water charge from beneficiaries, residents of the communities. Water charge should be set more than the production cost in order to run waterworks on self-supporting accounting system. So as to meet the operation and maintenance cost with the water charge by each community, residents in small communities shall bear high water charge due to its small population. In Ostagan, the operation and maintenance cost exceeds 100 KT per cubic meter. In order to keep the charge below the affordability of residents, group for the management of waterworks is formed on the basis of the proposal from RSEs. In the case of Group-1 in Table 2-22, the maximum cost is 73 KT per cubic meter.

The management in oblast scale is also considered for water supply facilities in North Kazakhstan Oblast (Group-2). In North Kazakhstan Oblast, RSE Esyl Su is planning to take responsibility of the operation and maintenance works while each water supply facility shall be under the jurisdiction of a district office or the oblast office in Akmla Oblast. The water charge would be 30 KT per cubic meter, in the case that Esyl Su would take responsibility of the operation and maintenance work for all communities.



The past water charge up to 1997 was 73 KT per cubic meter. The water charge for one month is estimated at 1,095 KT per household\*<sup>1</sup>. Assuming that the average income per household is 30,000 KT per month, the water charge of 1,095 KT is 3.6 % of the household income. This ratio is within the affordability of resident.

Note) \*<sup>1</sup>: 100 L/c/d as unit water consumption. 5 persons per household

Therefore, water charge of Group-1 (max. 73 KT per cubic meter) is within the affordability of resident. It is expected that the operation and maintenance cost of the project can be borne by residents.

In Ereimentau, waterworks is managed by water supply organization, GORVODOKANAL, on self-supporting accounting system with assets of 21 million KT and capital of 2.8 million KT. After the project, GORVODOKANAL will continue to manage all the water supply facilities. Table 2-23 shows financial balance of recent 6 months and projection after the project.

**Table 2-23 Projection of Financial Balance of GORVODKANAL  
(Ereimentau)**

[unit: KT]

	Present		After the project	
	[m <sup>3</sup> ]		Increment	Total
Income				
Water charge		6,326,000	9,818,596	16,144,596
Water supply volume	73,800			
Wastewater volume	55,900			
Total [m <sup>3</sup> ]	129,700			
Income per cubic meter of water charge		49		
Expense		7,377,000	890,190	8,267,190
Operation (power, expendable supplies, etc)		2,721,000		
Wage & salary (49 personnel)		4,656,000		
Balance		<b>-1,051,000</b>		<b>7,877,406</b>

Note) in case that the rate of accounted-for water is 57 %.

The deficit could be made up as the consequence of the increment of income more than that of the operation cost. It is expected that financial balance could be more improved if unaccounted-for water would be reduced.

## 2-6 “Soft Component” Plan

### (1) Background

Republic of Kazakhstan has many experiences of well drilling by use of drilling rig made in Russia. However, there are many technologies to be improved for the well drilling planning, quality control and maintenance skill for the equipments, for instance, delay of completion of the well drilling, useless of well by the screen clogging two years after completion of well drilling and so on.

In this project, it will be required to construct many wells during the short period. It is recommended to use the Japanese drilling rig to complete the project until the target year. However the engineers in Kazakhstan are not familiar with the Japanese drilling rig. Therefore “Soft Component” will be needed. It is efficient for the engineers of republic state enterprise in Kazakhstan to guide through the Soft Component program prepared by Japanese consultant. And it is also effective for development of the groundwater in the future.

### (2) Outputs

For the engineers of republic state enterprise, capacity building from both sides (construction management and technical aspects concerning to the construction facility) has the following goals.

The observance of the construction period for the construction of facility is recognized, and the implementation of project is carried out smoothly as per plan. (preparation of construction schedule and inspection manual for 38 wells)

Procured equipments will be maintained properly. (preparation of maintenance manual for the drilling rig and related equipments)

### (3) Execution Format

The execution format is engineering support by Japanese Engineers and project execution by Kazakhstan side.

### (4) Activities

The execution period of “Soft Component” is programmed as 1 month, which starts at the same time as the commencement of drilling borehole. The outline of “Soft Component” and assignment schedule are shown in the following tables.

**Table 2-24 Outline of “Soft Component”**

	Technical assistance for the project execution	Technical assistance for the maintenance of equipment
Components of the assistance activities	Construction planning, Construction management and Quality control	Technical assistance for the well drilling, Countermeasure against the construction troubles and storage management.
Outputs	Preparation of the construction schedule for 38 well drillings and inspection manual	Preparation of maintenance manual
Schedule	Refer to the construction schedule	

**Table 2-25 Assignment Schedule**

	1	2	3	4	5	6	7	8	9	10	11	12
Contract with consultant/preparation of tender documents	▼ □											
Tender and contract with bidder			▼									
Construction												■
Soft Component												
Preparation in Japan (making of the guidance)											□	
Engineer for the project execution												■
Engineer for the maintenance management												■

## **CHAPTER 3**

# **PROJECT EVALUATION AND RECOMMENDATIONS**

## CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

### 3-1 Project Effect

The current status and problems, the inputs to be implemented by the Project for these problems and the effects to be obtained by the Project are shown in Table 3-1.

**Table 3-1 Effects by the Project**

Current Status/Problems		Input by the Project	Effect by the Project
<b>Direct Effects</b>			
1	Most people in target communities depend on the shallow wells for the drinking water which quality and quantity are not sufficient.	Procurement of the intake facilities (38 deep wells) and the pipes for transmission of water and their installation	<ul style="list-style-type: none"> <li>- Provide safe and sufficient drinking water to 37,589 people covered under the project.</li> <li>- Service hour will be improved from 8 hours to 24 hours in two villages.</li> <li>- Current water supply rate of 0% in the 13 villages will be improved to 100% upon completion of the Project.</li> </ul>
2	Due to the old age of well drilling equipment owned by the contractor, duration of the construction of the well is long. The construction cost of the well is very high due to monopolization of the construction of the well.	<ul style="list-style-type: none"> <li>- Procurement of two drilling rigs and support materials.</li> <li>- Guidance for operation and maintenance for the drilling rigs by Japanese consultant.</li> </ul>	Shortening of the construction of the well and reduction of the budget for the well drilling will be expected.
3	People have to fetch and carry water from distant water sources and are forced to spend considerable time and effort to obtain water.	Public tap or house connection for the rural water supply system	- Reduce workload for obtaining water
<b>Indirect Effects</b>			
1	Oblast water supply planning will not be able to accomplish due to the long period of well construction.	Procurement of the most appropriate drilling rigs for the well drilling.	After completion of 15 villages water supply system, drilling rigs will be used for the new well construction and will cause the completion of 2005 water supply program
2	People are suffering from the waterborne infectious diseases.	Supply good quality of water.	Number of people suffered from the waterborne infectious diseases is reduced.

### **3-2 Recommendations**

In order to properly execute the maintenance of equipment and facilities procured under the Project and to execute the project that safe and sufficient water will be supplied to the 15 villages, it is indispensable to consider the following aspects.

- (1) Water resources committee and republic state enterprise shall secure the necessary budget for the water supply project included the construction of water intake, water transmission pipeline and repair/renewal of these facilities and execute.
- (2) Republic state enterprise shall keep the technology to be taught under the guidance of Japanese consultant about operation and maintenance for the drilling rig and supporting materials.
- (3) Republic state enterprises, countries and villages shall retain the organization of operation and maintenance for the water supply facilities. They shall also aim to establishment of the sustainable collection system for the water fee and improvement of the operation and maintenance by themselves.

## **APPENDICES**

## **Appendix 1**

### **Member List of the Study Team**



## 1 Member List of the Study Team

### Member list of the Basic Design Study Team

1.	Mr. FUKUDA Yoshio	Team Leader	Deputy Director, First Project Management Division, Grant Aid Management Department, JICA
2.	Mr. SATO Kohei	Planning Management	First Project Management Division, Grant Aid Management Department, JICA
3.	Mr. OKAGA Toshifumi	Chief Consultant / O&M Planner (facility)	Pacific Consultants International
4.	Mr. NAKATAKE Shunichi	Water Supply Planner	Pacific Consultants International
5.	Mr. ONODA Fumiakira	Socio-economist / O&M Planner (organization, finance, economy)	Pacific Consultants International
6.	Mr. YAMASAKI Yasumasa	Underground water Planner	Pacific Consultants International
7.	Mr. ARAKI Takayuki	Facility Planner	Pacific Consultants International
8.	Mr. UNE Yuji	Procurement / Cost Estimator	Pacific Consultants International
9.	Mr. GOTO Yukichi	Interpreter	Pacific Consultants International

### Member list of Consultation on the Draft Basic Design Study Team

1.	Mr. TAGUCHI Kunihiko	Team Leader	Grant Aid Management Division Economic Cooperation Administration, Ministry of Foreign Affairs
2.	Mr. SATO Kohei	Planning Management	First Project Management Division, Grant Aid Management Department, JICA
3.	Mr. YAMASAKI Yasumasa	Chief Consultant	Pacific Consultants International
4.	Mr. HIDAKA Shimao	Water Supply Planner	Pacific Consultants International
5.	Mr. OHSHIKA Yusuke	Procurement / Cost Estimator	Pacific Consultants International
6.	Mr. GOTO Yukichi	Interpreter	Pacific Consultants International

**Appendix 2**  
**Study Schedule**

## Basic Design Study

Date	Officials			Consultants						
	FUKUDA	SATO		OKAGA	GOTO	YAMASAKI	UNE	ARAKI	ONODA	NAKATAKE
22	Leave Narita				Leave Narita					
23	Arrive at Almaty				Arrive Almaty					
24	Courtesy call to EOJ Astana				Courtesy call to EOJ Almaty Astana					Narita – Almaty
25	Courtesy call to MOET, MOFA, EOJ Astana office, WRC	Leave Narita			Courtesy call to MOET, MOFA, EOJ Astana office, WRC					Almaty – Astana
26	Discussion with WRC	Arrive at Almaty			Discussion with WRC					
27	Discussion with WRC	Almaty – Astana			Discussion with WRC					
28					Site survey (Ereimentau, Turgaisky)					
29					Internal meeting					
30					Discussion on M/D					
1	Discussion on M/D	Leave Astana			Discussion on M/D	Site survey (Petropavlovsk)				Data collection
2	Discussion on M/D				Discussion on M/D	Site survey (Petropavlovsk)				Data collection
3	Discussion on M/D				Site survey	Discussion on M/D				Site survey (Zholymbet, Iskra, Minskoye)
4	Discussion on M/D				Site survey	Discussion on M/D				Site survey (Valikhanove)
5	Leave Astana									Site survey (Kokshetau)
6	Arrive at Narita									Kokshetau – Petropavlovsk, Data collection, Preparation for site survey
7					Site survey (Korneevka, Aksu, Novopokrovka)	Data collection, Survey on factories and workshop				Site survey (Korneevka, Aksu, Novopokrovka)
8					Site survey (Sergeivka office of Esyl Su, Ishimsky office of Esyl Su, Novoishimsky)	Data collection, Survey on factories and workshop, Petropavlovsk - Kokshetau				Site survey (Sergeivka office of Esyl Su, Ishimsky office of Esyl Su, Novoishimsky)
9					Site survey (Ostagan, Kirovka)	Data collection Kokshetau - Astana				Site survey (Ostagan, Kirovka)
10					Site survey (Kladbinka, Ulgo, Maibalyk)	Data collection and analysis				Site survey (Kladbinka, Ulgo, Maibalyk)
11					Discussion with Esyl Su	Data collection and analysis				Discussion with Esyl Su
12					Petropavlovsk – Astana	Data collection and analysis				Petropavlovsk – Astana

Date	Officials		Consultants						
	FUKUDA	SATO	OKAGA	GOTO	YAMASAKI	UNE	ARAKI	ONODA	NAKATAKE
13 Sun					Internal meeting				
14 Mon			Data analysis, supplementary data collection	Almaty – Astana	Data analysis, supplementary data collection				
15 Tue			Data analysis, supplementary data collection	Leave Astana	Data analysis, supplementary data collection				Narita – Almaty
16 Wed			Data analysis, supplementary data collection		Data analysis, supplementary data collection				Almaty – Astana
17 Thu			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
18 Fri			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
19 Sat			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
20 Sun			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
21 Mon			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
22 Tue			Supplementary site survey		Data analysis, supplementary data collection				
23 Wed			Discussion on T/N		Data analysis		Supplementary site survey (Turgaisky, Ereimentau)		
24 Thu			Supplementary site survey		Discussion on T/N		Data analysis		
25 Fri			Data analysis, supplementary data collection		Data analysis		Supplementary site survey (Zholymbet, Iskra, Minskoye)		
26 Sat			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
27 Sun			Data analysis, supplementary data collection		Data analysis, supplementary data collection				
28 Mon			Signing on T/N		Data analysis, supplementary data collection				
29 Tue			Supplementary data collection Astana – Almaty		Data analysis, supplementary data collection				
30 Wed			Report to EOJ		Data analysis, supplementary data collection				
31 Thu			Leaving Almaty		Signing on T/N				
Nov.1 Fri			Arriving at Narita		Supplementary data collection Astana – Almaty				
					Report to EOJ				
					Leaving Almaty				
					Arriving at Narita				

Consultation on the Draft Basic Design Study

Date		Officials		Consultants			
		Taguchi	Sato	Yamasaki	Hidaka	Ohshika	Goto
June, 2003	10	Tue	Leave Narita Arrive at Almaty				
	11	Wed	Courtesy call to EOJ, Leave Almaty-Arrive at Astana				
	12	Thu	Courtesy call to MOET, MOFA, EOJ Astana office, WRC				
	13	Fri	Discussion with MOET, WRC				
	14	Sat	Site survey ( Ereimentau, Turgaisky )				
	15	Sun	Internal Meeting				
	16	Mon	Discussion with MOET, WRC signing the Minutes of Discussions. Report to EOJ Astana Leave Astana Arrive at Almaty			Site survey	
	17	Tue	Leave Almaty-Arrive at Narita	Report to EOJ	Report to EOJ Almaty-Astana	Site survey	
	18	Wed		Leave Almaty-Frankfurt	Site survey		
	19	Thu		Arrive at Narita	Site survey		
	20	Fri			Site survey		
	21	Sat			Leave Astana-Arrive at Almaty		
	22	Sun			Leave Almaty- Arrive at Frankfurt		
23	Mon			Arrive at Narita			

## **Appendix 3**

### **List of Parties Concerned in the Federal Republic of Kazakhstan**

1. Embassy of Japan
 

Kiyoshi MATSUZAKI	Counselor
Masayuki HOSAKA	First Secretary
Kenji OTAKE	First Secretary
Nobumitsu HAYAMI	Second Secretary
  
2. JICA Expert
 

Terumi MIZUNO	Expert
Fuminari HASHIMOTO	Expert
Jiro IIDA	ODA Adviser
  
3. Asian Development Bank
 

Peter J. Wallum	Senior Project Economist
Yuri V. Blinov	
  
4. Ministry of Economy and Budget Planning
 

Rustem N. Khamzin	Director
Talimjan Urazov	Deputy Director
Zhan Muratbekov	Head of Division of Financial Cooperation
Madina M. Mukhayeva	Head of Division
  
5. Ministry of Finance
 

Rakhmet G. Baiakov	Deputy Head, Division of Governmental Loans and State Guarantees, Department of State Borrowing
Samat Sarbasov	Director, Department of International Taxation, Tax Committee
  
6. Ministry of Foreign Affairs
 

Zeinolla Kalymbetov	Japan Desk
Daniar Sarekenov	Head of Southern Asia Unit
Zeinolla R. Kalymbetov	Second Secretary
  
7. Ministry of Agriculture
 

Serit Mazhikenov	Department of International Investment
------------------	--
  
8. Ministry of Health
 

Belong Anatoliy	Vice Minister
-----------------	---------------

9. Committee for Water Resources
 

Ryabtev Anatolii Dmitrievich	Chairman
Kopbosyn Kudaibergenuly	Vice Chaiman
Serikbai Smailov	Chief Consultant & Coordinator
Zhumabek Mukhatav	Senior Specilalist
Murat Bekniyazov	Chief of Irrigation and Rural Communities Water Supply Department
  
10. Republic State Enterprise “Esyl Su”
 

Alexander Mihailovich Voronov	Director
Valereij Petrovich Belozerov	Deputy Director
Gennadyi Pavlovich Gorbunov	Technical Director
Ibatullin Shugaip	Deputy Head of Operation Division
  
11. Republic State Enterprise “Astana Su”
 

Valery Nikolaevich Petrishev	Director
Raugion Sagyndykovna Baisova	Deputy Director
Sergei V. Kim	Deputy Director
  
12. Ereimentau Raion
 

Lotts Vladimir Borisovich	Deputy Governor
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13. Republic State Enterprise “GORVODOKANAL”
 

Braliev Talgat Sbyrovich	Director
--------------------------	----------
  
14. Shortandinsk Raion
 

Antonina Rasilierna	Deputy Governor
---------------------	-----------------
  
15. Zholymbet Village
 

Shokhonov Nurmukhan	Head
---------------------	------
  
16. Valikhanove Village
 

Kyangali Adiefovich	Deputy Head
---------------------	-------------
  
17. Korneevka Village
 

Maslov Andrei Maksimovich	Head
---------------------------	------
  
18. Novopokrovka
 

Shpet Vladimir Ivanovich	Head
--------------------------	------



19. Akmola Hidrogeologia  
Sabit Myrzahanovich Myrzahanov Director  
Lydmila Izanovna Murashkins Hydro-geologist
20. Kokshetau Hidrogeologia  
Sergei Fiedorovich Solovjov Director
21. Kokshetau Mineral Water  
Askar Kaznavievich Alieyev Director
22. Torghay Village  
Alibekov Rashid Director

## **Appendix 4**

### **Minutes of Discussions**

TECHNICAL NOTES  
ON  
THE BASIC DESIGN STUDY  
ON  
THE PROJECT FOR RURAL COMMUNITIES WATER SUPPLY  
IN  
THE REPUBLIC OF KAZAKHSTAN

The consultant members of the Team had a series of discussions and conducted field surveys from September 27 to October 27, 2002.

As a result of the discussions and the surveys, both sides confirmed the technical conditions described as per the attached.

Astana, October 28, 2002



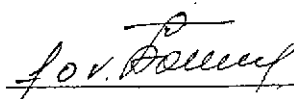
Okaga Toshifumi  
Chief Consultant,  
JICA Basic Design Study Team for  
the Project for Rural Communities Water  
Supply in the Republic of Kazakhstan



Ryabtev Anatolii Dmitrievich  
Chairman  
Water Resources Committee  
Ministry of Agriculture



Aleander M. Veronov  
Director  
Republic State Enterprise "Esyl su"



Valery N. Petrishev  
Director  
Republic State Enterprise "Astana Su"



## ATTACHMENT

Both parties agreed upon and confirmed the following items.

## 1. Target year

Target year would be 2005.

## 2. Water demand of the project

## 2-1 Projection of population in 2005

## Design Criteria of Population in 2005 for Community Water Supply

No.	Oblast	Community	District Raion	District Capital	Population in 2005
1	AKMOLA	Ereimentau	Ereimentau	Ereimentau	15,000
2		Turgaisky	Ereimentau	Ereimentau	1,810
3		Minskoye	Akkol	Akkol	796
4		Iskra	Akkol	Akkol	1,042
5		Zholymbet	Shortandinsk	Shortandui	4,952
6		Valikhanove	Enbekshildersk	Stepnyak	500
7	N. KAZAK.	Korneevka	Esiljskij	Yavlenka	2,829
8		Aksu	Shalakina	Sergeevka	311
9		Novopokrovka	Shalakina	Sergeevka	1,387
10		Ostagan	Shalakina	Sergeevka	335
11		Ulgy	Jambiljskij	Presnobka	363
12		Kladbinka	Jambiljskij	Presnobka	854
13		Maibalyk	Jambiljskij	Presnobka	423
14		Kirovka	Jambiljskij	Presnobka	478
15		Novoishimsky (A part of Novoishimsky)	Tselinnuj	Novoishimsky	6,509
<b>Total</b>					<b>37,589</b>

Note: The recent consistent downward tendency of republic population growth is getting upward in a year or two; and all the local communities will follow the general trend.

## 2-2 Water demand in 2005

The water demand for the domestic use and other use such as school, commercial, hospital and public office are estimated as below. Other use is planned from daily practice. The unit demand of public tap is estimated as 30 – 50 l/c/d and of the house connection as 60 – 125 l/c/d.

No.	Village	Population	Unit demand		Domestic Water	Other Water Use	Water Demand	
		[persons]	[L/c/d]	[%]	[m3/d]	[%]		
1	Ereimentau	15000	50	60(%)	450	20(%)	563	
			125	40(%)	750	20(%)	938	
			Sub Total		1,200	Sub Total	1,500	
2	Turgaisky	1650	30	100(%)	50	10(%)	55	
			160	30	100(%)	5	10(%)	5
				Total		54		60
3	Minskoye	796	30	100(%)	24	10(%)	27	
4	Iskra	1042	30	100(%)	31	10(%)	35	

5	Zholymbet	4952	50	60(%)	149	20(%)	186
			125	40(%)	248	20(%)	310
				Sub Total		396	Sub Total
6	Valikhanove	500	30	100(%)	15	10(%)	17
7	Korneevka	2829	30	100(%)	85	10(%)	94
8	Aksu	311	30	100(%)	9	10(%)	10
9	Novopokrovka	1387	30	100(%)	42	10(%)	46
10	Ostagan	335	30	100(%)	10	10(%)	11
11	Ulgo	363	30	100(%)	11	10(%)	12
12	Kladbinka	854	30	100(%)	26	10(%)	29
13	Maibalyk	423	30	100(%)	13	10(%)	14
14	Kirovka	478	30	100(%)	14	10(%)	16
15	Novoishimsky	6509	30	60(%)	117	20(%)	147
			60	40(%)	156	20(%)	195
Total		37589			2,203		2,709

## 2-3 Design capacity in 2005

Based on the water demand, the design capacity is estimated as follows:

No.	Village	Water Demand	Daily Max Factor	Daily Max.	Leakage	Design Capacity
				[m3/d]	[%]	[m3/d]
1	Ereimentau	563	1.3	731.25	43(%)	1,283
		938	1.3	1,219	43(%)	2,138
		1,500	Total	1,950	Total	3,421
2	Turgaisky Nigini Turgaisky	55	1.3	72	20(%)	89
		5	1.3	7	20(%)	9
		60			Total	98
3	Minskoye	27	1.3	34	20(%)	43
4	Iskra	35	1.3	45	20(%)	56
5	Zholymbet	186	1.3	241	20(%)	302
		310	1.3	402	20(%)	503
		495	Total	644	Total	805
6	Valikhanove	17	1.3	22	20(%)	27
7	Korneevka	94	1.3	123	20(%)	153
8	Aksu	10	1.3	14	20(%)	17
9	Novopokrovka	46	1.3	60	20(%)	75
10	Ostagan	11	1.3	15	20(%)	18
11	Ulgo	12	1.3	16	20(%)	20
12	Kladbinka	29	1.3	37	20(%)	46
13	Maibalyk	14	1.3	18	20(%)	23
14	Kirovka	16	1.3	21	20(%)	26
15	Novoishimsky	147	1.3	190	20(%)	238
		195	1.3	254	20(%)	317
Total		342		444		555
Grand Total		2,709		3,150		5,384

- Note: (1) According to the Design criteria of the Republic, the peak factor is from 1.2 to 1.3.  
 (2) The leakage of 20% is applied: the rehabilitation for the pipeline until 2005 by the both enterprises is expected to minimize the loss. However, for Ereimentau, the leakage of 43% is adopted, due to its usage of existing pipeline system under present condition.

## 3. The design of the facilities

## 3-1 Well drilling

No.	Village	Water Demand	Existing Well Capacity	Required Development	Expected Safe Yield per Well	No. of well		
						Estimated well depth	Number of pump	
							(m)	Operation
1	Ereimentau				864	80	2	1
		1,283			562	60	1	1
		2,138			302	60	1	-
					199	60	1	-
		3,421	1500	1,921	1927		5	2
2	Turgaisky Nigini Turgaisky	89	0	89	130.0	60	1	1
		9	0	9		60	1	1
		98					2	2
3	Minskoye	43		43	345.6	60	1	1
4	Iskra	56	0	56	172.8	60	1	1
5	Zholymbet	302		302				
		503		503				
		805	0	805	345.6	50	3	1
6	Valikhanove	27	96	0	-	70	-	1
7	Korneevka	153		153	527.0	70	1	1
8	Aksu	17		17	345.6	70	1	-
9	Novopokrovka	75		75	-	70	1	1
10	Ostagan	18		18	432.0	40	1	1
11	Ulgo	20		20	432.0	40	1	1
12	Kladbinka	46		46	259.2	70	1	1
13	Maibalyk	23		23	172.8	50	1	1
14	Kirovka	26		26	259.2	45	1	1
15	Novoishimsky	238						
		317						
		555		555	397.4	70	2	1
Total							22	16

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## 3-2 Well construction

No.	Village	Conductor		Casing		Screen	
		254mm	219mm	219mm	168mm	219mm	168mm
1	Ereimentau			180		60	
			80		180		60
2	Turgaisky		30		90		30
	Nigini Turgaisky		60		90		30
3	Minskoye		60		90		30
4	Iskra		50		90		30
5	Zholymbet			150		50	
6	Valikhanove	20		53		17	
7	Korneevka	40		105		35	
8	Aksu	40		105		35	
9	Novopokrovka	20		53		17	
10	Ostagan	20		60		20	
11	Ulgo	20		60		20	
12	Kladbinka		40		105		35
13	Maibalyk		20		75		25
14	Kirovka		20		68		22
15	Novoishimsky	60		158		52	
	Total	220	360	924	788	306	262

## 3-3 Submersible pump

No.	Village	Pump Planning			Friction loss	Pump Elevation (GL-)	Tank Level (GL+)	Total Head	Design Power of Motor
		Capacity/unit	Number of pump						
		[m3/d]	Operation	Standby	[m]	Pump-WT	[m]	[m]	KW
1	Ereimentau	480	2	1	30.2	45	0	75.2	8
		600	1	1					11
		384	1	-					8
		240	1	-					5.5
		1224	5	2	3.2	45	41	89.2	
2	Turgaisky	96	1	1	2.6	45	18	65.6	2.8
	Nigini Turgaisky	96	1	1	9.3	45	18	72.3	2.8
		192	2	2					
3	Minskoye	96	1	1	14.1	45	18	77.1	2.8
4	Iskra	96	1	1	12.9	45	18	75.9	2.8
5	Zholymbet	384	3	1	29.6	45	18	92.6	8.0
6	Valikhanove	96	-	1	12.9	45	18	75.9	2.8
7	Korneevka	151	1	1	17.5	30	18	65.5	2.8
8	Aksu	96	1	1	19.8	30	18	67.8	2.8
9	Novopokrovka	96	1	-	42.9	30	18	90.9	2.8
10	Ostagan	96	1	1	19.3	30	18	67.3	2.8

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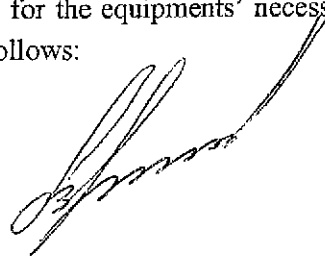
11	Ulgo	96	1	1	15.0	30	18	63.0	2.8
12	Kladbinka	96	1	1	28.3	30	18	76.3	2.8
13	Maibalyk	96	1	1	25.7	30	18	73.7	2.8
14	Kirovka	96	1	1	20.6	30	18	68.6	2.8
15	Novoishimsky	384	2	1	17.2	30	18	65.2	5.5
	Total		22	16					

## 3-3 Transmission pipe (From well to reservoir and elevation tank)

No.	Village	Flow "Q"	Factor "C"	Pipe Length	Hydraulic Graduation I	Velocity	Friction loss
		[m <sup>3</sup> /sec]		[m]	(1/1000)	[m/sec]	[m]
1	Ereimentau	0.01111	110	1,500	20.1451	1.2	30.2
		0.00694					
		0.00444					
		0.00278					
		0.01416	110	3,300	0.9672	0.4	3.2
2	Turgaisky Nigini Turgaisky	0.00111	110	200	13.2143	0.6	2.6
		0.00111	110	700	13.2388	0.6	9.3
				900			
3	Minskoye	0.00111	110	3,300	4.2879	0.4	14.1
4	Iskra	0.00111	110	3,000	4.2879	0.4	12.9
5	Zholymbet	0.01333	110	6,500	4.5504	0.7	29.6
6	Valikhanove	0.00111	110	3,000	4.2879	0.4	12.9
7	Korneevka	0.00175	110	10,000	1.7524	0.3	17.5
8	Aksu	0.00111	110	1,500	13.2143	0.6	19.8
9	Novopokrovka	0.00111	110	10,000	4.2879	0.4	42.9
10	Ostagan	0.00111	110	4,500	4.2879	0.4	19.3
11	Ulgo	0.00111	110	3,500	4.2879	0.4	15.0
12	Kladbinka	0.00111	110	6,600	4.2879	0.4	28.3
13	Maibalyk	0.00111	110	6,000	4.2879	0.4	25.7
14	Kirovka	0.00111	110	4,800	4.2879	0.4	20.6
15	Novoishimsky	0.00889	110	8,000	2.1507	0.4	17.2
	Total			77,300			

## 4. Equipment and materials requested

Regarding to the equipment and material requested by the application, the Republic of Kazakhstan requests to change the specifications and the quantities of equipments, and also sets the order of priority for the equipments' necessity for the project. The components of the project are listed as follows:





## 4-1 Equipment for water well drilling

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Water well drilling rig for 100 to 200 m depth (inclusive of rotary head, draw-works, mast, pull down, mud pump, carrier truck)	1 units	120 m depth 2 units	1
(2)	Drilling tools and accessories for 150 m depth		120 m depth	1
a)	Standard accessories	1 set	2 sets	1
b)	Drilling tools for mud rotary	1 set	2 sets	1
c)	Drilling tools for DTH hammer	1 set	2 sets	1
d)	Casing handling tools	1 set	2 sets	1
e)	Fishing tools	1 set	2 sets	1
f)	Air lifting tools	1 set	2 sets	1
(3)	4 x 4 truck mounted air compressor	1 unit	2 sets	1
(4)	Spare parts			1
a)	Spare parts for drilling rig	1 lot	2 lots	1
b)	Spare parts for air compressor	1 lot	2 lots	1

## 4-2 Supporting vehicles for drilling and other works

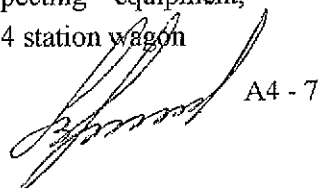
<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Cargo truck, 6 x 6, G.V.W. of 26,000 kg, long body type, with 6-ton cab back crane, for drilling tools and heavy equipment	1 unit	No request	-
(2)	Cargo truck, 4 x 4, G.V.W. of 15,000 kg, with 3-ton cab back crane, for drilling tools and other equipment	1 unit	2 units	2
(3)	Water tanker, 4 x 4, tank capacity of 8 3 m <sup>3</sup>	1 unit	2 units	2
(4)	Pick-up type light vehicle, 4 x 4	1 unit		5
(5)	Spare parts	1 unit	2 units	2

## 4-3 Borehole test equipment

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Borehole logging equipment	1 set	No request	-
(2)	Borehole testing equipment	1 lot	No request	-
(3)	Water analysis equipment	1 lot	No request	-
(4)	Spare parts	1 lot	No request	-

## 4-4 Geophysical survey equipment

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Electrical prospecting equipment, mounted on 4 x 4 station wagon	1 set	No request	-

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(2)	Electromagnetic prospecting equipment	1 set	No request	-
(3)	Global positioning system	1 set	2 sets	1
(4)	Spare parts	1 lot	No request	-

## 4-5 Workshop equipment

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Equipment and tools for workshop	1 set		4
(2)	Spare parts	1 lot		4

## 4-6 Equipment of the boreholes (36 holes)

<u>Item</u>	<u>Description</u>	<u>Quantity</u>	<u>Change</u>	<u>Priority</u>
(1)	Submersible motor pump, 150 l/min			3
(2)	Transformer, power panel, power cable		Transformer is not included	3
(3)	Well casing and screens for 100 meter depth		70 m	3
(4)	Pipes for connection of water supply point			1

## 5. Delivery of the materials and facilities

All materials and facilities will be delivered to CIF Water Resources Committee in Astana.

## 6. Soft components

If the Drilling rigs and tools are procured and imported from Japan, Kazakhstan will request the Training for the Equipment for 2 months.

## 7. Construction cost

In compliance with The Scope of Works agreed, Japan will supply materials and equipments required for the facility installation from well to reservoir or elevation tank. Both enterprises submit unit price for the construction cost.

## 8. Schedule of the design and construction

(1) Both enterprises submitted the project implementation schedule shown in Appendix.

(2) Water resource committee requests that Exchange of Notes would be completed by the end of May 2003, in time for the preparation of the budget on 2004.

Fr





Директор филиала су"  
Петрищев.



### ГРАФИК

составления проектно-сметной документации для строительства скважинного водозабора из подземных вод для водоснабжения 6-ти населенных пунктов Акмолинской области по проекту «Водоснабжение сельских населенных пунктов в Республики Казахстан» (Японское Агентство Международного сотрудничества)

№ п/п	Наименование работ	2002 год		2003 год				
		Ноябрь	Декабрь	Январь	Февраль	Март	Апрель	Май
1	Составление ТЭО	←				→		
2	Составление рабочей документации				←			→

Составил:

М.К. Шарипов.

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### ГРАФИК

строительства скважинного водозабора из подземных вод для водоснабжения 6-ти населенных пунктов в Республике Акмолинской области по проекту «Водоснабжение сельских населенных пунктов в Республике Акмолинской области» (Японское Агентство Международного сотрудничества)

№ п/п	Наименование работ	Годы, месяцы																		
		2004 год						2005 год												
		Май	Июнь	Июль	Август	Сентябрь	Октябрь	Ноябрь	Декабрь	Январь	Февраль	Март	Апрель	Май	Июнь	Июль	Август	Сентябрь	Октябрь	
1	Бурение скважин																			
2	Благоустройство скважин																			
3	Строительство водовода																			
4	Строительство линии электропередачи																			
5	Строительство резервуара и водораспределительной узла																			
6	Рекострукция разводящей сети																			
7	Гидравлическое испытание водовода																			
8	Хлорирование и промывка водовода и резервуаров																			

Примечание:

1. общая протяженность – 57 000 км
2. общая протяженность линий электропередач – 47 500 км
3. количество скважин – 22 шт.

- Ориентировочная стоимость:  
 1 км водовода – 4,47 млн. тенге  
 1 км линии электропередач – 1,40 млн. тенге.

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Составил:

Шарипов М.К.

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Петренко В.М.  
 Воронцов А.И.  
 Ош  
 Ош

«УТВЕРЖДАЮ»  
 Директор РГП "Есіл су"  
 А.М. ВОРОНОВ

### ГРАФИК

составления проектно-сметной документации для строительства скважинного водозабора из подземных вод для водоснабжения 9-ти населенных пунктов Северо-Казахстанской области по проекту «Водоснабжение сельских населенных пунктов в Республики Казахстан» (Японское Агентство Международного сотрудничества).

№ п/п	Наименование работ	2002 год		2003 год		
		Ноябрь	Декабрь	Январь	Февраль	Март
1	Составление ТЭО	-----				
2	Составление рабочей документации			-----		

Составил:

*И.И.И.*

Ибатуллин Ш.Н.

Вх № 1665  
 от 28.10.02.

*И.*

管水施設建設工程

"УТВЕРЖДАЮ"  
 Директор РГП "Есіл су"  
 А.М. ВОРОНОВ

**ГРАФИК**

строительства скважинного водозабора из подземных вод для водоснабжения 9-ти населенных пунктов  
 Северо-Казахстанской области по проекту "Водоснабжение сельских населенных пунктов в Республике Казахстан"  
 (Японское Агентство Международного сотрудничества)

№ п/п	Наименование работ	Годы, месяцы															
		2004 год						2005 год									
		Июнь	Июль	Август	Сентябрь	Октябрь	Ноябрь	Декабрь	Январь	Февраль	Март	Апрель	Май	Июнь	Июль	Август	Сентябрь
1	Бурение скважин																
2	Благоустройство скважин																
3	Строительство водовода																
4	Строительство линий электропередач																
5	Строительство резервуара и водораспределительного узла																
6	Реконструкция разводящей сети																
7	Гидравлическое испытание водовода																
8	Хлорирование и промывка водовода и резервуаров																

Примечание:  
 1. Общая протяженность водовода - 54900 п.м.  
 2. Общая протяженность линий электропередач - 45800 м.  
 3. Количество скважин - 17 шт.

Ориентировочная стоимость:  
 1 км. водовода 4 ~ 4,6 млн.т  
 1. км. линии электропередач 1,4 млн.т

Составил:

Ибатуллин Ш.Н.

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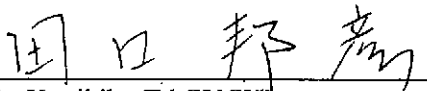
**MINUTES OF DISCUSSIONS  
ON  
THE BASIC DESIGN STUDY  
ON  
THE PROJECT FOR RURAL COMMUNITIES WATER SUPPLY IN  
THE REPUBLIC OF KAZAKHSTAN  
(EXPLANATION ON DRAFT FINAL REPORT)**

In September 2002, Japan International Cooperation Agency (hereinafter referred to as 'JICA') dispatched a Basic Design Study Team on the Project for Rural Communities Water Supply (hereinafter referred to as "the Project") to the Republic of Kazakhstan (hereinafter referred to as 'Kazakhstan'), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft final report of the study.

In order to explain and to consult with the Kazakhstan side on the contents of the draft final report, JICA sent to Kazakhstan the Draft Final Report Explanation Team (hereinafter referred to as 'the Team'), which was headed by Mr. Kuniyuko TAGUCHI, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, and is scheduled to stay in the country from June 10th to June 17th, 2003.

As a result of discussion, both parties confirmed the main items described on the attached sheets.

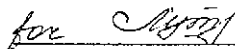
Astana, 16th June, 2003



Mr. Kuniyuko TAGUCHI  
Leader  
Basic Design Study Team  
Japan International Cooperation Agency  
Japan



Mr. Anatoliy RYABTSEV  
Chairman  
Water Resource Committee  
Ministry of Agriculture  
The Republic of Kazakhstan



Mr. Rustem N. KHAMZIN  
Director  
Department of International Financial and  
Economic Relations  
Ministry of Economy and Budget Planning  
The Republic of Kazakhstan

## ATTACHMENT

### 1. Components of the Project

The Kazakhstan side agreed and accepted in principle the components of the draft final report explained by the Team. After discussions with the Team, the Kazakhstan side confirmed the components, which will be procured under the Japanese Grant Aid listed in Annex-1.

### 2. Project Area

The requested project sites are 9 villages located in North Kazakhstan Oblast and 6 villages in Akmola Oblast as shown in Annex-2.

### 3. Responsible and Implementing Agency

The responsible and implementing Agency is the Water Resource Committee of the Ministry of Agriculture.

### 4. Japan's Grant Aid Programme

The Kazakhstan side has understood the system and characteristics of Japan's Grant Aid Programme as described by The Team shown in Annex-3.

### 5. Necessary Measures to be taken by the Kazakhstan side

Kazakhstan side will take the necessary measures, as described in Annex-4, for smooth implementation of the Project on condition that the Japanese Grant Aid is extended.

### 6. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and will send it to Kazakhstan by September 2003.

### 7. Other Relevant Issues


#### a. Role of Both Countries

Both sides confirmed that the Japanese side procures main equipment and materials necessary for water well drilling, water well, water transmission to reservoir.

The Kazakhstan side bears all construction works and other necessary equipment except above mentioned, and implements procurement and construction from reservoir to distribution system.

#### b. Project Implementation

Both sides confirmed that the Esil-su in North Kazakhstan Oblast and the Astana-su





in Akmola Oblast of state enterprises have responsibilities on construction works.

c. Ownership of Equipment

Both sides confirmed that the Water Resource Committee possesses equipment procured by Japanese side. And the Esil-su in North Kazakhstan Oblast and the Astana-su in Akmola Oblast of state enterprises make use of them in the Project.

d. Maintenance of the Water Well Drilling Equipments and water supply facilities

The Kazakhstan side has agreed to secure and allocate the necessary budget to operate and maintain the Water Well Drilling Equipments, and water supply facilities constructed by Project and in accordance with the legislation of Republic of Kazakhstan to submit the budget to the Budget Commission for consideration in the process of forming of the budget for the years of 2004-2005.

e. Soft Component

The Kazakhstan side requested the consultant services for construction plan, quality control, operation and maintenance on procured equipment as one of the components of the Grant Aid.

f. Tax Exemption

The Kazakhstan side will take necessary measures in order to ensure the tax exemption according to the procurement schedule described in Annex-5.



## Annex-2 Project Components

No.	Equipment & Materials	Main Specification and Component	Quantity	Unit
I	Water Well Drilling Rig			
1	Truck mounted drilling rig	Type: Truck mounted Drilling method : Both D.T.H. and Mud rotary drilling Drive: Top head drive Max. drilling depth in plan : 120m Max. drilling diameter : 133mm~350mm Geology : Medium~ Hard formation Truck : 4x4(P.T.O.)	2	units
2	Standard operating accessories for rig and drilling tools		2	lots
3	Truck mounted high pressure air compressor	High pressure air compressor Air delivery : $\geq 25.0\text{m}^3/\text{min}$ Pressure : $\geq 1.96\text{MPa}$ (20.0kgf/cm <sup>2</sup> ) Carrier truck Water cooled diesel engine, Max. payload : $\geq 7$ ton, All wheels drive	2	units
4	Spare parts for above	Operating periods : 2 years	2	lots
II	Supporting vehicles			
1	Cargo truck with 3 ton crane	Engine : Water cooled diesel engine Max. payload : 5.5 t, Crane capacity : 2.9 t All wheels drive	2	units
2	Water tank truck	Engine : Water cooled diesel engine Tank capacity : $\geq 3,000$ liter All wheels drive	2	units
3	Spare parts for above	Operating periods : 2 years	2	lots
III	Survey equipment			
1	GPS	Measuring items : Latitude , Longitude, Alutitude, Tolerance 15RMS	2	units
IV	Workshop equipment & tools		2	lots
1	Engine welder	Welding current: 30~280A(50Hz), Auxiliary power: AC10kVA, 380V	2	sets
2	Air compressor	Air delivery : $\geq 245$ Liters/min Pressure : $\geq 7$ kgf/cm <sup>2</sup>	2	sets
3	Battery charger	AC input: 230V DC output: 6-12V, 18-24V	2	sets
4	Hydraulic garage jack	Capacity $\geq 10$ ton	2	sets
5	Maintenance tools for vehicle	tire maintenance tool, electric tools, general tools, etc.,	2	sets
6	Spare parts for above	Operating periods : 2 years	2	sets
V	Equipment & materials for Well Construction(38 wells)			
1	Submersible motor pump	Total head : 75~125m Discharge rate : 70~420 $\text{m}^3/\text{min}$ Frequency : 50Hz、 Voltage : 3 phase, 380V Applicable for 6" & 8" casing Including power cable, con' panel, riser pipes and standard accessories	38	sites

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No.	Equipment & Materials	Main Specification and Component	Quantity	Unit
2	Casing and screen pipes	Casing pipe Steel pipe and threads and coupling Dia. : 6-5/8", 8-5/8" Screen pipe Steel pipe and threads and coupling Dia. : 6-5/8", 8-5/8" Open ratio : $\geq 5\%$ Centralizer Material : steel Applicable for 6" & 8" casing Conductor pipe Steel pipe and plane ends Dia. : 8-5/8", 10"	38	sites
3	Transmission pipe (from well to elevated water tank or reservoir)	Material : Polyethylene pipe (PE) Max. pressure : $\geq 10\text{kgf/cm}^2(0.98\text{Mpa})$ Including sluice valves, air release valves and fittings	38	sites

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## Annex-2 Project Area

Region	No.	Name of Village	No. of well
Akmola Oblast	1	Ereimentau of Ereimentau District	7
	2	Torgaisky of Ereimentau District	4
	3	Minskoye of Akkolsk District	2
	4	Iskra of Akkolsk District	2
	5	Zholymbet of Shortandinsk District	4
	6	Valikhanovo of Airtau Distret	1
North Kazakhstan Oblast	7	Korneevka of Yesilsky District	2
	8	Aksu of Shal Akin District	2
	9	Novopokrovka of Shal Akin District	1
	10	Ostagan of Shal Akin District	2
	11	Ulgy of Zhambylsky District	2
	12	Kladbinka of Zhambylsky District	2
	13	Maibalyk of Zhambylsky District	2
	14	Kirovka of Zhambylsky District	2
	15	Novoishimsky of Tselinnyy District	3
Total			38

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JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedures

(1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

(2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

(1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the

Project by the Japanese Government. The contents of the Study are as follows:

- 1) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- 2) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- 3) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- 4) Preparation of a basic design of the Project.
- 5) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

## (2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work in the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

## 3. Japan's Grant Aid Scheme

### (1) Grant Aid

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

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(2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc. are confirmed.

- (3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and a final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year by mutual agreement between the two Governments.

- (4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

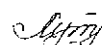
- 1) To secure land necessary for the sites of the Project, and to clear, level and reclaim the land prior to commencement of the construction.
- 2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- 3) To secure buildings prior to the procurement in case the installation of the equipment.
- 4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

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- 5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- 7) Proper Use  
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- 8) Re-export  
The products purchased under the Grant Aid should not be re-exported from the recipient country.
- 9) Banking Arrangement (B/A)
  - (a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
  - (b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.





Annex-4

MAJOR UNDERTAKING TO BE TAKEN BY EACH GOVERNMENT

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation.		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
3	To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contact such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contact		●
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities		●

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Annex-5 Procurement schedule

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Flow and Works	☆														
Cabinet decision		☆													
Exchange of Notes (E/N)				☆											
Ratification of E/N															
Consultant agreement & approved by MOFA															
Detail design study															
Preparation of Tender documents															
Tender Notice															
Tender and Tender evaluation															
Supplier agreement & approved by MOFA															
Manufacturing of equipment															
Pre-shipment inspection															
Transportation and custom Inspection															
Unloading and installation															
Training and test operation															
Completion of the Project															☆

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## **Appendix 5**

### **Geological Log at Each Village**

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.1	SWL	: m
Community	: Ereimentau	DWL	: m
District	: Ereimentau	Quantity	: l/min
Oblast	: Akmola	Drilled depth	: 80.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	4.0	4.0	Overburden		Sandy soil			
10								
20	20.0	16.0	Sandstone		Moderately weathered and slightly fractured			
30								
40	40.0	20.0	Limestone		Moderately weathered and slightly fractured			
50								
60								
70								
80	80.0	40.0	Limestone		Polus and fractured			

**PRESUMED GEOLOGICAL LOG**

Project Title		: The Project for Rural Communities Water Supply in the Republic of Kazakhstan			
Site Number	: No.2	SWL	:	m	
Community	: Turgaisky	DWL	:	m	
District	: Ereimentau	Quantity	:	l/min	
Oblast	: Akmola	Drilled depth	:	60.0 m	

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	4.0	4.0	Overburden		Sandy clay			
10						~~~~~	10	
20						~~~~~	20	
30	30.0	26.0	Claystone		Intervened sandstone layer	~~~~~	30	
40						~~~~~	40	
50						~~~~~	50	
60	60.0	30.0	Sandstone		Fractured	~~~~~	60	
70							70	
80							80	

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.3	SWL	: m
Community	: Minskoye	DWL	: m
District	: Akkol	Quantity	: l/min
Oblast	: Akmola	Drilled depth	: 60.0 m

SCALE	DEPTH	THICK-NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	1.5	1.5	Overburden	Gray	Loam and clay			
10						----		
20						----		
30	30.0	28.5	Claystone		Intervened sandstone layer	----		
40						LLL		
50						LLL		
60	60.0	30.0	Dolomite		Intervened quartz vein and fractured	LLL		
70								
80								

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.4	SWL	: m
Community	: Iskra	DWL	: m
District	: Akkol	Quantity	: l/min
Oblast	: Akmola	Drilled depth	: 60.0 m

SCALE	DEPTH	THICK-NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Gray	Clayey loam			
10						----	10	
20						----	20	
	25.0	20.0	Claystone		Intervened thin sandstone layer			
30						LLLL	30	
40						LLLL	40	
50						LLLL	50	
60	60.0	35.0	Dolomite		Intervened quartz vein and fractured	LLLL	60	
70							70	
80							80	

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.5	SWL	: m
Community	: Zholymbet	DWL	: m
District	: Shortandinsk	Quantity	: l/min
Oblast	: Akmola	Drilled depth	: 50.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	4.0	4.0	Overburden	Dark brown	Clayey and sandy soil	~ ~ ~ ~		
10						~ ~ ~ ~	10	
20						~ ~ ~ ~	20	
30						~ ~ ~ ~	30	
40	40.0	36.0	Mudstone	Dark gray	Fractured	~ ~ ~ ~	40	
50	50.0	10.0	Sandstone		Fractured		50	
60							60	
70							70	
80							80	



**PRESUMED GEOLOGICAL LOG**

Project Title : The Project for Rural Communities Water Supply in the Republic of Kazakhstan			
Site Number : No.6		SWL : m	
Community : Valikhanove		DWL : m	
District : Enbekshildersk		Quantity : l/min	
Oblast : Akmola		Drilled depth : 70.0 m	

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Gray yellow	Clay			
10								
20	19.0	14.0	Sandstone	Gray yellow	Slightly weathered Intervened gravel	†††		
30						†††		
40			Porphyrite	Gray green	Slightly fractured	†††		
50						†††		
60			Porphyrite	Gray green	Fractured	†††		
70	70.0	51.0	Porphyrite	Gray green	Fractured	†††		
80								

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.7	SWL	: 5.3 m
Community	: Korneevka	DWL	: 12.8 m
District	: Esiljskij	Quantity	: 6.1 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 70.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Dark and light brown	Humus and coarse sand	~ ~ ~ ~		
10	10.0	5.0	Clay	Light brown	Sand mixed	~ ~ ~ ~	10	
	26.0	16.0	Fine sand	Gray	Fine grained			
	28.0	2.0	Weathering crust	Dark brown				
30						~ ~ ~ ~	30	
40						~ ~ ~ ~	40	
50						~ ~ ~ ~	50	
60						~ ~ ~ ~	60	
70	70.0	42.0	Alternation of sandstone, coal slate and limestone		Fractured	~ ~ ~ ~	70	
80							80	

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No. 8 & No. 9	SWL	: 8.9 m
Community	: Aksu & Novopokrovka	DWL	: 16.8 m
District	: Shalakina	Quantity	: 4.0 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 70.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Dark brown	Humus and clay	~ ~ ~ ~		
10						~ ~ ~ ~		
	25.0	20.0	Clay	Light brown	Sand mixed	~ ~ ~ ~		
	28.0	3.0	Sand	Gray	Fine grained	~ ~ ~ ~		
30	30.0	2.0	Weathering crust	Dark brown		~ ~ ~ ~		
						~ ~ ~ ~		
40						~ ~ ~ ~		
						+++++		
						+++++		
						+++++		
						+++++		
50						~ ~ ~ ~		
						~ ~ ~ ~		
						~ ~ ~ ~		
						~ ~ ~ ~		
						+++++		
						+++++		
						+++++		
						+++++		
60						~ ~ ~ ~		
						~ ~ ~ ~		
						~ ~ ~ ~		
						~ ~ ~ ~		
70	70.0	40.0	Alternation of sandstone, slate and aleurolite		Fractured	~ ~ ~ ~		
						~ ~ ~ ~		
80								

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.10	SWL	: 5.6 m
Community	: Ostagan	DWL	: 15.2 m
District	: Shalakina	Quantity	: 5.0 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 40.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	4.5	4.5	Overburden	Dark brown	Humus and sandy clay	---		
10						---		
	28.0	23.5	Clay	Gray	Intervened sand layer	---		
30	30.0	2.0	Quartz sand	Gray				
	35.0	5.0	Sand	Gray	Medium grained	---		
40	40.0	5.0	Clay(tight)	Dark green		---		
50								
60								
70								
80								

### PRESUMED GEOLOGICAL LOG

Project Title		: The Project for Rural Communities Water Supply in the Republic of Kazakhstan	
Site Number	: No.11	SWL	: 8.0 m
Community	: Ulgy	DWL	: 14.0 m
District	: Jambiljskij	Quantity	: 5.0 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 40.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Dark brown	Humus and loam			
10						-----	10	
						-----		
20						-----	20	
						-----		
30	30.0	25.0	Clay	Gray	Intervened sand layer	-----	30	
						-----		
	35.0	5.0	Sand	Gray	Medium grained	-----		
	37.0	2.0	Clay	Green gray		-----		
40	40.0	3.0	Clay(tight)	Dark green	Hard and tight	-----	40	
50							50	
60							60	
70							70	
80							80	



**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.13	SWL	: 12.0 m
Community	: Maibalyk	DWL	: 25.0 m
District	: Jambiljiskij	Quantity	: 2.0 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 50.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Dark brown	Humus and clay			
10						~~~~		
20						~~~~		
30						~~~~		
40	40.0	35.0	Clay	Gray	Intervened sand layer			
	45.0	5.0	Sand	Gray				
	47.0	2.0	Clay	Green gray		~~~~		
50	50.0	3.0	Clay(tight)	Dark green	Hard and tight	~~~~		
60								
70								
80								

**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.14	SWL	: 3.6 m
Community	: Kirovka	DWL	: 13.4 m
District	: Jambiljskij	Quantity	: 3.0 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 45.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	4.5	4.5	Overburden	Dark brown	Humus and clay	----		
10						-----		
20						-----		
30	30.0	25.5	Clay	Gray	Intervened sand layer	-----		
40	40.0	10.0	Sand	Gray	Medium grained	-----		
	45.0	5.0	Clay(tight)	Dark green	Hard and tight	-----		
50								
60								
70								
80								



**PRESUMED GEOLOGICAL LOG**

Project Title	: The Project for Rural Communities Water Supply in the Republic of Kazakhstan		
Site Number	: No.15	SWL	: 15.3 m
Community	: Novoishimsky	DWL	: 16.8 m
District	: Tselinnuj	Quantity	: 4.6 l/sec
Oblast	: North Kazakhstan	Drilled depth	: 70.0 m

SCALE	DEPTH	THICK- NESS	GEOLOGICAL DESCRIPTION	COLOR	REMARKS	SYMBOL	CASING PROGRAM	
							GL-m	GL-m
	5.0	5.0	Overburden	Dark brown	Humus and sandy soil	~ ~ ~		
10	10.0	5.0	Clay	Light brown	Intervened sand layer	~ ~ ~	10	
	15.0	5.0	Sand	Gray	Coarse grained and gravel mixed			
20	20.0	5.0	Weathering crust	Dark brown			20	
30						~ ~ ~	30	
40						+++++	40	
50						+++++	50	
60						~ ~ ~	60	
70	70.0	50.0	Alternation of sandstone, slate and aleuralite		Fractured	+++++	70	
80							80	

## **Appendix 6**

### **Results of Test Drilling**

## 1. Location of Test Drilling

The test drilling was conducted in order to verify the possibility of underground development at the following village.

Name of village; Kladbinka Jamvill District in North Kazakhstan

## 2. Components of Test Drilling

### (1) Specification of Test Drilling Well

Main specifications of the test drilling are as follows;

#### 1) Standard Specification of Test Drilling Well

Final diameter of drilling size is 8-1/2", PVC casing and screen with internal diameter of 6" will be inserted. Drilling depth criteria is 70m.

#### 2) Geophysical Logging

After drilling at the predefined depth, the following 4 well loggings will be done and casing program will be decided taking into consideration the result of cutting sample.

Measuring items; Spontaneous, Resistivity (short and long), Natural Gamma Ray

#### 3) Casing and Screen Pipe

Casing and screen pipe inserted in the well is a steel pipe with diameter of more than 6" and pipe connection shall be screw-thread cutting.

#### 4) Gravel-packing and Cementation

Gravel-packing which grain size is 2-5 mm, for the annular space between the borehole and casing/screen pipe shall be done. Clay packing for the annular space of the upper part of gravel packing shall be done. Backfilling by the cutting slime for the annular space between the clay packing and cementation shall be done. Cementation for the annular space above the back filling of cutting slime shall be done up to the top surface.

#### 5) Pumping Test

After performing the development of a well by air-lifting, the test shall be run at least 120 hours or occasionally longer in duration followed by a recovery test.

6) Water Quality Test

Water quality test stated as the following shall be done after taking water samples.

Water Quality Test Items; pH, Turbidity, Color, Effluvium, SO<sub>4</sub>, Cl, NH<sub>4</sub>, NO<sub>3</sub>, Fe, Ca, Mg, HCO<sub>3</sub>, Hardness, Total Solid

(2) Implementation Organization

Test drilling shall be performed by the below company under controlled by the state enter prize water company Esyl Su

Name of Company; Kokshetau Hidrogiology, Inc.

(3) Drilling Test Term

November 6, 2002-December 2, 2002

3. Result of Test Drilling

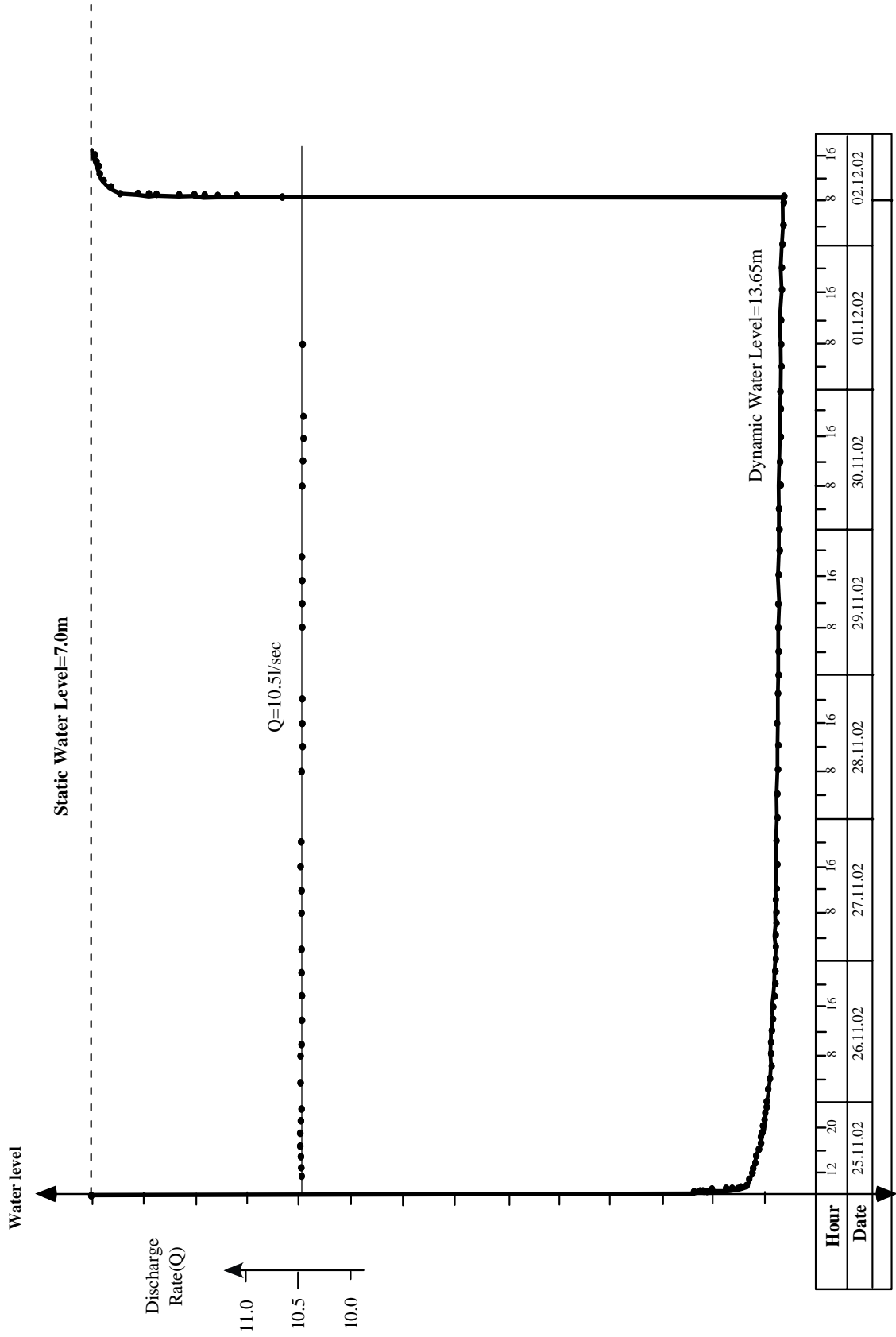
Result of test drilling is as follows.

Drilling Depth	71.5m
Size of Casing	219mm
Location of Screen	21.5~29.5m
Aquifer	Quartziferous Sand
Static Water Level	7.00m
Dynamic Water Level	13.65m
Yield	10.5l/sec (907.2m <sup>3</sup> /day)
Coefficient of Transmissibility	232.2m <sup>2</sup> /day

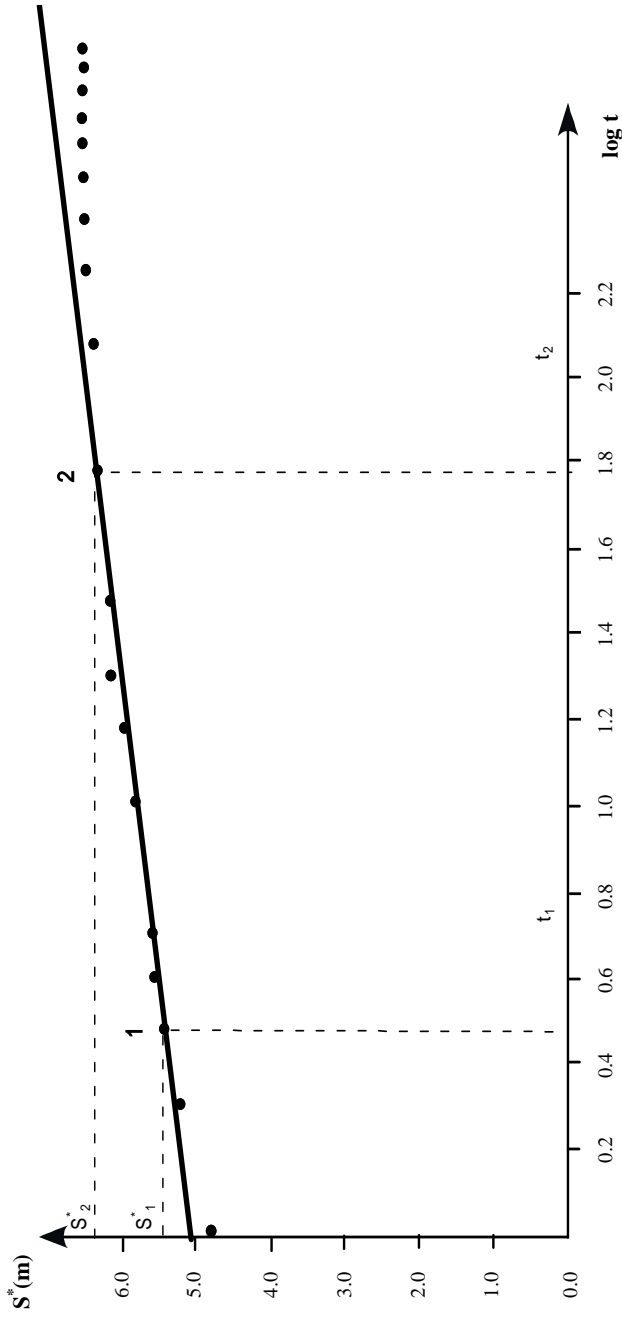
Result of pumping test and water quality analysis will be shown in end of this report. As a result of tests, it is judged that there is no problem to develop the underground water taking into consideration of quantity and quality of water since aquifer of this area is good condition.



# Constant Discharge Test



# Recovery Test



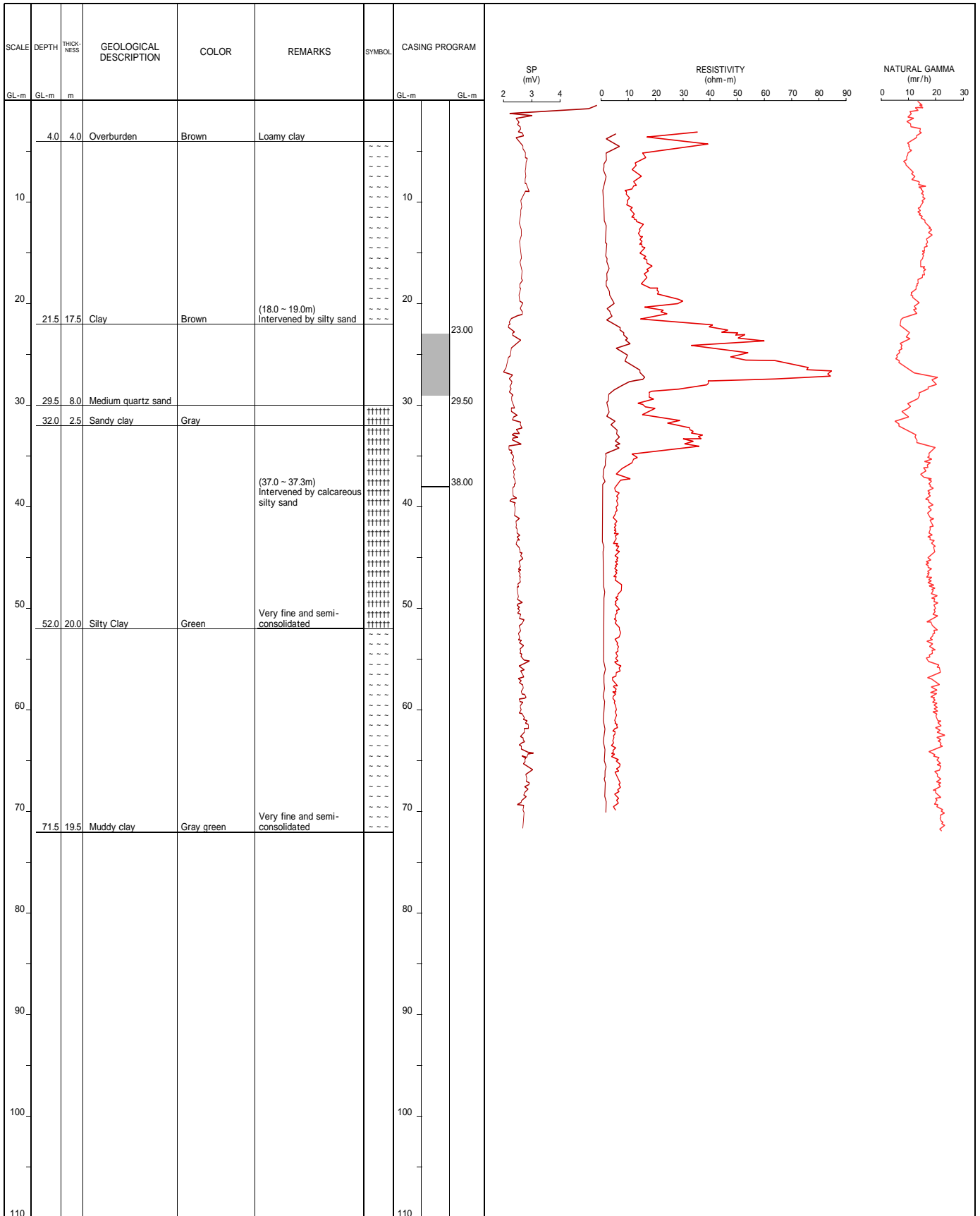
$$C = \frac{S_2^* - S_1^*}{\lg t_2 - \lg t_1} = \frac{S_2^* - S_1^*}{\lg t_2 - \lg t_1} = 0.715$$

$$T = \frac{0.183 \times Q \times 86.4}{C} = \frac{0.183 \times 10.5 \times 86.4}{0.715} = 232.2 \text{ m}^2/\text{day}$$

t (min)	log t	S*, m
1	0.00	4.85
2	0.30	5.28
3	0.48	5.47
4	0.60	5.60
5	0.70	5.69
10	1.00	5.89
15	1.18	6.07
20	1.30	6.23
30	1.48	6.24
60	1.78	6.40
120	2.08	6.49
180	2.26	6.58
240	2.36	6.60
300	2.48	6.62
360	2.56	6.63
420	2.62	6.65
480	2.68	6.65
540	2.73	6.65
600	2.78	6.65

**GEOLOGICAL AND GEOPHYSICAL LOG**

Project Title : <b>Basic Design Study on the Project for Rural Communities Water Supply in the Republic of Kazakhstan</b>		Latitude :	SWL :	7.00 m	pH :	8.1
Site Number : 12	Longitude :	DWL :	13.65 m	Temperature :	C	
Community : Kladbinka	Drilled depth : 71.50 m	Quantity :	10.50 l/sec	Conductivity :	mS/cm	
Region : Jambil'skij	Completed depth : 38.00 m	Casing height :	m	Constructed by :	Kokshetau Hydrogeology	
Completed Date : 12/02/02						





WATER QUALITY ANALYSIS DATA SHEET			
Site No.	: 12	Drilled Depth	: 71.50 (m)
Community	: Kladbinka	Completed Depth	: 38.00 (m)
Region	: Jambiljskij	Static Water Level	: 7.00 (m)
Date of Sampling	: 11/16/02	Date of Analysis	: 11/22/02

No.	Item	Value	Unit	WHO Guideline
1	pH 水素イオン濃度	8.1		-
2	Turbidity 濁度	Nil	NTU	5NTU
3	Color 色	Transparent	TCU	15TCU
4	Odor 臭気	Nil	μ S/cm	-
5	Sulphate(SO4) 硫酸塩	86	mg/l	-
6	Chloride(Cl) 塩化物	22	mg/l	250
7	Nitrate(NO3) 硝酸塩	0	mg/l	50
8	Nitrite(NO2) 亜硝酸塩	0	mg/l	3
9	Ammonium(NH4) アンモニウム	0.2	mg/l	-
10	Iron(Fe) 鉄	0.0	mg/l	0.5
11	Calcium(Ca) カルシウム	32	mg/l	-
12	Magnesium(Mg) マグネシウム	44	mg/l	-
13	HCO3 重炭酸	537	mg/l	-
14	Total Hardness 全硬度	5.5	mmol/l	-
15	Total Residue 蒸発残留物	677	mg/l	1,000
16	Total Coliform 大腸菌群	-		Undetected
17	耐熱性大腸菌	-		Undetected