ANNUAL REPORT 1985
ON
THE TECHNICAL COOPERATION
FOR THE PROJECT (RESEARCH)
ON
SEA-WATER DESALINATION TECHNOLOGY
IN
THE KINGDOM OF SAUDI ARABIA

MARCH, 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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APPENDIX

1. Outline of the Project

1.1 History

The Record of Discussion (hereinafter referred to as R/D) on this project was formally agreed on between Saline Water Conversion Corporation (hereinafter referred to as SWCC) and Japan International Cooperation Agency (hereinafter referred to as JICA) in Riyadh, January 1982. In March 1982, a Japanese technical survey team visited the Kingdom of Saudi Arabia (hereianfter referred to as the Kingdom) and had detailed discussions with SWCC officials on project implementation. In the discussions, it was agreed that the project was to get under way in June 1982.

R/D stipulates that this project will be ended on March 31, 1986. However, the implementation schedule of this project is now being fairly delayed and JICA dispatched in July 1985 its first mission for R/D modification to the Kingdom to have discussions with SWCC officials. In this discussions, the basic extension method for this project was agreed between JICA and SWCC. Following up the measures agreed on, JICA plans to send in March 1986 its second mission on R/D modification to the Kingdom. The mission members and their SWCC counterparts will be expected to sign an agreement on this project extension.

1.2 Objective

This project is intended to establish, through joint efforts of Japan and the Kingdom, the Research Center of Desalination Technology (provisional; hereinafter referred to as the Research Center) that will introduce Japanese desalination technology into the Kingdom, thereby contributing to the stable supply of water resource in the Kingdom and promoting amicable relations between the two countries.

1.3 Scope of Work

The project will span about four years starting on January 12, 1982 and ending on March 31, 1986. During the period, Japan and the Kingdom will jointly set up the Research Center in the Kingdom for joint research on seawater desalination.

The project plans to implement the following targets:

1) **Estalbishing the Research Center (in the first two years)**

(1) Setting up the laboratory building with its related facilities, and installing laboratory equipment
(2) Setting up a multi-stage flash evaporation process (hereinafter referred to as MSF) test plant (1 unit; 20 m^3/day in capacity)
(3) Setting up a reverse osmosis (hereinafter referred to as RO) test plant (2 units; 20 m^3/day in capacity)

2) **Conducting Joint Research on Seawater Desalination (in the latter two years)**

(1) Chemical study
(2) Study on technology for corrosion prevention and scale deposition control at MSF test plant
(3) Study on RO module performance test methods at RO test plant
(4) Evaluation of problems that may be or have been found in the seawater desalination plants currently operating in the Kingdom.
(5) Others

The implementation schedule of this project is now being fairly delayed. As mentioned in 1.1, an agreement on this project extension will be expected to be made in March 1986 between JICA and SWCC.

1.4 Present State

The progress of the project that got under way in 1982 is described below.

1) The Research Center

With regard to the construction of the Research Center, SWCC will take charge of all stages ranging from basic design to construction, on the basis of the conceptual design to be carried out by JICA. The conceptual design was concluded in October 1982.

However, in view of delays that came about in the implementation schedule, the JICA mission held meetings with SWCC for consultation about the construction of the building in question. In conformity with this consultation, JICA prepared basic data about the Test Plants and Laboratory equipment required for construction of the Research Center, and sent them to SWCC.

SWCC proposed in February 1984 to use an existing building as the Research Center. The JICA mission checked this building and discussed the possibility of using it with SWCC in May 1984.

On the basis of the discussion, JICA revised its conceptual design of the laboratory of which the dimensions were a little reduced compared with the former design so that the eixsting building would be used as part of the Research Center.

The JICA mission explained to SWCC the revised conceptual design in August 1984. Further, the mission explained to SWCC amended basement drawings of the Test Plants in November 1984.

Thereafter, SWCC selected a consulting firm in December 1984 to conduct detailed design for the construction of the Research Center. In March 1985, the JICA mission examined the detailed design and gave necessary advice to SWCC and the consulting firm.

The detailed design was finalized in October 1985 and SWCC called for bids to construct the Research Center and the training center. The bidding prices exceeded SWCC's original budget, making it necessary to revise the training program due to the expected reduction of the training center for budgetary reasons. SWCC is now studying measures to implement the revisions proposed. Construction of the Research Center will not start until SWCC has come up with definite measures to take.

2) Test Plants and Laboratory Equipment

The Test Plants and the laboratory equipment will be provided by JICA. The relevant specifications were drawn up in 1982.

JICA had postponed procurement of the Test Plants components and the laboratory

equipment (hereinafter referred to as the Provided Equipment) as the construction of the Research Center by SWCC was delayed. Then, with the specifications partially modified, JICA offered a tender for the Test Plants components in August 1984 and called for another tender for the laboratory equipment in November 1984. Orders for the Provided Equipment were placed with the successful bidders.

The Provided Equipment was shipped to the Yanbu of the Kingdom in May 1985. In July, JICA dispatched technical experts to the Kingdom to help SWCC inspect and store the Provided Equipment upon arrival. The Provided Equipment is now stored in SWCC's Yanbu plant.

In December 1984, the already procured laboratory equipment was reviewed for additions. It turned out that some laboratory equipment was additionally needed for future joint research. A decision was reached to add the equipment and have its detailed specifications drawn up.

2. Detailed Specifications of the Additionally Laboratory Equipment

In 1984, JICA procured MSF test plant, RO test plant components and laboratory equipment in Japan and shipped them to the SWCC plant at Yanbu in the Kingdom. They are now stored in SWCC's Yanbu plant.

Later, a review of the equipment procured in 1984 revealed the need for additional laboratory equipment for use in joint research. A decision was made to procure the additional laboratory equipment.

In 1985, the detailed specifications of the additional laboratory equipment were determined. The equipment will be procured in 1986.

The detailed specifications are listed in Appendix 2.

3. Preparation of the Master Plan for Research Institute

JICA has prepared the master plan for research institute (hereinafter referred to as Master Plan) that would serve as guidelines to let varieties of tasks proceed smoothly in both managerial and procedural terms once research activities get under way.

Research activities, as are well known, consist of numerous interrelated tasks that complement one another for effective research. As a guide to these activities, the Master Plan comprises the following:

1) Management System

- o Organization
- o Management policies
- o Office regulations and other rules

2) Budgetary and Purchasing System

3) Technical Standards

- o Operation standard
- o Working standard
- o Analysis standard
- o Safety standard

4) Research Theme

The initial draft of this Master Plan made up of about 700 pages was prepared at the beginning of March 1985. The draft will be revised as needed through the progress of the project.

4. Collection and Preparation of Technical Literature in Connection with the Japan-Saudi Seawater Desalination Technology Cooperation

4.1 Objective

Japan's seawater desalination technology based on MSF and RO techniques is among the most advanced in the world. With their competitive bidding prices for commercial plants, Japanese firms in this field have satisfied many customers in both technical and budgetary terms.

But attempts to obtain technical documents written by Japanese researchers reveal that while magazine articles and papers in Japanese regarding water desalination are numerous, there are few reports, often of lower quality, written in English. This language barrier has made it quite difficult for overseas researchers to obtain Japanese technology through literature.

In the present Japan-Saudi technical corporation, it will be very helpful for Saudi researchers to gain access to technical documents written in Japanese. To achieve this objective, experts involved in this project searched technical literautre in Japan for MSF- and RO-related articles, reports and patents, and had their abstracts prepared in English. With some analyzed results and an indexing system added, this collection of abstracts will allow Saudi researchers to see what is happening in Japan in this field of technology and to find the abstracts of articles they are looking for.

JICA plans to have the article or report, whose abstract has interested Saudi researchers, translated into English as much as possible.

4.2 Composition of Abstracts

1) Collection of Abstracts

Various literature and patent retrieval systems were used to collect relevant particles, reports and patents. Experts in various branches of the field digested these documents and prepared their abstracts.

2) **Abstract Indexing System**

A punch card-based abstract indexing system is provided for Saudi researchers to gain easy access to the abstracts.

3) **Analysis of Contents**

The contents of the indexed particles, reports and patnets were analyzed to reveal the technological trends of MSF and RO research in Japan. This effort will provide a perspective in which new directions of future research and development may be suggested in the Japan-Saudi joint project.

4) **Summary**

The analyzed contents above were compiled into a comprehensive summary.

4.3 Scope of Retrieval

A large number of items in connection with MSF and RO techniques will be searched and obtained. The detailed items are listed in Tables 4-1 and 4-2.

For chemical analysis, the techniques accompanying these items will be checked and obtained.

Table 4-1 MSF-Related Items to be checked

Item		Contents
Process		Brine circulation systems (recycling and one through types) for MSF, improved MSF process (MES, VVC), automation.
Efficiency		Distilling ratio, maximum temperature/seawater temperature
Characteristics of seawater, brine and fresh water		Physical and chemical characteristics
Economy		Cost estimation
Heat transfer	Heat rejection part	Heat flux, heat transfer coefficients inside and outside the tube, overall heat transfer coefficient, fouling factors.
	Heat recovery part	Heat flux, heat transfer coefficients inside and outside the tube, overall heat transfer coefficient, fouling factors.
	Heater	Same coefficients and factors as above in connection with both vapor and heated fluids
Structures	Intake devices	Screens, filters, chlorinators, seawater electrolysis equipment
	Tube bundles	Long tube type, short tube type, expanded tube type, baffle plate structure
	Flashing chamber	Orifice structure, demister structure and their locations of installation, countermeasures against electrolytic corrosion
	Air vent system	Air vent locations, structure and performance of ejectors
	Degassing system	Structures of deaerator and decarbonator
	Chemical injection system	Injection locations and structures of equipments to feed acids, alkalis and anti-scale chemical
	Drinking water treatment system	Structures of devices to add TDS and hardening agent to fresh water produced.
Chemical processing	Descaling techniques techniques	pH control system, operating principles and designs of chemical feeders, descaling technique
	Degassing techniques	Streamlining of deaerator and decarbonator operations
	Drinding water treatment	Mechanisms and techniques of dissolving HCO_3^-, C_a^{2+} and Mg^{2+}, their relationship with brine quality
	Anti-corrosion system	Electrical protection technique, technique to provide corrosion protective covering
	Foam inhibition	Foam inhibiting technique, processes to apply additives
Materials	Heat transfer tube	Corrosion characteristics of Cu alloy, TTH, Al alloy, etc.
	Air-phase of flashing section	Understanding of corrosive environments and field history of various materials used over time.
	Liquid-phase of flashing section	Understanding of corrosive environments and field history of various materials used over time.
	Internal structures	Materials of orifices and demisters and their relationship with shell material quality
Instrumentation	Process instruments	Control sequence
	Monitoring instruments	Locations of instruments for plant operation control
Maintenance	Anti-corrosion control	Selection of optimum materials and their relevant anti-corrosion countermeasures, monitoring equipment
	Chemical control	Analysis of various chemicals under MSF environment
	Repairing	Methods for repairing corroded parts
	Shell preservation	Charging of nitrogen gas, washing by fresh water
Environmental protection		Contamination by discharged seawater
Others		

Table 4-2 RO-Related Items to be checked

Item		Contents
Process		Combination with other techniques (density difference, electrolysis, ion exchange), combination of elements (single-stage and multi-stage desalination)
Characteristics of seawater, brine and fresh water		Physical and chemical characteristics
Economy		Cost estimation
Permeability	Salt permeability	Solute removal rate
	Water permeability	Flux
Auxiliary facilities	Intake equipment	Screens, filters, chlorinators, seawater electrolysis
	Pretreatment equipment	Flocculators, sand filter, UF membranes, cartridge filters, deoxidation devices
	Equipment	High pressure pumps, turbines
	Piping	Materials
	Chemical injection system	Injection locations and structures of equipments to feed acids, alkalis and anti-scale chemical
Chemical processing	Descaling techniques	Sterilization technique, operating principles and design of chemical feeders, washing technique
	Chemicals, etc.	Oxygen scavenger, membrane treatment agents
	Drinking water treatment	After treatment of produced water
Membrane modules	Modules	Spiral, hollow fiber, etc. (shape)
	Membrane materials	Field history of CA membrane, compound membranes, etc. used over time.
Instrumentation	Process instruments	Control sequence
	Monitoring instruments	Locations of instruments for plant operation control
Maintenance	Chemical control	Analysis of various chemical species and microorganisms under RO environment
	Storage of membrane modules	Storage by formalin, etc.
Environmental protection		Contamination by discharged seawater
Others		

5. JICA Mission to Assist the Provided Equipment Storage

5.1 Objective

The objective of this JICA mission was followings:

1) To help SWCC inspect the Provided Equipment for acceptance on arrival in the Kingdom from Japan.
2) To repack the Provided Equipment using metal containers after inspection.
3) To advise SWCC on storing the Provided Equipment.

5.2 Member and Itinerary of the Mission

1) Member of the Mission

TAKEO SAKAMOTO	Leader	Consulting Engineer
YASUO MORIYA	Repacking	Consulting Engineer
YOSHIHIKO KONISHI	Inspection & Storage	Consulting Engineer

2) Itinerary of the Mission

July 11	(Thu.)	Leaves Tokyo and Arrives at Bangkok.
12	(Fri.)	Stays overnight at Bangkok because of plane trouble.
13	(Sat.)	Leaves Bangkok and arrives at Yanbu via Riyadh and Jeddah.
14	(Sun.)	Greeting to Mr. Darwish, Manager at SWCC's Yanbu plant, and meets SWCC officials.
15	(Mon.)	Assists customs officials in inspecting the Provided Equipment for entry into the Kingdom.
16	(Tue.)	Assists SWCC officials in inspecting the Provided Equipment for acceptance.
17	(Wed.)	Assists SWCC officials in inspecting the Provided Equipment for acceptance, and in repacking the equipment.
18	(Thu.)	Assists SWCC officials in inspecting the Provided Equipment for acceptance, and in repacking the equipment.

19	(Fri.)	Holds discussions among mission members.
20	(Sat.)	Assists SWCC officials in inspecting the Provided Equipment for acceptance, and in repacking the equipment.
21	(Sun.)	– do –
22	(Mon.)	– do –
23	(Tue.)	Prepares and signs a minutes regarding the acceptance inspection, storage locations and other relevant matters.
24	(Wed.)	Greeting to Mr. Darwish, Manager at SWCC's Yanbu plant, and checks the planned locations for researchers' living quaters. Leaves Yanbu and arrives at Riyadh.
25	(Thu.)	Greeting to the Manager of JICA's Riyadh office and reports on the result of the acceptance inspection.
26	(Fri.)	Report to JICA on the result of the acceptance inspection.
27	(Sat.)	Greeting to the Deputy Governor and Research Division Manager of SWCC. Leaves Riyadh.
28	(Sun.)	Arrives at Bangkok.
29	(Mon.)	Leaves Bangkok and arrives at Tokyo.

5.3 **Meeting Member**

1) **SWCC (Riyadh)**

Dr. ABDULLAH AL-HUSSAYEN	Deputy Governor for Operation & Maintenance
Mr. ABDULLAH AL-AZZAZ	Acting Director General of Research and Technical Affairs

2) **SWCC (Yanbu)**

Mr. NAJI A. DARWISH	Plant Manager
Mr. AWAD A.R. AL-HARBI	Efficiency Engineer
Mr. HABEEB MOHAMMED	Technical Advisor of Research and Technical Affairs

5.4 Results of Inspecting the Provided Equipment

1) Inspection by Customs Officials

The Provided Equipment was inspected by customs officials on the premises of SWCC's Yanbu plant. Randomly selected packages were opened and inspected. The inspection was completed without any irregularities pointed out by the customs officials.

2) Acceptance Inspection

All the Provided Equipment was inspected in the presence of JICA and SWCC officials. The results were as follows:

(1) Equipment that rusted considerably under moisture and was incapable of performing its function

Package No.	Tag No.	Equipment name	Purchase price (yen)
L(B)-2	LB1-14-1	Precision cutter	¥2,000,000

(2) Equipment that rusted and molded under moisture and whose function could not be checked until powered.

Package No.	Tag No.	Equipment name	Purchase price (yen)
L(A)-7	LA1-4-1–4	Conductivity meter and spares	¥670,000
	LA1-5-1–11	pH meter and spares	¥580,000
	LA1-7-1	Residual chlorine meter	¥10,000
	LA1-8-1	Potable water analysis kit	¥1,210,000
	LA1-9-1-1–2	Scale deposition testing equipment and spares	¥3,520,000
	LA1-11-1–13	Oil concentent determination app. with its standard and optional accessories and spares	¥840,000

	LA1-12-1	DO meter	¥190,000
	LA1-13-1–6	ORP meter and optional accessories and spares	¥230,000
	LA1-14-1–3	Microbiological examination kit and optional accessories	¥40,000
L(B)-2	LB1-9-1	Mounting press*	¥970,000
	LB1-10-7–9	Wet grinder and polisher and spares*	¥4,800,000

* Not applicable to insurance coverage.

(3) Equipment whose tag number failed to match the packing list

Package No.	Tag No.	Equipment name
L(A)-5	LA1-3-1–8	X-ray diffractometer

(4) Missing equipment (listed in the packing list but not found)

Refer to Appendix 1.1.

3) State of the Defective Provided Equipment on Unpacking

(1) Common conditions

(a) Equipment with package No. L(B)-2 and L(A)-7 bore large quantities of moisture. The cushioning material, apparently of polyrethane chips, bore water which was felt when touched.

(b) Moistureproof packages did not maintain a vacuum state but no damage was found inside.

(c) Paper containers such as cartons lost their strength after being subjected to moisture.

(2) Individual conditions

(a) Precision cutter (Tag No. LB1-14-1)
Water was trapped all over the cutter top designed to fine-adjust the position of the sample to be cut. This resulted in the reddish rust on the chrome plating.

(b) Scale deposition testing kit and spares (Tag No. LA1-9-1 ~ 2)
The entire surface of the equipment was covered with water. Considerable quantities of water were also felt in the packing materials. Although there was little rust observed, a motor fault was suspected.

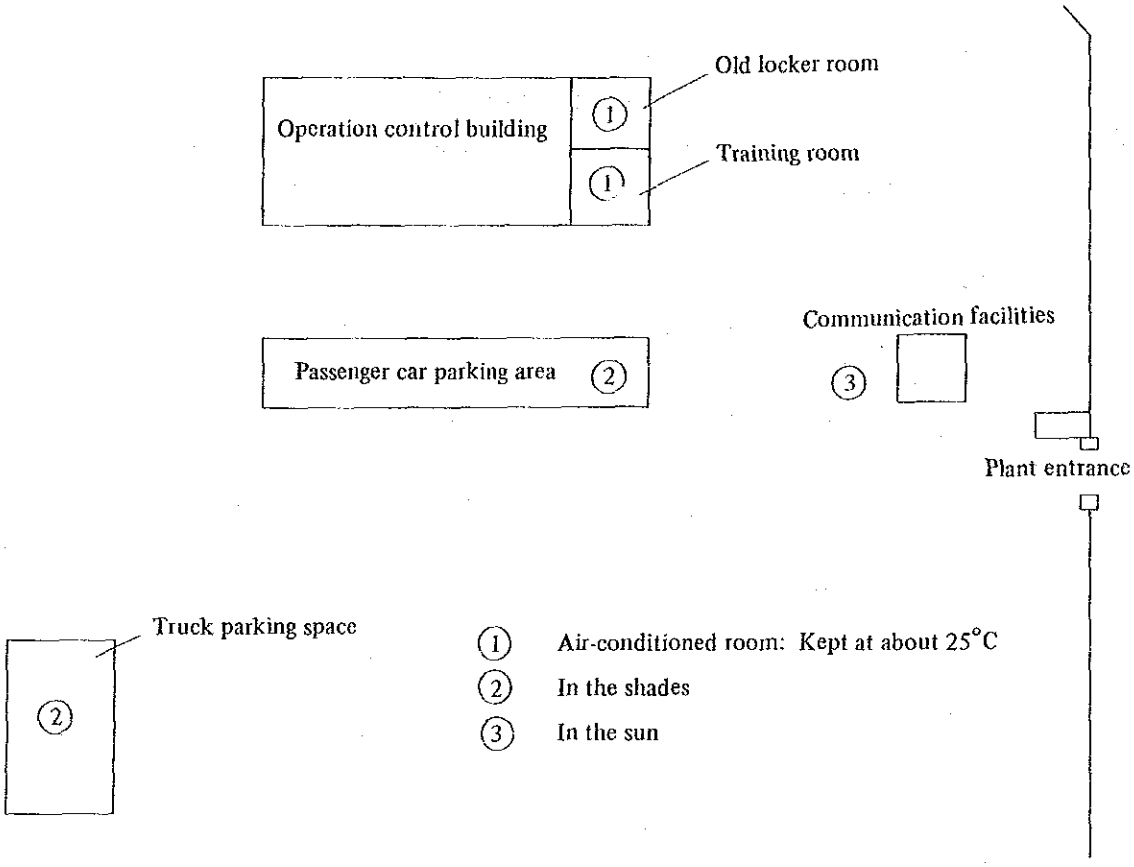
(c) pH meter, conductivity meter and other potential measuring instruments
- o All the cables were covered with mold.
- o Receptable plugs were filled with mold inside.
- o The labels on the containers of electrolyte and standard buffer solution molded but the contents were apparently normal.
- o Paper containers lost their strength after being subjected to moisture.

(d) Residual chlorine meter (Tag No. LA1-7-1)
The mold that appeared on the surface was expected to make color comparisons difficult.

5.5 Storage Condition of the Provided Equipment

1) Locations of Storage

All the Provided Equipment was stored on the premises of SWCC's Yanbu plant at the locations shown below.



Power generation and Seawater desalination plant

2) Storage Arrangements

(1) Air-conditioned Room

Precision instruments (precision scale, X-ray diffractometer, infrared spectrophotometer, etc.), electrical appliances (pH meter, DO meter, etc.), membranes, chemicals in bags (SBS, sodium hexametaphoshate, etc.)

(2) In the Shades

Non-precision instruments (lathe, cutters, tools, etc.), RO test plant, instrument panel, boiler, chemicals in drums.

(3) In the Sun

MSF test plant and its components (heat insulating materials, vinyl chloride resin flanges, gaskets, etc.)

3) **Storage Condition**

All the devices and components except for the MSF test plant, RO test plant, boiler and instrument panel were placed in metal containers for storage. The containers in the air-conditioned room were kept in a tier. Dust covers are expected to be placed over the components in crates.

There is no fear of having the stored equipment stolen from the plant premises which are placed under heavy security. Overall, the storage status is excellent.

5.6 Measures to Remedy the Defective Equipment

1) **Damaged or Probably Damaged Equipment**

Claims are to be lodged with the underwriters.

2) **Components with Their Tag Numbers not matched with the Packing List**

The tag stubs are to be refcrenced to prepare a new list which dispatched researchers will bring for checkups.

3) **Missing Equipment**

The manufacturers are to be asked to prepare price lists. The price lists will serve as the basis on which to lodge claims with the underwriters. It might be possible, with SWCC's approval, to remove the devices below (components of electron probe micro analyzer) from the missing equipment list if the manufacturer issues a certificate.*

Package No.	Tag No.	Equipment name
L(A)-2	1.26.110 1.26.120	Display console CRT unit

* A certificate with an officially attested photograph of the true equipment shown with its correct list number.

6. First Mission for Modification of Record of Discussion (R/D)

6.1 Mission Guidelines

The Resources Division in charge of research and the Overseas Center Division in charge of training decided to dispatch a coordination mission to the Kingdom in connection with the Saudi Arabia seawater desalination cooperation project. In July 18, 1985, the Divisions drafted and decided on the "guidelines for the mission to coordinate the Japan – Saudi Arabia seawater desalination technical cooperation project (for both research and training)" through consultation with representatives from the Technical Cooperation Division and Development Cooperation Division of the Ministry of Foreign Affairs, the Technical Cooperation Division of Ministry of International Trade and Industry, and the International Cooperation Division of the Ministry of Labor.

The history and the contents of the guidelines are described below.

1) History

The R/D (signed on Jan. 12, 1982) stipulated that the Japan – Saudi seawater desalination technology cooperation is conducted between 1982 and March 31, 1986. Later, the research and training activities scheduled originally to start at the beginning of 1984 were changed to start in May and August 1986 respectively in order to modify the planning and prolong the detailed design of the research and training buildings by SWCC. (minutes dated Mar. 13, 1985)

Most of the equipment for research part has been sent to the Kingdom. Five Japanese researchers will now be selected and two years' research schedule will be drafted.

For training part, another mission will be sent to the Kingdom after this mission, followed by the purchase and shipping of necessary equipment and the dispatching of experts.

2) Items to be discussed

(1) Items Common to Research and Training

(a) Discussion over R/D extension
(b) Discussion over the dispatching of JTT (joint technical team) personnel
(c) Assignment of Saudi counterparts (researchers and instructors)

(2) Items in Connection with Research Part

(a) Verification of stored Provided Equipment for conditions
(b) Discussion over the Saudi accommodations regarding the dispatching of Mr. Sakamoto

(3) Items in Connection with Training Part

(a) Explanation of the specifications of the provided equipment for training
(b) Discussiion over the master plan (M/P) and temporary schedule of implementation (TSI)
(c) Discussion over the demarcation on the provided equipment
(d) Discussion over the demarcation in connection with the installation of the provided equipment
(e) Discussion over the sources from which SWCC procures equipment

3) **Member of the Mission**

(1) Research Part

HARUO SUZUKI	Leader	JICA, Head of Natural Resources Div.
HIDEKI NAKAMURA	Technical Cooperation	Ministry of International Trade and Industry, Industrial Water Div.
KATSUHIKO OZAWA	Management	JICA, Natural Resources Div.

(2) Training Part

HIDETOSHI YAOI	Leader	JICA, Head of Overseas Center Div.

KOUICHI IGARASHI	Training Plan	Ministry of Labour, Deputy Director of Overseas Cooperation Div.
KAZUAKI HAYASHI	Management	JICA, Overseas Center Div.
KEIZO ORIHASHI	Equipment	Consulting Engineer

4) Guidelines

[Items Common to Both of Research Part and Training Part]

(1) Discussion on R/D Extension

As set forth under Article 15 of the R/D, which expires on March 31, 1986, SWCC officials and their Japanese counterparts will exchange minutes of meeting (M/M) this fall on (1) the extension of the R/D and (2) the definition of some abiguous items in the R/D as well as undefined items in connection with research and training activities.

(2) Discussion on the Dispatching of JTT Personnel

(a) Of two JTT members urgently requested by SWCC to be dispatched, Mr. Sakamoto of the Water Re-use Promotion Center will be dispatched this fall for a long-term stay in the Kingdom to assist research activities if the requests for Japanese researchers' accommodations during their stay in the Kingdom, submitted by this mission, are approved by SWCC.

(b) For training, JTT members also serving as team leaders will be dispatched. Although the current R/D specifies that one chief representative is to be dispatched, two persons will be sent to the Kingdom to provide for new developments since the signing of the R/D.

(3) Assignment of Saudi Counterparts

(a) For research activities, both JICA (and JTT) and SWCC will assign their researchers earlier this year. Discussions will be held as to how to conduct

research based on the "research implementation schedule" submitted by JICA in January 1986.

(b) For training activities, both sides will discuss the assignment of Saudi researchers based on the M/P and TSI (separately discussed).

[Items in Connection with Research]

(4) Verification of the Provided Equipment for storage conditions

The Provided Equipment shipped and now in SWCC's custody will be checked for storage conditions.

(5) Discussion Over the Accommodations to be provided by SWCC for Mr. Sakamoto.

The document shown below was submitted to SWCC for approval.

Conditions of Dispatching a Member of the Joint Technical Team (JTT) from JICA to SWCC

In connection with dispatching a member of JTT to SWCC, JICA requests to SWCC to take the following measures until the both parties agree to the definition and function of JTT, and the comprehensive conditions for Japanese members (JTT members, researchers, engineers, and instructors) of the Project:

1) Providing suitable accommodation in Riyadh, as the main working place will be Riyadh until the completion of the laboratory building;
2) Providing a car with a driver for official use;
3) Providing free medical treatment, hospitalization, and medicine when necessary;
4) Bearing the internal travel expenses;
5) Free use of office supplies, copying machine, telex, facsimile, telephone, and other SWCC's facilities by the Japanese member;
6) Assigning a member (members) of JTT for the Project from SWCC side.

[Items in Connection with Training]

(6) Explanation of the Specifications of the Provided Equipment for Training.

Any of the specifications of the provided equipment shipped for training will be explained if so requested by SWCC.

(7) Discussion Over M/P, TSI, etc.

Discussions will be held with SWCC over the M/P, TSI and other issues necessary for the cooperation project provided that the term of the R/D will be extended as planned.

(8) Discussion Over Demarcation of the Provided Equipment

This issue was presented to SWCC by the Japanese mission sent this May. After SWCC asked the mission to present the approximate estimates on CIF terms of the training course-wise equipment, this issue remains undecided. It will likely be agreed that the equipment for the four maintenance courses is to be provided by JICA, and that for the three operation courses along with audio-visual equipment by SWCC. The approximate estimates of the course-wise equipment will be presented after being signed by the mission leader.

(9) Discussion Over the Demarcation of the Provided Equipment for Installation

It will kikely be agreed that JICA will dispatch a technical adviser and SWCC will provide field supervisers, technicians, workers, transportation vehicles, cranes and other necessary devices, for installation of the provided equipment in the field.

(10) Discussion on the Sources from which SWCC Procures Equipment

It is most effective for Saudi trainees training in Japan to work at the manufacturer that supplies the equipment. Experts to be dispatched from Japan will also be able to show trainees most effectively how to operate the equipment if the equipment was manufacturered in Japan. In view of these benefits expected from the

use of devices of Japanese origin, it will be proposed and hopefully agreed that major devices will be imported from Japan.

[Preparation of the Minutes]

(11) Within the scope outlined above, the minutes of the discussions will be prepared and minutes of meeting based on the minutes will be signed by both parties.

6.2 Itinerary of the Mission

July	25	(Thu.)	Leaves Tokyo (18:00; XC-505, CX-201, SV-201)
	26	(Fri.)	Arrives at Riyadh (11:55), Holds discussions with the Manager of JICA's Riyadh office and with Mr. Hattori, secretary to the Embassy of Japan.
	27	(Sat.)	Greeting to Dr. Abdullah Al-Hussayen, Deputy Governor for the Operation and Maintenance at SWCC, and holds a general meeting will SWCC officials.
	28	(Sun.)	Holds a general meeting and detailed discussions with SWCC officials.
	29	(Mon.)	Goes on an inspection tour to the Yanbu plant (for research and training) and other facilities.
	30	(Tues.)	Holds discussions with SWCC officials (for training). (The Training Division is moved from Yanbu to Riyadh.)
	31	(Wed.)	Holds a general meeting and detailed discussions with SWCC officials. Signs the minutes.
August	1	(Thu.)	Reports the results of the discussions and meetings to the Embassy of Japan and JICA's Riyadh office.
	2	(Fri.)	Leaves Riyadh (8:50; SV-200, XC-200, XC-504)

3 (Sat.) Arrives at Tokyo.

6.3 Contents of the Discussions

On arrival in the Kingdom, the mission members paid a courtesy call to Dr. Abdullah Al-Hussayen, Deputy Governor for the Operation and Maintenance at SWCC, and had discussions with Mr. Abdullah Al-Azzaz, Director-General for the Research and Technical Affairs and other officials at SWCC. Because the Director-Generator for the Training unexpectedly passed away soon after the arrival of the mission in the Kingdom, Mr. Abdullah Al-Azzaz took charge of both research and training activities and held talks with the mission in that capacity.

The results of the discussions over individual items are described below.

1) Extension of the Term of R/D

The mission raised a question of possible R/D extension in line with the guidelines it had prepared, and explained the proposal. In response, SWCC asked the mission to present the guidelines in writing. After the guidelines were presented in writing (Appendix 1), talks led to an agreement that would allow another Japanese mission to visit the Kingdom around November this year for discussion over R/D extension.

2) Dispatching of Joint Technical Team (JTT) Personnel

(1) The accommodations for Mr. Sakamoto to stay in the Kingdom were approved by SWCC as proposed by the mission except for a few details. These details, including the payment of staying expenses (mostly rent) will have to be discussed on a continuous basis in line with SWCC regulations.

SWCC promised to assign Mr. Sakamoto's counterpart by the end of this year.

(2) SWCC approved the Japanese proposal that the JTT would consist, from the Japanese side, of one researcher and one trainer. (The staff makeup including these members is attached to the minutes.)

3) **Assignment of Saudi Counterparts**

(1) For Research

SWCC and the mission agreed that earlier this year, researchers (including those of JTT) from both sides would be assigned, and that discussions would be held over how to conduct research based on the "research plan" to be presented by JICA in January 1986.

(2) For Training

The counterparts of the Japanese personnel will be assigned according to the plan attached to the minutes. The detailed assignments are as follows:

	Maintenance course	Operation course
Chief instructor	1	1
Instructors	4	3
Assistant instructors	12	6
Total	17	10

The counterpart of the team leader to be dispatched first will be the Manager of the Training Center, who will be officially assigned on January 1, 1986.

It was also agreed that the chief instructor and instructors would be assigned around August 1986, when the Japanese experts other than the team leader will be dispatched to the Kingdom.

4) **Verification of the Provided Equipment for Storage Condition**

The mission verified that the provided equipment was stored in good condition at the Yanbu plant, and promised to supply the missing components as soon as possible. (Claims will be lodged with the underwriters when necessary.)

5) **Explanation of the Specifications of the Provided Equipment for Training**

Two sets of the specifications and drawings of the equipment along with a letter (Appendix II) were presented to SWCC. The mission was asked several questions about some quantities, qualities and ratings involved during discussions. It was agreed that SWCC would present its comment on the specifications to JICA via the JICA office in Riyadh within three months.

6) **M/P and TSI (for training)**

Japanese drafts of the M/P (Master plan) and TSI (temporary schedule of implementation) were explained to SWCC. The drafts were approved after the following changes were made:

(1) Trainees' Eligibility for Enrollment

Trainees for both maintenance and operation courses must be high school graduates.

(2) Acceptance of Saudi Counterparts

The stipulated counterpart trainees (9 instructors) will together be accepted into Japan for six months' training starting in April 1986.

(3) Opening of the Course

In view of the fact that construction of the building is about one month behind schedule at present, the courses are scheduled to be opened on February 1, 1987.

(4) Development of the Curriculum and Teaching Materials

JICA will begin drafting the curriculum and teaching materials in October 1985. The drafts will be completed in November 1986. (SWCC will translate the drafts into Arabic.)

7) **Demarcation of the Provided Equipment (for training)**

The draft of demarcation previously discussed between SWCC and JICA was presented in writing (Appendix III), and was approved in principle. SWCC's comment is awaited

before the draft can be finalized.

8) Sources from which SWCC Procures Equipment (for training)

The mission presented to SWCC the "list of the equipment to be purchased from Japan" and explained why procuring the equipment from Japan was desirable. Although SWCC understood the basic necessity for such a scheme, it cited considerable difficulty involved in executing the plan. An agreement was yet to be reached over this issue.

SWCC in its turn presented a proposal that would require JICA to procure all the equipment including the devices SWCC was expected to provide. But no conclusion was reached on this issue as well, and the mission brought the proposal back to Japan for further study.

6.4 Meeting Member

1) SWCC (Riyadh)

Dr. ABDULLAH AL-HUSSAYEN	Deputy Governor for Operation & Maintenance
Mr. ABDULLAH A. AL-AZZAZ	Acting Director General of Research and Technical Affairs
Mr. MOFLIH AL-SHIFATRA	Specialist for Training
Mr. HABBIB MOHAMMED	Technical Advisor of Research and Technical Affairs

2) SWCC (Yanbu)

Mr. NAJI A. DARWISH	Plant Manager
Mr. ABDUL IBRAHIN DABBOUR	Assistant Plant Manager
Mr. AWAD R. AL-HARBI	Engineer

3) Japanese Residents

Mr. KAORU HATTORI	Embassy of Japan, First Secretary of Commercial & Finicial
Mr. TAKANORI ZIBIKI	JICA, Manager of Riyadh Office

APPENDIX-I

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

P. O. BOX 216 MITSUI BLDG
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO
160 JAPAN

July 31, 1985

H.E. Dr. Shaikh Abdullah M. Al-Gholaikah

Governor
Saline Water Conversion Corporation
Riyadh
The Kingdom of Saudi Arabia

Sub: Extention of Term of Cooperation and Formation of Joint Technical Team(JTT)

Dear Sir,

It is our great pleasure to have an opportunity for staying in Riyadh and to have fruitful talks with SWCC. Taking this opportunity, we would like to propose in connection with the Sea Water Desalination Project as follows:

In order to comply with the present schedule of the Project, which was proposed by SWCC in APPENDIX-2 of Minites of Meeting on 13th of March, 1985, JICA and SWCC will extend the Term of Cooperation by relevant time length for Research and Training respectively. The new Term of Cooperation shall be determined by November of this year in the manner that is stipulated in Article 15 of Record of Discussions(12th January, 1982):

With regard to the staffing of the Joint Technical Team(JTT), JICA forms the team as shown in the attached paper.

Your prompt reply to the above proposals and further cooperation are highly appreciated.

Sincerely Yours,

Haruo SUZUKI
Leader
JICA Mission for
the Technical Cooperation
for the Project on
Sea Water Desalination
Technology

c.c Mr. Hattori
First Secretary
Embassy of Japan

Mr. Jibiki
JICA Riyadh Office

APPENDIX - II

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

P. O. BOX 216 MITSUI BLDG
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO
160 JAPAN

July 27, 1985

Dr. Shaikh Abdullah M. Al-Gholaikah
Governor
Saline Water Conversion Corporation
Riyadh
The Kingdom of Saudi Arabia

Ref: Submission of the course-wise estimated price list of the training equipment according to the training courses

Dear Dr. Al-Gholaikah,

It is pleased to submit the course-wise estimated price list of training equipment herewith. References to sources, for your information, the prices of equipment are made on the basis of the ex-godown Yokohama Japan and Exchange rate of Yen is ¥230 as per one US$.

In addition to this, the total price is compiled with ex-godown price, shipping charge, insurance charge and ocean freight charge to Yanbu Saudi Arabia.

Sincerely yours,

Hidetoshi YAOI
Leader (Training Sector)
JICA Mission for
the Technical Cooperation for
the Project on
Sea Water Desalination Technology

- Course-wise Summary of Estimated Price

Basis of Estimation : Ex-Godown, Yokohama, JAPAN

Unit : US$

Ex. Rate : ¥230/US$

CODE	Concerned Course	Estimated Price	Remarks
SW-1	Mechanical Maintenance	226,509	
SW-2	Piping Maintenance	214,126	
SW-3	Electrical Maintenance	182,800	
SW-4	Instrumentation Maintenance	314,800	
Sub-Total		938,235	
SW-5	Plant Operation	496,174	Mini Plant A, B
SW-6	Plant Operation	278,878	Plant Simulator
SW-7	Plant Operation	242,735	
SW-8	Audio-Visual Aids	128,000	Common for all courses
Sub-Total		1,145,787	
Grand Total		2,084,022	

Attachment－1

Item	Unit	SW－1	SW－2	SW－3	SW－4	SW－5	SW－6	SW－7	SW－8	Total
Ex－Godown Price	US$	226,509	214,126	182,800	314,800	496,174	278,878	242,735	128,000	2,084,022
Packing Charge	〃	－	－	－	－	－	－	－	－	
Shipping Charge	〃	2,139	1,826	1,826	1,826	8,522	130	3,443	783	18,495
(Approx. Gross Weight)	(WT.)	(20.14)	(18.27)	(14.27)	(8.52)	(20.12)	(1.2)	(1.5)	(4.8)	(88.82
(Approx. Gross Measurement)	(m³)	(123)	(105)	(105)	(105)	(375)	(7,5)	(193)	(45)	(1058,5
FOB JAPAN	US$	228,648	215,952	184,626	316,626	502,696	279,008	246,178	128,783	2,102,517
Estimated Insurance	〃	1,874	1,757	1,521	2,513	4,261	2,104	2,104	1,026	17,161
Estimated Ocean Freight	〃	21,391	18,261	18,261	18,261	65,217	1,305	33,566	7,826	184,957
Estimated CIF YANBU	〃	251,913	235,970	204,408	337,400	572,174	282,417	281,848	137,635	2,303,765

Note 1) Estimated Unit Rate : US$174/m³ Ocean Freight

2) Packing Charge is included in Ex－Godown Price

3) Exchange Rate : ¥230/US$

APPENDIX-III

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

P. O. BOX 216 MITSUI BLDG
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO
160 JAPAN

July 31, 1985

HE. Dr. Shaikh Abdullah M. Al-Gholaikah

Governor
Saline Water Conversion Corporation
Riyadh
The Kingdom of Saudi Arabia

Ref: Submission of proposal of the demarcation of training equipment and demarcation of equipment installation between JICA and SWCC

Excellency Dr. Al-Gholaikah,

It is pleased to submit a proposal of demarcation of training equipment provision and demarcation of equipment installation between JICA and SWCC.

Regarding to demarcation of training equipment, the followings are proposed between JICA and SWCC;

JICA provides the equipments of courses for mechanical maintenance, piping maintenance, electrical maintenance and instrumentation maintenance with the amount of US Dollars nine hundred and thirty eight thousand two hundred and thirty five (938,235.-) as shown in the attached paper.

SWCC provides the equipments of the courses for plant operation and audio visual aids with the amount of US Dollars one million one hundred forty five thousand seven hundred eighty seven (1,145,787.-) as shown in the attached paper.

- 1 -

Regarding

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

P.O.BOX 216 MITSUI BLDG
2-1, NISHI-SHINJUKU, SHINJUKU-KU TOKYO
160 JAPAN

Regarding to the installation of the equipment into the training center, it is proposed that JICA shall dispatch technical advisors, and that SWCC shall bear the other installation expences such as workers, vehicles and installation machines.

Sincerely Yours,

Hidetoshi YAOI
Leader (Training Sector)
JICA Mission for
the Technical Cooperation for
the Project on
Sea Water Desalination Technology

c.c. Mr. Hattori
First Secretary
Embassy of Japan

Mr. Jibiki
JICA Riyadh Office

Demarcation of training equipment provision

between JICA and SWCC

(Basis of estimation: Ex-godown, Yokohama Japan)

Unit : US$

Ex. Rate : ¥230/US$

CODE	Concerned Course	Estimated Price	Demarcation
SW-1	Mechanical Maintenance	226,509	JICA
SW-2	Piping Maintenance	214,126	JICA
SW-3	Electrical Maintenance	182,800	JICA
SW-4	Instrumentation Maintenance	314,800	JICA
Sub-Total		938,235	JICA
SW-5	Plant Operation	496,174	SWCC
SW-6	Plant Operation	278,878	SWCC
SW-7	Plant Operation	242,735	SWCC
SW-8	Audio-Visual Aids	128,000	SWCC
Sub-Total		1,145,787	SWCC
Grand Total		2,084,022	

(Attached Paper)

Detailed table of demarcation of training equipment provision

Between JICA and SWCC

Item	Unit	SW－1	SW－2	SW－3	SW－4	SW－5	SW－6	SW－7	SW－8	Total
Ex－Godown Price	US$	226,509	214,126	182,800	314,800	496,174	278,878	242,735	128,000	2,084,022
Packing Charge	〃	—	—	—	—	—	—	—	—	
Shipping Charge	〃	2,139	1,826	1,826	1,826	6,522	130	3,443	783	18,495
(Approx. Gross Weight)	(WT.)	(20.14)	(18.27)	(14.27)	(8.52)	(20.12)	(1.2)	(1.5)	(4.8)	(88.82
(Approx. Gross Measurement)	(m³)	(123)	(105)	(105)	(105)	(375)	(7,5)	(193)	(45)	(1058,5
FOB JAPAN	US$	228,648	215,952	184,626	316,626	502,696	279,008	246,178	128,783	2,102,517
Estimated Insurance	〃	1,874	1,757	1,521	2,513	4,261	2,104	2,104	1,026	17,161
Estimated Ocean Freight	〃	21,391	18,281	18,261	18,261	65,217	1,305	33,566	7,826	184,957
Estimated CIF YANBU	〃	251,913	235,970	204,408	337,400	572,174	282,417	281,848	137,635	2,303,765
Demarcation		JICA	JICA	JICA	JICA	SWCC	SWCC	SWCC	SWCC	

Note 1) Estimated Unit Rate : US$174/m³ Ocean Freight

2) Packing Charge is included in Ex－Godown Price

3) Exchange Rate : ¥230/US$

APPENDIX

1. Minutes of Meeting

   1.1 JICA Mission to Assist the Provided Equipment Storage

   1.2 First Mission for Modification of Record of Discussion (R/D)

2. List of Additional Laboratory Equipment

1. MINUTES OF MEETING

1.1 JICA Mission to Assist the Provided Equipment Storage

1.2 First Mission for Modification of Record of Discussion (R/D)

1.1 JICA Mission to Assist the Provided Equipment Storage

بسم الله الرحمن الرحيم

KINGDOM OF SAUDI ARABIA
SALINE WATER CONVERSION CORPORATION
DIRECTORATE GENERAL, OPERATIONS AND MAINTENANCE
Desalination and Power Plant
Medina — Yanbu

المملكة العربية السعودية
المؤسسة العامة لتحلية المياه المالحة
الادارة العامة للتشغيل والصيانة
محطة تحلية المياه والقوى الكهربائية
المدينة - ينبع

Date 23 / 07 / 1985 Ref. ..... رقم ..... التاريخ / / ١٤٠٥

EQUIPMENT INSPECTION REPORT FOR RESEARCH CENTER AT YANBU.

A list of Research Equipment and pilot test plants was provided by the Japanese side. These equipment and test plants are to be installed at the Research Center which will be constructed by SWCC at the Yanbu-Medina Desalination And Power Plant.

The list is attached as appendix-I.

All seventy five crates were recived at the Plant site containing laboratory equipment and test plants (Msf and R.O.),. It was decided between SWCC and Japanese side that these equipment be classified into three categories as follows:-

1. Equipment which required Air conditioning will be kept in the ground floor room of the Operations building.
2. Equipment which required to be protected from direct exposure to sun will be stored in the parking area in front of the Operations building and,
3. Those equipment which can be kept outside wiht out any protection from sun will be stored in an area beside the Telecommunications building.

A list of those crates as classified in three categories are attached as appendix II.

A complete check of all the crates consisting the equipment was done by SWCC and Japanese representatives. A list of the items missing from the provided list is attached as appendix - III.

It was agreed that crates Nos. R-2,R-3 for R.O. test plant and crates Nos.M-12 , M-2 and R-8, will be kept in the parking area for trucks and will be suitably covered to protect the crates from sand.

The expiry date of the Chemicals will be the end of June, 1987. Provided the wrapping films of the bags are not torn.

S . W . C . C .

Naji A. Darwish — Medina/Yanbu Power
A.R.Al-Harbi — And Desal Plant
Habeeb Mohammed — Research Dept.
Riyadh.

JAPANESE SIDE.

T.Sakamoto. Takeo Sakamoto
Y.Moriya. Y. Moriya
Y.Konishi. Y. Konishi

ص.ب ٤٩٠ ، تليفون ١٥٥٨-٣٢١-٠٤ ، تلكس ..... ، برقيا ، تحلية ينبع
P. O. Box 490, Telephone 04-321-1558, Telex ..... SJ. — Cables : TAHLIA, YANBU

JAPAN INTERNATIONAL COOPERATION AGENCY

P.O. Box 216, Mitsui Bldg., Shinjuku-ku, Tokyo, Japan.

PACKING LIST

Consigned to : SALINE WATER CONVERSION CORPORATION
WATER DESALINATION STATION OF MADINAH & YANBU P.O.BOX (30058) YANBU,
INDUSTRIAL ZONE.KINGDOM OF SAUDI ARABIA.

No : .....

Date : May.1,1985

Shipped per "ALIKI IP"/M.O.L.

from Kobe,Japan

to Yanbu,Saudi Arabia.

via .....

on May.17,1985

Shipping Mark :

JICA
YANBU
C/No.L(A) 1/18,L(B)-1/6
MADE IN JAPAN

SIDE MARK

TECHNICAL COOPERATION
BY THE GOVERNMENT OF JAPAN
S W C C
JICA
YANBU
C/NO.R-1/15,M-1/36
MADE IN JAPAN

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
	TECHNICAL EQUIPMENT OF J.I.C.A.				
(75)Packages	MATERIALS FOR JAPAN - SAUDI ARABIA RESEARCH PROJECT OF SEA WATER DESALINATION	15,739 pcs, 4,025.2 M, 3,949 kgs, 4,896 sets, 500 M, 197 sh, 45 L, 45 rolls, 36 shets, 33 cans, 30 bags, 21 packs, 20 btls, & 1 drum.	72,249kgs	96,926kgs	588.062 M3
	- Details as per attached sheets -				

E. & O. E

JAPAN INTERNATIONAL COOPERATION AGENCY

P.O. Box 216, Mitsui Bldg., Shinjuku-ku, Tokyo, Japan.

C/Nos.	Description of Goods	Quantity	Weight net kgs	Weight gross kgs	Measurement M3
C/NO.L(A)-1			520	800	4.472 (4.289)
	Electron Probe Micro Analyzer Model:X-650				
TAG NO.					
1.26.010	Main Console	1 set			
2.26.110	Rack	1 set			
C/NO.L(A)-2			580	900	5.727 (5.446)
1.26.020	Rotary Pump	2 sets			
030	Weight	1 pc.			
040	Rubber Tube for Vacuum 1m	2 pcs			
050	Evacuating Pipe for RP	2 pcs			
060	Table	1 pc.			
070	Cover (1)	1 pc.			
080	Cover (2)	1 pc.			
090	Fixed Apertube Assy	1 set			
100	Oil Filter for RP	2 sets			
110	Display Console	1 set			
120	Phot CRT Unit	1 set			
130	Rubber Board for Photo CRT	1 pc.			
160	Rubber Tube for Vaccum 680mm	2 pcs			
170	Accessory Parts Set	1 set			
200	Screw	4 pcs			
.26.010	Auto Camera Assy S-5080	1 set			
	Polaroid Film Holder	1 set			
2.26.010	2CH Spectrometer Assy	1 set			
1.28.	S-6582 Motor 2	1 pc.			
1.29.	S-6583 Motor 3	1 pc.			
1.30.	S-6584 Motor 4	1 pc.			
	(OPTIONAL ACCESSORIES)				
1.31.010	Auto Transformer	1 set			
	Ion Coater	1 set			
	(SPARE PARTS)				
1.33.	Filament 10 pcs/set	1 set			
1.34.	Window	1 pc.			
1.35.	Window	1 pc.			

- to be continued -

JAPAN INTERNATIONAL COOPERATION AGENCY

P.O. Box 216, Mitsui Bldg., Shinjuku-ku, Tokyo, Japan.

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
1.36.	Photomul	1 set			
1.37.	Scintillator	1 set			
C/NO.L(A)-3			155	290	0.469
1.32.010	Vacuum Evaporator HUS-5GB	1 set			
020	Rotary Pump with Transformer	1 set			
C/NO.L(A)-4			109	200	1.245 (1.158)
2.	Ammeter with Transformer	1 set			
LA2-8-1	Vacuum pump (I) Model: 160VP				
LA2-8-1	Vacuum pump 160VP	1 set			
	(OPTIONAL ACCESSORIES)				
-2	Vacuum Oil	1 set			
-3	Oil Mist Trap (B)	1 set			
	Air Compressor Model: SC-62				
LA-2-10-1	Air Compressor SC-62	1 set			
-2	Stepdown Transformer	1 pc.			
C/NO.L(A)-5	X-Ray Diffractometer Model: D/MAX-IIA		688	1,050	6.447 (6.182)
LA1-3-1	X-Ray Generator	1 set			
-2	Goniometer	1 set			
-3	Control/Data Processing Unit	1 set			
-4	Counting Section	1 set			
-5	Recorder	1 set			
-6	Counting System	1 set			
-7	Radiation Enclosure	1 pc.			
-8	Standard Accessories	1 set			
C/NO.L(A)-6	Precission Lathe Model: TAL-510x1000		2,300	2,600	5.685 (5.397)
LA3-1-1	Precision Lathe	1 set			
-2	Standard Accessories	1 set			

- to be continued -

C/Nos.	Description of Goods		Quantity	Weight net	Weight gross	Measurement
				kgs	kgs	M3
	(OPTIONAL ACCESSORIES)					
LA3-1-3	3-Jaw Scroll Chuck	254ϕ	1 pc.			
-4	4-Jaw Independent Chuk	300ϕ	1 pc.			
-5	Facd Plate	460ϕ	1 pc.			
-6	Steade Rest	15 - 120ϕ	1 pc.			
-7	Follow Rest	20 - 60ϕ	1 pc.			
-8	Live Center	MT No.4	1 pc.			
-9	Tool Post Grinder with Work Light		1 set			
-10	Plastic Chip Cover		1 pc.			
-11	Stopper for Headstock		1 pc.			
-12	Stopper for Tailstock		1 pc.			
-13	Lubricant		1 set			
	(SPARE PARTS)					
-14	Pilot Lamp		5 pcs			
-15	V-Belt		4 pcs			
-16	Brake Band		1 set			
-17	Contact Point		1 set			
-18	Change Gears	95T, 93T	1 set			
-19	Micro Switch		2 pcs			
-20	Limit Switch		1 pc.			
-21	Clamp Bolt		12 pcs			
-22	Half Nut	08-G9, G10	1 set			
-23	Pinion Gear		1 pc.			
-24	Gear	TA-0121	1 pc.			
-25	Gear Shifter	TA-0325	1 pc.			
-26	Timer		1 pc.			
-27	Lubricant	18 ℓ	1 can			
C/NO.L(A)-7	Electrical Conductivity Meter Model: CM-30ET			296	420	2.853 (2.703)
LA1-4-1	Digital Conductivity Meter CM-30ET with Standard Accessories		2 sets			
	(SPARE PARTS)					
-2	Conductivity Cell		2 pcs			

- to be continued -

JAPAN INTERNATIONAL COOPERATION AGENCY

P.O. Box 216, Mitsui Bldg., Shinjuku-ku, Tokyo, Japan.

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	
LA1-4-3	Temperature Probe	2 pcs			
-4	KCl Solution	2 pcs			
	PH Meter Model: COM-11 & H-7SD				
LA1-5-1	pH Meter COM-11 with Standard Accessory	2 sets			
	(SPARE PARTS)				
-2	Standard Solution ph4	2 sets			
-3	" ph7	2 sets			
-4	Combination Electrode 6155	2 pcs			
-5	KCℓ Solution 500mℓ	2 pcs			
LA1-5-6	pH Meter, H-7SD with Standard Accessories	1 set			
	(SPARE PARTS)				
-7	Standard Powder pH4 10bag/pack	5 packs			
-8	" pH7 "	5 packs			
-9	" pH9 "	5 packs			
-10	KCℓ Solution 250mℓ	1 pcs			
-11	Electrode #6328-10C	1 pc.			
	Residual Cjlorine Meter 8054-03				
LA1-7-1	Chlorine Comparator	1 set			
	Portable Water Analysis Kit Model: DR-EL-SD				
LA1-8-1	Direct Reading Spertrophotomer with Standard Accessories	1 set			
	Scale Deposition Testing Equipment Model: TEM-V				
LA1-9-1	Main Equipment Body	2 sets			
-2	Standard Accessories	2 sets			
	Oil Content Determination App. Model: OCMA-220, CR-200				
LA1-11-1	Oil Content Analyzer OCMA-220	1 set			
-2	Standard Accessories	1 set			

- to be continued -

JAPAN INTERNATIONAL COOPERATION AGENCY

P.O. Box 216, Mitsui Bldg., Shinjuku-ku, Tokyo, Japan. (5)Y

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	
	(OPTIONAL ACCESSORY)				
LA1-11-3	Solvent Reclaimer CR-200	1 set			
	(SPARE PARTS)				
-4	Filter Element 5 pcs/set	2 sets			
-5	Packing	2 pcs			
-6	Fuse	3 pcs			
-7	Micro Sylinge 25μℓ	1 pc.			
-8	Sylinge 10mℓ	1 pc.			
-9	Sylinge for Sample 10mℓ	1 pc.			
-10	Activated Carbon S-316 500mℓ	3 pcs			
-11	Slovent for Oil in Water 10mℓ	2 pcs			
-12	Absorbent Carbon 500g	1 pc.			
-13	Filter Element 5 pcs/set	2 sets			
	DO Meter Model: U-7DO				
LA1-12-1	Dissolved Oxygen Analyzer with Accessories U-70D	1 set			
	ORP Meter Model: F-8L				
LA1-13-1	Oxidation Reduction Potential Meter with Standard Accessories	1 set			
	(OPTIONAL ACCESSORIES)				
-2	Metallic Electrode 6811-06C	1 pc.			
-3	ORP Standard Powder 160-51	5 bags			
-4	" 160-22	5 bags			
	(SPARE PARTS)				
-5	ORP Standard Powder 160-51	5 bags			
-6	" 160-22	5 bags			
	Micro Biological Examination Kit				
LA1-14-1	Incubator	1 set			
-2	Coliforms Detection Paper Kit	1 set			
	(OPTIONAL ACCESSORIES)				
-3	Sun Colitep for Standard Bacteria 100 pcs/set	1 set			

- to be cotinued -

JAPAN INTERNATIONAL COOPERATION AGENCY

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
C/NO.L(A)-8			423	640	5.484 (5.248)
	Analytical Balance Model: AE-160				
LA2-1-1	Balance AE-160 with Accessory	2 sets			
	Drying Oven for Glassware Model: DN-42				
LA2-5-1	Drying Oven with Accessories DN-42	2 sets			
	(SPARE PARTS)				
-2	Fuse 15A	2 pcs			
	Vacuum Pump (2) Model: KP-20-GB				
LA2-9-1	Vacuum Pump KP-20-GB	1 set			
	Water Bath General Type Model: WH-12				
LA2-13-1	Water Bath	1 set			
	Refrigerator Model: R-225A				
LA2-14-1	Refrigerator R-225A	1 set			
-2	Stepdown Transformer	1 pc.			
	Water Circulating Pump (Handy Type) Model: WP-45				
LA2-15-1	Handy Aspirator WP-45	2 sets			
	Stop Watch Model: TYX018				
LA2-16-1	Stop Watch TYX018	2 sets			
	Air Pump (Handy Type)				
LA2-18-1	Air Pump --	2 sets			
	Gas Flow Meter Model: WE-2				
LA2-19-1	Gas Meter WE-2	3 sets			
	(PARE PARTS)				
-2	Manometer U-Type	3 sets			
-3	Liquid Supply Plug	3 sets			
-4	Liquid Adjusting Valve	3 sets			
-5	Drain Plug	3 sets			
-6	Blast Pipe Drain Plug	3 sets			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight net kgs	Weight gross kgs	Measurement M3
	Constant Temperature Bath Model:ET-45P				
LA2-20-1	Water Bath ET-45P	2 sets			
	(SPARE PARTS)				
-2	Fuse 25A	2 pcs			
	Calculator Model: EL-51035				
LA2-21-1	Calculator EL-51035	3 sets			
	Pressure Regulator				
LA2-23-1	Regurator for N_2 WR-13-NP-N2	5 sets			
-2	Regurator for H_2 WR-13-NP-H2	2 sets			
	Vacuum Evaporator Model: RE-51A				
LA2-24-1	Rotary Evapolator RE-51	1 set			
-2	Glass Parts Sets (A)	1 set			
	(OPTIONAL ACCESSORY)				
-3	Water Bath BM-51	1 set			
-4	Stepdown Transformer	1 set			
C/No.L(A)-9			403	610	5.219 (4.983)
	Chemical Balance, Direct Reading Model: PE-3600				
LA2-2-1	Direct Reading Balance PE-3600	2 sets			
	(OPTIONAL ACCESSORY)				
-2	Standard Weight W-3	2 sets			
	Balance Model: B-20				
LA2-3-1	Balance B-20	1 set			
	Water Purification App. Model: WG-25				
LA2-4-1	Auto-Still with Accessories WG-25	2 sets			
	(SPARE PARTS)				
-2	Scale Remover	10 bags			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
	Drying Oven for Chemical Model:DF-41				
LA2-6-1	Drying Oven DF-41	1 set			
	(SPARE PARTS)				
-2	Pilot Lamp	4 pcs			
-3	Fuse 10A	2 pcs			
	Muffle Furance Model: FM-36				
LA2-7-1	Muffle Furance FM-36	1 set			
	(SPARE PARTS)				
-2	Heating Element A-1	1 set			
	Magnetic Stirrer Model: MD-41				
LA2-11-1	Magnetic Stirrer MD-41	2 sets			
	Magnetic Stirrer with Hot Plate Model: MH-61				
LA2-12-1	Magnetic Stirrer with Hot Plate MH-61	1 set			
-2	Stepdown Transformer 110/100V	1 pc.			
	Hot Plate Model: HM-11				
LA2-17-1	Hot Plate HM-11	1 set			
-2	Stepdown Transformer	1 pc.			
	Digital Thermometer Model: MCAIII-216				
LA2-22-1	Portable Thermometer MCAIII-216	2 sets			
	(OPTIONAL ACCESSORIES)				
-2	Carrying Case	2 sets			
	(SPARE PARTS)				
-3	Thermistor Sensor	2 pcs			
C/NO.L(A)-10			778	940	3.741 (3,559)
	Bench Drilling Model: B-23				
LA3-2-1	Bench Drill Machine B-23	1 set			
	Electric Bench Grinder Model: KBT-10				
LA3-3-1	Bench Grinder KBT-10	1 set			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight net kgs	Weight gross kgs	Measurement
	Cutter Model: H-16B				
LA-3-4-1	High Speed cut-Off Machine H-16B	1 set			
	Electric Drill Model: DU-PN2				
LA3-5-1	Drill DU-PN2	2 sets			
	Universal Swivelling Branch Vice Model: E-105				
LA3-9-1	Swivelling Branch Vice E-105	1 set			
	Cast Anvil Model: NO.100				
LA-3-10-1	Cast Iron Anvil No.100	1 set			
	Hack-Saw Frame				
LA3-11-1	Hack-Saw Frame	1 set			
	File Set				
LA3-12-1	File L-150mm Flat	12 pcs			
-2	" " Half-Round	12 pcs			
-3	" " Round	12 pcs			
-4	" " Square	12 pcs			
-5	" " Three-Square	12 pcs			
-6	File L-250mm Flat	12 pcs			
-7	" " Half-Round	12 pcs			
-8	" " Round	12 pcs			
-9	" " Square	12 pcs			
-10	" " Three-Square	12 pcs			
	Calipers Set				
LA3-13-1	Inside Caliper 150mm	1 pc.			
-2	" 200mm	1 pc.			
-3	" 250mm	1 pc.			
-4	" 300mm	1 pc.			
-5	" 350mm	1 pc.			
-6	Outside Caliper 150mm	1 pc.			
-7	" 200mm	1 pc.			
-8	" 250mm	1 pc.			
-9	" 300mm	1 pc.			

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C/Nos.	Description of Goods	Quantity	Weight net kgs	Weight gross kgs	Measurement
LA3-13-10	Outside Caliper 350mm	1 pc.			
	Steel Tape Measure				
LA3-14-1	Measuring Tape, Steel 2m	1 pc.			
-2	" " 3.5m	1 pc.			
-3	" " 5m	1 pc.			
-4	" " 30m	1 pc			
	Steel Ruel				
LA3-15-1	Steel Ruel 150mm	1 pc.			
-2	" 300mm	1 pc.			
-3	" 600mm	1 pc.			
-4	" 1000mm	1 pc.			
	Vernier Caliper				
LA3-16-1	Vernier Caliper 150mm	1 pc.			
-2	" 300mm	1 pc.			
-3	" 600mm	1 pc.			
	Micrometer (All Kinds)				
LA3-17-1	Outside Micrometer 0 - 25mm	1 pc.			
-2	" 25 - 50mm	1 pc.			
-3	" 50 - 75mm	1 pc.			
-4	" 75 - 100mm	1 pc.			
-5	Inside Micrometer 5 - 30mm	1 pc.			
-6	" 25 - 50mm	1 pc.			
-7	" 50 - 75mm	1 pc.			
-8	" 75 - 100mm	1 pc.			
	Adjustable Tap Wrench Set				
LA3-18-1	Tap Wrench No. 0	1 set			
-2	" No. 4	1 set			
-3	" No. 5	1 set			
-4	" NO. 6	1 set			
-5	" NO. 7	1 set			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	
	Electric Soldering Iron				
LA3-19-1	Soldering Iron H-30	1 set			
-2	" H-40	1 set			
-3	" H-60	1 set			
-4	" H-80	1 set			
-5	" H-100	1 set			
	Spanner Set				
LA3-20-1	Spanner 6 pcs/set A-Type	1 set			
-2	" " B-Type	1 set			
-3	" " ISO-Type	1 set			
	Adjustable Angle Wrench				
LA3-21-1	Adjustable Angle Wrench 150mm	1 pc.			
-2	" 200mm	1 pc.			
-3	" 250mm	1 pc.			
-4	" 300mm	1 pc.			
-5	" 375mm	1 pc.			
	Water Pump Pliers				
LA3-22-1	Water Pump Pliers 250mm	1 pc.			
-2	" 300mm	1 pc.			
	Side Cutting Pliers				
LA3-23-1	Side Cutting Plier 150mm	1 pc.			
-2	" 175mm	1 pc.			
-3	" 200mm	1 pc.			
	Radio Pliers				
LA3-24-1	Radio Plier 175mm	1 pc.			
-2	" 150mm	1 pc.			
	Diagonal Cutting Nippers				
LA3-25-1	Diagonal Cutting Nipper 125mm	1 pc.			
-2	" 150mm	1 pc.			

- to be continued -

C/Nos.	Description of Goods		Quantity	Weight net	Weight gross	Measurement
				kgs	kgs	
	Figure and Letter Punches					
LA3-26-1	Figure & Letter Punch	2mm	1 set			
-2	"	3mm	1 set			
-3	"	4mm	1 set			
-4	"	5mm	1 set			
-5	"	6mm	1 set			
	Wire Stripper					
LA3-27-1	Wire Stripper 170mmL	A-Type	1 set			
-2	" "	B-Type	1 set			
	Hammer Set					
LA3-28-1	Hammer	225g	1 pc.			
-2	"	450g	1 pc.			
-3	"	900g	1 pc.			
-4	"	1300g	1 pc.			
-5	"	1800g	1 pc.			
-6	"	2200g	1 pc.			
-7	"	2700g	1 pc.			
-8	"	3600g	1 pc.			
	Plastic Hammer					
LA3-29-1	Plastic Hammer	0.2kg	1 pc.			
-2	"	0.3kg	1 pc.			
-3	"	0.5kg	1 pc.			
-4	"	0.8kg	1 pc.			
-5	"	1.0kg	1 pc.			
	Thinner Scissors					
LA3-30-1	Straight Edge Thinner Scissor	210mm	1 pc.			
-2	" "	300mm	1 pc.			
	Oil Gun					
LA3-31-1	Oil Gun	Type-200	1 pc.			
-2	"	Type-600	1 pc.			

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	
	Screw Driver Set				
LA3-32-1	Screw Driver, (+) Wooden Handle 100mm	1 pc.			
-2	" " 150mm	1 pc.			
-3	" " 200mm	1 pc.			
-4	" " 250mm	1 pc.			
-5	Screw Driver, (-) Wooden Handle 100mm	1 pc.			
-6	" " 150mm	1 pc.			
-7	" " 200mm	1 pc.			
-8	" " 250mm	1 pc.			
-9	Screw Driver, (+) Plastic Handle 100mm	1 pc.			
-10	" " 150mm	1 pc.			
-11	" " 200mm	1 pc.			
-12	Screw Driver, (-) Plastic Handle 100mm	1 pc.			
-13	" " 150mm	1 pc.			
-14	" " 200mm	1 pc.			
	Box Spanner Set				
LA3-33-1	Ring Wrench, A-Set 2600M	1 set			
-2	" B-Set 2600	1 set			
-3	" SIO-Set 2700M	1 set			
	Gas Cutter Model: 9999-0001				
LA3-34-1	Gas Cutter Kit	1 set			
	Tube Puller				
LA3-35-1	Pump	1 set			
-2	Cylinder	1 set			
-3	Hose 5m	2 pcs			
-4	Accessory for Tube Puller	1 set			
	(SPARE PARTS)				
-5	Hose	2 pcs			
-6	Adaptor	1 pc.			
-7	Hose Shoe Lock	1 pc.			
-8	Collar	2 pcs			
-9	Spear	10 pcs			

- to be continued -

C/Nos.	Description of Goods		Quantity	Weight net	Weight gross	Measurement
				kgs	kgs	
	Expander					
LA3-36-1	Controller	TRC-2468D	1 set			
-2	Voltage Regulator	AVR-115	1 set			
-3	Tube Roller	TR-502H	1 set			
-4	"	TR-504H	1 set			
	(OPTIONAL ACCESSORIES)					
-5	Expander	CB-107	2 sets			
-6	"	CB-109	2 sets			
-7	"	CB-111	2 sets			
-8	"	CB-113	2 sets			
-9	"	CB-115	2 sets			
-10	Facing Tube	FC-5	2 sets			
-11	Expander Oil	1ℓ	10 cans			
	(SPARE PARTS)					
-12	Roller	3 kind/set	15 sets			
-13	Mandrel	3 kind/set	15 sets			
-14	Facing Cutter	FF-Type	15 sets			
	Corrater Model: 1136					
LA3-37-1	Corrater 1136		1 set			
	(OPTIONAL ACCESSORIES)					
-2	Cu-Ni Probe		3 pcs			
-3	BSTF Probe		3 pcs			
-4	Connector Cable	50m	6 pcs			
-5	Valve & Pipe for Probe		6 sets			
-6	Recorder for 6-channel		1 set			
-7	Element Set		1 set			
	(SPARE PARTS)					
-8	Element for Cu-Ni		3 sets			
-9	Element for BSTF		3 sets			
-10	Chart Paper		12 pcs			
-11	Stepdown Transformer for Recorder		1 set			

- to be continued -

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(15) Y

C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
			kgs	kgs	M3
C/NO.L(A)-11			338	460	2.638 (2.539)
	Band Sawing Machine Model: L-400X				
LA3-8-1	Band Sawing Machine L-400X	1 set			
C/NO.L(A)-12			685	810	2.678 (2.517)
	Hand Level Shear Model: FS-102				
LA3-6-1	Foot Shear	1 set			
	Hand Sawing Machine Model: KILSER-250				
LA3-7-1	Hack Sawing Machine	1 set			
-2	Standard Accessories	1 set			
C/NO.L(A)-13			161	310	1.949 (1.831)
	Infrared Spectrophotometer				
LA1-4-1	Spectrophotometer Main Unit	1 set			
2	Control Unit	1 set			
3	Cathode Ray Tube (CRT)	1 set			
4	Standard Sample (Polystyrene)	1 set			
5	Standard Accessories	1 set			
6	KBr Die FD-2 033-0023	2 sets			
7	KBr Disc Holder FH-1 016-0070	1 set			
8	Demountable Cell IRL-2 for KRS-5	2 sets			
9	Sealed Demountable Cell IRA-3 for KRS-5	2 sets			
10	Specular Reflectance Attachment IRR-31 033-0014	1 set			
11	Vacuum Pump	1 set			
12	Transformer for Vacuum Pump	1 pc			
13	10 Ton Press	1 set			
14	Mortar Agate	1 pc			
15	Window Plate for Demountaple Cell	4 pcs			
16	Recording Charts 10pcs/set	1 set			
17	Light Source	1 set			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
C/NO.L(A)-14			98	240	1.582 (1.470)
	Spectrophotometer Model: 150-20				
LA1-2-1	Spectrophotometer 150-20	1 set			
-2	Display Unit	1 set			
-3	Control Unit & Graphic Printer	1 set			
-4	Standard Accessories	1 set			
	(SPARE PARTS)				
-5	Tungsten Lamp 10U-4A, J851170	8 pcs			
-6	Fuse Set 150-0166	1 set			
-7	Silicagel	2 pcs			
-13	Spectrophotometer 100-10	1 set			
-14	Power Supply Unit	1 set			
-15	Standard Accessories	1 set			
	(SPARE PARTS)				
-16	Tangsten Lamp	8 pcs			
-17	Fuse Set 2Ax6, 4Ax3	1 set			
-18	Silicagel	2 pcs			
-19	Glass Cell Set 10mm 4 pcs/set	1 set			
-20	Cell Cap for 10mm 4 pcs/set	1 set			
-21	Glass Cell Set 50mm 4 pcs/set	1 set			
-22	Cell Holder	1 set			
C/NO.L(A)-15			988	1,400	7.755 (7.445)
	Inductive Coupled Plasma Emission Spectrophotometer Model: 306				
LA1-1-1	Super Scan Spectrophotometer Unit	1 set			
-2	I.C.P. Light Source & Power Supply Unit	1 set			
-3	Data Station Unit	1 set			
-4	Graphic Printer Unit	1 set			
-5	Standard Accessories	1 set			
-6	Printer Table	1 set			
-7	Standard Sample	1 set			
	(SPARE PARTS)				
-8	Grossflow Nebulizer	1 set			

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
			Kgs	Kgs	M3
LA1-1- 9	Glass Nebulizer	1 set			
10	Glass Chamber	1 set			
11	Chart paper	10 pcs			
12	Penley Lamp	1 set			
13	Input Pipe	1 set			
C/NO.L(A)-16			46	66	0.335
	Automatic Tiration Model:COMTITE-7S				
LA1-6-1	Main Control Unit	1 set			
2	Buret B-7	1 set			
3	Stirrer K-7	1 set			
4	Standard Accessories	1 set			
C/NO.L(A)-17			16	35	0.201
	Turbiditiy meter Model: UT-11				
LA1-10-1	Turbidimeter UT-11	1 set			
2	Standard Accessories	1 set			
	- Following Blank -				

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(18) Y

C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
					M3
/NO.L(A)-18			604Kgs	900Kgs	6.852 (6.560)
	GLASSWARE & MISCELLANEOUS				
TAG NO. 4-1-1	Beaker Standard 50ml	12 pcs			
-2	" " 100ml	12 pcs			
3	" " 200ml	12 pcs			
4	" " 300ml	12 pcs			
5	" " 500ml	6 pcs			
6	" " 1,000ml	6 pcs			
7	" " 2,000ml	6 pcs			
8	Tall Beaker 500ml	6 pcs			
9	Conical Beaker 300ml	6 pcs			
10	Beaker Silicate 500ml	3 pcs			
11	Beaker SUS With Handle 2,000ml	2 pcs			
12	Beaker Polyethlene with Handle 500ml	2 pcs			
13	" " " 2,000ml	2 pcs			
4-2-1	Erlenmeyer Flask 20ml	6 pcs			
2	" " 50ml	6 pcs			
3	" " 100ml	12 pcs			
4	" " 300ml	24 pcs			
5	" " 500ml	12 pcs			
6	" " 1,000ml	6 pcs			
7	Flask with Stopper 50ml	6 pcs			
8	" " " 100ml	6 pcs			
9	" " " 300ml	6 pcs			
10	" " " 500ml	6 pcs			
11	Flask Iodine 250ml	2 pcs			
12	Votumetric Flask 10ml	6 pcs			
13	" 25ml	6 pcs			
14	" 50ml	6 pcs			
15	" 100ml	6 pcs			
16	" 250ml	6 pcs			
17	" 500ml	6 pcs			
18	" 1,000ml	6 pcs			
19	Volumetric Flask Amber 10ml	3 pcs			

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(19) Y

C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
4-2-20	Volumetric Flask Amber 25ml	3 pcs			
21	" " 50ml	3 pcs			
22	" " 100ml	3 pcs			
23	" " 250ml	3 pcs			
24	" " 500ml	3 pcs			
25	" " 1,000ml	3 pcs			
4-3- 1	Pipet Volumetric 0.5ml	6 pcs			
2	" " 1 ml	6 pcs			
3	" " 2 ml	6 pcs			
4	" " 5 ml	12 pcs			
5	" " 10 ml	12 pcs			
6	" " 20 ml	6 pcs			
7	" " 25 ml	6 pcs			
8	" " 50 ml	6 pcs			
9	Pipet Graduated 1ml	6 pcs			
10	" " 2ml	6 pcs			
11	" " 5ml	6 pcs			
12	" " 10ml	6 pcs			
13	" " 25ml	6 pcs			
14	" Automatic 5ml	2 pcs			
15	" " 10ml	2 pcs			
4-4- 1	Buret Plain 5ml	3 pcs			
2	" " 10ml	3 pcs			
3	" " 25ml	2 pcs			
4	" " 50ml	2 pcs			
5	Buret Blue Line 50ml	2 pcs			
6	Buret Amber 50ml	2 pcs			
7	Micro Buret Plain 1ml	2 pcs			
8	" " 2ml	2 pcs			
9	" " 5ml	2 pcs			
10	" " 10ml	2 pcs			
11	Buret Stand	8 pcs			
12	Buret Automatic Plain 10ml	2 pcs			
13	" " " 25ml	3 pcs			
14	" " " 50ml	3 pcs			
15	Resciving Bottle Plain 2l	8 pcs			
16	Buret Automatic Amber 25ml	3 pcs			
17	" " " 50ml	3 pcs			
18	Resciving Bottle Amber 2l	6 pcs			
4-5- 1	Plastic Bottle 250ml	18 pcs			
2	" " 500ml	18 pcs			
3	" " 1,000ml	18 pcs			
4	Reagent Bottle Narrow Mouth 250ml	24 pcs			
5	" " " " 500ml	24 pcs			
6	" " " " 1,000ml	24 pcs			
7	" " Amber Narrow Mouth 250ml	12 pcs			
8	" " " " " 500ml	12 pcs			
9	" " " " " 1,000ml	12 pcs			
10	Reagent Bottle Wide Mouth 120ml	6 pcs			
11	" " Amber Wide Mouth 120ml	6 pcs			

- to be continued -

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(20)Y

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
4-5-12	Reagent Bottle Amber Wide Mouth 250ml	3 pcs			
13	" " " " " 500ml	3 pcs			
14	Bottle Dripping Type 120ml	6 pcs			
15	Bottle Dripping Type Amber 120ml	6 pcs			
16	Bottle Filtering Buchner 300ml	6 pcs			
17	" " " 500ml	6 pcs			
18	" " " 1,000ml	3 pcs			
19	Washing Bottle Polyethlene 500ml	12 pcs			
20	Polyethlene Bottle with Stopcock 30ml	2 pcs			
21	Gas Washing Bottle Dressel Type 250ml	6 pcs			
22	" " Fritted Disc Type 250ml	6 pcs			
23	Weighing Bottle 40mm x 20mmφ	6 pcs			
24	" " 60mm x 30mmφ	6 pcs			
4-6- 1	Cylinder Graduated with Glass Stopper 25ml	12 pcs			
2	" " " " "				
3	50ml " " " " "	12 pcs			
4	100ml " " " " "	12 pcs			
5	250ml " " " " "	12 pcs			
6	500ml " " " " "	12 pcs			
7	1,000ml " " " " "	12 pcs			
8	2,000ml	3 pcs			
9	Cylinder Graduated 5ml	6 pcs			
10	" " 10ml	6 pcs			
11	" " Cone Type 10ml	6 pcs			
12	Cylinder Graduated 100ml	6 pcs			
13	" " 250ml	6 pcs			
14	" " 500ml	6 pcs			
15	" " 1,000ml	6 pcs			
4-7- 1	" " 2,000ml	3 pcs			
2	Condenser Liebig 30mml	2 pcs			
3	" Dimroth 300mml	2 pcs			
4-8- 1	" Graham 300mml	2 pcs			
2	Crucible Porcelain with Cover B-Type 30ml	6 pcs			
3	Crucible Porcelain with Inlet Board Gooch Type 35ml	6 pcs			
4	Evaporating Dish 85mmφ 100ml	6 pcs			
5	" " 120mmφ 260ml	6 pcs			
4-9- 1	Crucible Platinum 30ml	1 pc			
2	Funnel Separatory with Teflon Plug 100ml	6 pcs			
	" " " " 300ml	6 pcs			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
4-9- 3	Funnel Separatory with Teflon Plug 500ml	6 pcs			
4	" " " " " 1,000ml	6 pcs			
5	Funnel Glass 75mmφ	12 pcs			
6	" " 120mmφ	6 pcs			
7	" " 210mmφ	3 pcs			
8	" " Long Stem 75mmφ	3 pcs			
9	Funnel Buchner Type Porcelain 118mmφ	3 pcs			
10	" " " Glass 70mmφ	2 pcs			
11	" with Fritted Disc No.1 30ml	3 pcs			
12	" " " " No.2 30ml	3 pcs			
13	" " " " No.3 30ml	3 pcs			
14	" " " " No.4 30ml	3 pcs			
15	Funnel Stem for Above	3 pcs			
4-10- 1	Desiccator Scheibler Type 150mmφ	3 pcs			
2	" " 300mmφ	2 pcs			
3	" Vacum Type 300mmφ	2 pcs			
4	" Scheibler Type Amber 150mmφ	2 pcs			
4-11- 1	Test Tube 200 x 21mm	50 pcs			
2	" " 105 x 12mm	50 pcs			
4-12- 1	Watch Glass 75mmφ	18 pcs			
2	" " 120mmφ	18 pcs			
4-13- 1	Glass Rod 1500 x 6 mmφ	5 pcs			
2	Glass Tube Capillary 1500 x 1mm(I.D)	3 pcs			
3	Glass Tube Hard Glass 1500 x 2mm-7mmφ	3 pcs			
4	" " " " 1500 x 4mm-6mmφ	15 pcs			
5	" " " " 1500 x 6mm-8mmφ	15 pcs			
6	" " " " 1500 x 8mm-10mmφ	15 pcs			
7	" " " " 1500x11.6mm-14mmφ	5 pcs			
8	" " " " 1500x15.6mm-18mmφ	3 pcs			
9	" " " " 1500x19mm-22mmφ	3 pcs			
10	" " " " 1500x25mm-28mmφ	2 pcs			
4-14- 1	Stopcock 2-Way 6mm(O.D.)	6 pcs			
2	" " 7.5mm(O.D.)	6 pcs			
3	" 3-Way 7.5mm(O.D.)	3 pcs			
4-15- 1	Connecting Tube T-Shaped 7.5mm(O.D.)	6 pcs			
4-16- 1	Connecting Tube Y-Shaped 7.5mm(O.D.)	6 pcs			
4-17- 1	Filter Pump(Aspirator) L300-350mm	6 pcs			
4-18- 1	Stopcock for Gas 2-Way 8mm(O.D.)	3 pcs			
2	" " " 12mm(O.D.)	3 pcs			
3	" " " 15mm(O.D.)	3 pcs			
4	" " 3-Way 8mm(O.D.)	2 pcs			
5	" " " 12mm(O.D.)	2 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
4-19- 1	Drying Tube U-Shape 15φx150mm	3 pcs			
4-20- 1	Stopper Cork No.1 15/12	100 pcs			
2	" " No.2 16.5/13.5	100 pcs			
3	" " No.3 18/15	100 pcs			
4	" " No.4 19.5/16.6	100 pcs			
5	" " No.6 22.5/19.5	100 pcs			
6	" " No.8 25.5/22.5	50 pcs			
7	" " No.10 30/27	50 pcs			
8	" " No.12 36/33	50 pcs			
9	" " No.14 42/39	50 pcs			
10	" " No.16 48/45	50 pcs			
11	" " No.18 54/51	50 pcs			
4-21- 1	Stopper Rubber No.0.3 11/9	20 pcs			
2	" " No.0.1 14/10	20 pcs			
3	" " No.0 15/12	20 pcs			
4	" " No.1 16/12	20 pcs			
5	" " No.2 18/14	20 pcs			
6	" " No.3 19/15	50 pcs			
7	" " No.4 20/16	20 pcs			
8	" " No.5 22/19	20 pcs			
9	" " No.6 23/20	20 pcs			
10	" " No.7 25/21	20 pcs			
11	" " No.8 28/23	20 pcs			
12	" " No.9 30/25	20 pcs			
13	" " No.10 32/28	20 pcs			
14	" " No.12 37/32	10 pcs			
15	" " No.14 41/37	10 pcs			
16	" " No.16 46/40	10 pcs			
17	" " No.18 52/46	10 pcs			
18	" " No.20 58/51	10 pcs			
19	" " No.25 74/68	10 pcs			
20	" " No.30 90/84	10 pcs			
4-22- 1	Stopper Silicone No.3 19/15	20 pcs			
2	" " No.8 28/23	10 pcs			
4-23- 1	Rubber Tube Red 3mmφ - 4.6mmφ x 10m	1 pc			
2	" " 5mmφ - 7mmφ x 20m	1 pc			
3	" " 8mmφ - 11.6mmφ x 50m	1 pc			
4	" " 12mmφ - 17mmφ x 50m	1 pc			
5	Rubber Hose for Gas 8mmφ - 12mmφx50m	1 pc			
6	Rubber Hose for Vacuum 4.5mmφ - 15mmφ x 30m	1 pc			
7	" " - " 6mmφ - 21mmφ x 10m	1 pc			
8	" " " 9mmφ - 24mmφ x 10m	1 pc			
9	Rubber Hose for Pressed Air 8mmφ - 18mmφ x 10m	1 pc			
10	Synthetic Rubber Tube 5mmφ-7mmφx10m	1 pc			
11	" " " 7mmφ-10mmφx10m	1 pc			
12	" " " 10mmφ-14.6mmφx10m	1 pc			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
4-23-13	Silicone Tube 6mmφ-8mmφx10m	1 pc			
14	" " 8mmφ-12mmφx10m	1 pc			
15	" " 12mmφ-15mmφx10m	1 pc			
16	Polyvinyl Chloride Tube 3mmφ-5mmφx10m	1 pc			
17	" " " 6mmφ-8mmφx50m	1 pc			
18	" " " 8mmφ-11mmφx30m	1 pc			
19	" " " 10mmφ-13mmφx30m	1 pc			
20	" " " 15mmφ-19mmφx20m	1 pc			
21	" " " 18mmφ-22mmφx10m	1 pc			
22	" " " 25mmφ-30mmφx10m	1 pc			
4-24- 1	Bucket Polyethylene 10L	12 pcs			
4-25- 1	Siphone Polyethiene Small	6 pcs			
4-26- 1	Thermometer 0 to 100°C	12 pcs			
2	" 0 to 250°C	6 pcs			
3	" 0 to 360°C	6 pcs			
4-27- 1	Variable Transformeter 1KW	3 pcs			
4-28- 1	Borer for Cork	3 sets			
2	" " Rubber	3 sets			
3	Cork Borer Sharpener	2 sets			
4-29- 1	Cork Press Rotary	1 pc			
4-30- 1	Tripod Iron 12cm(O.D.)	6 pcs			
4-31- 1	Triangle with Clay Pipe Stem	12 pcs			
4-32- 1	Asbestos Wire Gauze 18 x 18cm	50 pcs			
4-33- 1	Asbesto Band 32mm x 10m	1 pc			
2	" " 5cm x 10m	1 pc			
3	" Yarn 6mm x 10m	1 pc			
4-34- 1	Pinch Cock Middle	12 pcs			
4-35- 1	Screw Cock Large (5cm)	12 pcs			
2	" " Middle (3cm)	12 pcs			
4-36- 1	Mortar and pestle porcelain 150mm(O.D)	3 pcs			
2	" " Agate 150mm(O.D)	2 pcs			
4-37- 1	Crucible Tong 180mm(L)	3 pcs			
2	" 240mm(L)	2 pcs			
3	" 600mm(L)	2 pcs			
4	Tong for Beaker 290mm(L)	2 pcs			
5	Tong for Platinum Crucible 210mm(L)	1 pc			
4-38- 1	Forceps 125mm(L)	12 pcs			
2	" 150mm(L)	12 pcs			
3	" 300mm(L)	6 pcs			
4	" Teflon Coating 180mm(L)	3 pcs			
4-39- 1	Spoon 150mm(L)	12 pcs			
2	" 180mm(L)	12 pcs			
3	" with Spatula 150mm(L)	6 pcs			
4	" " 180mm(L)	6 pcs			

- to be continued -

C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
4-40- 1	Spatula SUS 210mm(L)	6 pcs			
4-41- 1	Clamp Small	12 pcs			
2	" Midium	12 pcs			
3	" Large	24 pcs			
4	Clamp Holder Regular	48 pcs			
4-42- 1	Support Stand Tripod Base 60cm(H)	6 pcs			
2	" " " " 90mm(H)	6 pcs			
3	Support for Two Funnel	2 sets			
4	Buret Stand	6 sets			
5	Tset Tube Stand 21mmφ	1 pc			
6	" " " 12mmφ	1 pc			
7	Pipet Stand	3 pcs			
4-43- 1	Ring Support Cast Iron with Clamp Small 70mmφ	6 pcs			
2	" " " Medium 85mmφ	12 pcs			
3	" " " Large 105mmφ	6 pcs			
4-44- 1	Gas Burner	12 pcs			
2	Gas Burner Meker Type	3 pcs			
4-45- 1	Rubber Blower (Spray)	12 pcs			
4-46- 1	Pipet Filler Rubber	6 pcs			
4-47- 1	Filter Paper No.1 12.5cmφ	6 boxes			
2	" " No.1 18.5cmφ	6 boxes			
3	" " No.2 12.5cmφ	6 boxes			
4	" " No.5A 12.5cmφ	6 boxes			
5	" " No.5B 12.5cmφ	6 boxes			
6	" " No.5C 12.5cmφ	6 boxes			
7	" " for Oil No.26 800x300mm	2 boxes			
8	Paraffin Paper	6 packs			
9	PH Test Paper PHO.4-13.6	6 sets			
4-48- 1	Emery Paper Fine	12 sheets			
2	" Medium	12 sheets			
3	" Coarse	12 sheets			
4-49- 1	Brush for Test Tube	6 pcs			
2	Brush for Burette	6 pcs			
3	Brush for Flask Middle	6 pcs			
4	Brush for Flask Large	6 pcs			
5	Brush for Pipette	6 pcs			
6	Brush for Beaker	3 pcs			
4-50- 1	Vessel 1L	3 pcs			
4-51- 1	Platinum Dish 150mL(55g)	1 pc			
4-52- 1	Incubation Bottle 100ml	5 pcs			
4-53- 1	Electric Tool Set	2 sets			

- to be continued -

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(25) Y

C/Nos.	Description of Goods	Quantity	Weight		Measurement
			net	gross	
			Kgs	Kgs	M3
LA5-1 -1	Dissolved Oxygen Measurement System				
	D.O. Meter Model : 2713	1 set			
LA3-2 -1	Salinometer Model : SA-1K	1 set			
C/NO.L(B)-1	AC Impedance Measurement System		227	375	2.097 (1.953)
LB1-1-1	Potentio/Galvanostatic Model:273	1 set			
2	Digital Lock-In Amp Model:5301EC	1 set			
3	Cell Kit Model:K0047	1 set			
4	Computer	1 set			
5	Disc Drive	1 set			
6	CRT Display	1 set			
7	Printer	1 set			
C/NO.L(B)-2	Mounting Press Model: 2426		564	700	3.133 (2.960)
LB1-9-1	Mounting Press 2426				

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
	Wet Grinder and Polisher				
LB1-10-7	Polisher (Low Spead) with Std. Accessory Model: 5627-51	1 set			
-8	Polisher (Variable Speed) with Std. Accessory Model: 5627-56	2 sets			
-9	Automatic Polishing Attachment Model: 7705-3	3 sets			
	Precision Cutter Model: VH-603				
LB1-14-1	Velnus Cut with Cover	1 set			
C/NO.L(B)-3			325	430	2.090 (1.987)
	Mounting Press Model: 2426				
LB1-9-2	Standard Accessories	1 set			
	(SPARE PARTS)				
-3	Resin Powder 2.5kg Black	5 cans			
-4	" " Red	5 cans			
-5	" " Green	5 cans			
-6	" " Transparent	5 cans			
-7	Ralease Fluid 1ℓ	1 can			
	Wet Grinder and Polisher				
LB1-10-1	Hand Pregrinder Model: 6547	1 set			
-2	Standard Accessories	1 set			
	(SPARE PARTS)				
-3	Grinding Paper # 320	10 pcs			
-4	" # 500	10 pcs			
-5	" # 700	10 pcs			
-6	" #1000	10 pcs			
	Electropolishing Equipment Model: MOVIPOL 130				
LB1-12-1	Power Pack	1 set			
-2	Polishing Unit	1 set			
-3	Transcopy	1 set			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net kgs	Weight gross kgs	Measurement
	(SPARE PARTS)				
LB1-12-4	Electrolyte Container	5 pcs			
-5	Transcopy	10 sets			
	Dryer Model: 8303				
LB1-13-1	Specimen Dryer with Std. Accessory	1 set			
-2	Stepdown Transformer	1 pc.			
	Precision Cutter Model: VH-603				
LB1-14-2	Standard Accessories	1 set			
	(SPARE PARTS)				
-3	Cutting Wheels A120N	3 boxes			
-4	" A100P	3 "			
-5	" WA46N	3 sets			
-6	" WA80N	3 "			
-7	" WA120N	3 "			
-8	" GC120N	3 "			
-9	WELLCUT 18ℓ P404	1 can			
	(SPARE PARTS)				
-11	Polishing Disc P.B.C. 200mmφ	2 pcs			
-12	Polishing Paper 223φ # 320	5 boxes			
-13	" " # 500	5 "			
-14	" " # 700	5 "			
-15	" " #1000	5 "			
-16	" " #1200	5 "			
-17	Polishing Cloth No.101 250mmφ	10 "			
-18	" No.773 200mmφ	10 "			
-19	Alumina Pawder 0.3μm 500g	10 btls			
-20	" 0.06μm 500g	10 "			
-21	Diamond Paste 3μm 10g	10 pcs			
-22	" 1μm 10g	10 pcs			
-23	Polishing Cloth for Diamond Paste 200mmφ	5 boxes			
-24	DP-Lubricant 250mℓ	2 pcs			
-25	DP-Lubricant 1ℓ	5 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
			kgs	kgs	M3
	Spot Welder Model: 33706				
LB1-11-1	Spot Welder Model: 33706	1 set			
-2	Standard Accessories	1 set			
C/NO.L(B)-4			361	510	3.451 (3.267)
	Electrometer Model: HE-101A				
LB1-2-1	Electrometer HE-101A	3 sets			
	(STANDARD ACCESSORY)				
-2	Electrode	10 pcs			
-3	Standard Battery	1 set			
	Tester (Volt-ohm Meter) Model: 2411				
LB1-3-1	Tester 2411	2 sets			
LB1-4-5	Recorder R-56	1 set			
	(SPARE PARTS)				
-6	Chart Paper	12 rolls			
-7	Ink No.1 - 6	6 pcs			
-8	Fiber Pen	6 pcs			
	Camera Model: OM-1				
LB1-5-1	Camera OM-1	1 set			
	(OPTIONAL ACCESSORIES)				
-2	Light Unit with Lamps, 4 pcs	1 set			
-3	Copy Stand P-Type	1 set			
-4	Stepdown Transformer	1 pc.			
	Photographic Enlarger Model: CSD-690				
LB1-6-1	Photographic Enlarger CSD-690	1 set			
-2	Timer 690	1 set			
-3	Standard Accessories	1 set			
-4	Stepdown Transformer	1 pc.			
	(OPTIONAL ACCESSORIES)				
-4	Color Analyzer	1 set			
-5	Lens 50mm	1 pc			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	
LB1-6-6	Lens 75mm	1 pc.			
-7	Lens 90mm	1 pc.			
-8	Stepdown Transformer for Color Analyzer	1 pc.			
	Metallurgical Microscope Model: PME-1				
LB1-7-1	Metallurgical Microscope PME-1	1 set			
-2	Standard Accessories	1 set			
-3	Up Transformer 110/220	1 pc.			
	(OPTIONAL ACCESSORY)				
-4	Polaroid Back	1 set			
	Roughness Meter Model: SE-3C				
LB1-8-1	Surfcorder, Amplifier AS-3C	1 set			
-2	Pick-Up Unit PU-DJ2 & PU-DW800	1 set			
-3	Drive Unit DR-100x11	1 set			
-4	Bed	1 set			
-5	Levelling Stand ST-11	1 set			
-6	Recorder RA-60A	1 set			
-7	Calibration Specimen SS-G	1 set			
-8	Column SP-11	1 set			
	(INSTALLATION PARTS)				
-9	Chart Paper	1 roll			
-10	Lubricant 50mℓ	1 pc.			
	(SPARE PARTS)				
-11	Chart Paper	20 rolls			
-12	Lubricant 50mℓ	5 pcs			
	Plastic Desiccator Model: C-3				
LB1-15-1	Plastic Desiccator C-3	4 pcs			
	Immersion Corrosion Testing Equipment				
LB1-16-1	Glass Parts Set	2 sets			
-2	Muntle Heater	2 sets			
-3	Stand Set	2 sets			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
			kgs	kgs	M3
	Zero Shunt Ammeter Model: HM-101				
LB1-17-1	Zero Shunt Ammeter HM-101	1 set			
	DOS Tester Model: S-56				
LB1-18-1	DOS Tester S-56	1 set			
-2	Standard Accessories	1 set			
	(SPARE PARTS)				
-3	Comparison Electrode	1 pc.			
-4	Pt Electrode	1 pc.			
-5	Injector	3 pcs			
-6	Printing Paper	12 pcs			
-7	Electrolyte Cell	1 set			
-8	Thermometer 0 - 50°C	1 pc.			
-9	Battery & Charger	1 set			
-10	KCℓ Solution 1ℓ	1 pc.			
-11	Electrolyte Solution	1 pc.			
C/NO.L(B)-5			20	50	0.444
	Recorder (Include Charts)				
LB1-4-1	Recorder 561	1 set			
	(SPARE PARTS)				
-2	Chart Paper	12 rolls			
-3	Cartridge Pen Red	6 pcs			
-4	" Green	6 pcs			
C/NO.L(B)-6			123	230	2.277 (2.111)
LB1-10-10	laboratory Table Model: 8712C	1 set			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.R-1 (CRATE)					
PR-1	PRETREATMENT EQUIPMENT OF SEA WATER		5,260KGS	6,700KGS	35.954 M3
H2-001	PRETREATMENT UNIT W2600xL2800xH3650	1 pc			
PR-5	CHEMICAL INJECTION SYSTEM				
H2-004	Chemical Dosing Unit	1 pc			
C/NO.R-2 (CRATE)					
PR-3	SPIRAL WOUND TYPE RO EQUIPMENT		2,450KGS	3,100KGS	16.128 M3 (15.496)
H2-002	Spiral Wound Tyoe, RO Unit W2000xL3000xH1700	1 pc			
C/NO.R-3 (CRATE)					
PR-4	HOLLOW FIBER RO EQUIPMENT		2,450KGS	3,100KGS	16.128 M3 (15.496)
H2-003	Hollow Fiber Type RO Unit W2000xL3000xH1700	1 pc			
C/NO.R-4 (CRATE)					
PR-1	PRETREATMENT EQUIPMENT OF SEA WATER		905KGS	2,100KGS	37.522 M3 (36.566)
H2-012	Filtered Sea Water Tank Ø2580xH3650	1 pc			
-018	Ladder for T-102 W500xL2400	1 pc			
-020	Level Gauge for T-102 L2780	1 pc			
C/NO.R-5 (CRATE)					
PR-1	PRETREATMENT EQUIPMENT OF SEA WATER		305KGS	600KGS	10.872 M3 (10.564)
H2-011	Raw Water Tank Ø1620xH2050	1 pc			
-017	Ladder for T-101 W500xL3800	1 pc			
-019	Lavel Gauge for T-101 L1450	1 pc			
C/NO.R-6 (CRATE)					
PR-3	SPIRAL WOUND TYPE RO EQUIPMENT		150KGS	500KGS	9.151 M3 (8.779)
H2-013	SW/RO Feed Tank Ø1276xH1660	1 pc			

- Concluded -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
H2-021	Level Gauge for T-201 L1150	1 pc			
PR-4	HOLLOW FIBER RO EQUIPMENT				
H2-014	HF/RO Feed Tank Ø1276xH1660	1 pc			
-021	Level Gauge for T-301 L1150	1 pc			
C/NO.R-7 (CRATE)					
PR-4	SPIRAL WOUND TYPE RO EQUIPMENT		90KGS	400KGS	6.581 (6.276)
H2-015	SW/RO Product Tank Ø1106xH1450	1 pc			
-022	Level Gauge for T-202 L 100	1 pc			
PR-4	HOLLOW FIBER RO EQUIOMENT				
H2-016	HF/RO Product Tank Ø1106xH1450	1 pc			
-022	Level Gauge forT-302 L1000	1 pc			
C/NO.R-8 (CASE)			1,400KGS	2,200KGS	15.198 (14.751)
PR-8	MVP-701 POWER PANEL				
H2-008	Power Panel W1000xL1400xH2350	1 pc			
PR-009	CONTROL PANEL				
H2-009	Control Panel W700xL2000xH2350	1 pc			
C/NO.9 (CASE)			320KGS	600KGS	5.247 (4.969)
PR-6	RO WASHING SYSTEM				
H2-005	RO Chemical cleaning Unit W1200xL1600xH1500	1 pc			
PR-2	AUTOMATIC FOULING INDEX MONITOR				
H2-237	Measuring System	1 pc			
H2-236	Recorder	1 pc			
	-Concluded -				

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.10 (CASE)			1,300KGS	1,800KGS	9.978 M3 (9.395)
PR-7	PIPING AND ELECTRIC MATERIAL				
H2-056	HT-Pipe 1B-4000	24 pcs			
-057	- do - 1-1/4B-4000	17 pcs			
-058	- do - 1-1/2B-4000	14 pcs			
-071	VP-Pipe 1/2B-4000	6 pcs			
-072	- do - 1B-4000	13 pcs			
-073	- do - 1-1/4B-4000	14 pcs			
-074	- do - 2B-4000	29 pcs			
-075	- do - 2-1/2B-4000	21 pcs			
-110	Elbow Type 1-1/4Bx200x2800	1 pc			
-111	Straight Type 1-1/4Bx1200	1 pc			
-112	Elbow Type 1-1/4Bx200x3700	1 pc			
-113	- do - 1-1/4Bx200x700	1 pc			
-114	Straight Type 1-1/4Bx5500	1 pc			
-115	Regurator Unit 1-1/4Bx200x920	1 pc			
-116	Control Unit 1-1/4Bx700	1 pc			
-117	Tee Type 3/4Bx200x200x3055	1 pc			
H2-118	Straight Type 3/4x5340	1 pc			
-119	Elbow Type 3/4Bx200x3055	1 pc			
-120	Drain Trap Unit 1/2Bx400x3600	1 pc			
-121	Elbow Type 1/2Bx374x250x2090x200	1 pc			
-122	- do - 1/2Bx263x250x1982	1 pc			
-123	Tee Type 3/4Bx200x2340x200	1 pc			
-124	Straight Type 3/4Bx5500	1 pc			
-125	Straight Type 3/4Bx3000	1 pc			
-126	Elbow Type 3/4Bx200x800	1 pc			
-127	Insert Pipe 1-1/4Bx450	1 pc			
-128	- do - 3/4Bx450	1 pc			
-136	Pipe 1-1/4B-SGP(Zn)-5500L	3 pcs			
-137	- do - 3/4B-SGP(Zn)-5500L	1 pc			
-138	- do - 1/2B-SGP(Zn)-5500L	1 pc			
-256	Feed Pipe For HF RO 1-1/4B-3000	1 pc			
-257	Brine Pipe For HF RO 1-1/4"110x475x300	1 pc			
W1-19	Conduit Pipe 22Ax3660L	6 pcs			
-35	Dador for C.P. 40Wx30Hx2500L	1 pc			
-44	Cable Tray WR-30 300Wx3000L	10 pcs			
	- Concluded -				

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.R-10 (CASE)					
W1-45	Cable Tray WR-20 200Wx3000L	2 pcs			
-46	- do - MR-15 150Wx3000L	16 pcs			
-51	Fixed Plate WRS-1	20 pcs			
-53	Sparater WRDF-P 1500L				
C/NO.R-11 (CASE)			1,600KGS	2,380KGS	11.778 M3 (11.285)
PR-1	PRETREATMENT EQUIPMENT OF SEA WATER				
H2-006	Anchor Bolt & Nut M20x200L	22 pcs			
-007	- do - M16x200L	3 pcs			
-023	Anchor Bolts Nut for Each Tanks M16x200L	23 pcs			
PR-2	AUTOMATIC FOULING INDEX MONITOR				
H2-238	Compressure	1 pc			
-239	Cable	2 pcs			
-240	Hose	12 m			
-241	Hose Band	5 pcs			
-242	Miller	1 pc			
-243	O-Ring P-42	3 pcs			
-244	Filter Paper	1 pc			
-245	Printer Paper	12 pcs			
-246	Fuse 3A,5A,10A	9 pcs			
-247	Printer Ribbon	1 pc			
-248	Hose Connector Teflon	4 pcs			
250	Screw	1 set			
-251	Union 13A Inlet	1 pc			
-252	- do - 25A Outlet	1 pc			
PR-3	SPIRAL WOUND TYPE RO EQUIPMENT				
H2-258	Feed Hose LB-1000	1 pc			
-259	Brine Hose 1-1/4B-3000	1 pc			
-260	Inlet Nozzle 1B-250	1 pc			
-261	Brinw Noxxle 1B-100x150x320	1 pc			
-262	U-Band M10-P278	2 pcs			
J3-01	RO Element SP-120 2 pcs./carton x 4 cartons 1 pc. /carton x 1 carton	9 pcs			
-02	End Plate Adaptor (Inlet)	3 pcs			
-03	- do - (Outlet)	3 pcs			
-04	O-Ring (P-32)	32 pcs			
-05	O-Ring (P-34)	6 pcs			
-06	Lapping Bag for Eklement	6 pcs			
PR-4	HOLLOW FIBER RO EQUIPMENT				
H2-147	Element HR8355E1	2 pcs			

- Concluded -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.R-11 (CASE)					
H2-148	O-Ring P-225 NBR	2 pcs			
-149	- do - P-195 NBR	1 pc			
-150	- do - G-30 NBR	1 pc			
-151	Element HM8155E1	2 pcs			
-152	O-Ring P-195 NBR	4 pcs			
-153	- do - G-25 Silicone Rubber	8 pcs			
PR-5	CHEMICAL INJECTION SYSTEM				
H2-253	Inlet Hose 1-1/4B-3000L	1 pc			
-254	Brine Hose 1B-4000L	1 pc			
-255	Product Hose 1B-4000L	1 pc			
PR-7	PIPING AND ELECTRIC MATERIAL				
H2-029	Ball Valve (P-102) 2-1/2B-PVC-FF	1 pc			
-030	- do - (T-101) 1B-PVC-FF	1 pc			
-031	- do - (T-102) 1B-PVC-FF	1 pc			
-032	Glove Valve (FIR) 1/2B-PVC-SC	1 pc			
-033	- do - (T-101) 2B=PVC-FF	1 pc			
-034	Ball Tap (T-201) 1-1/4B-BC-SC	1 pc			
-035	Ball Valve (P-202) 1-1/2B=PVC-FF	1 pc			
-036	Glove Valve 1-1/4B-PVC-FF	1 pc			
-037	Ball Valve 1-1/4B=PVC-FF	1 pc			
-038	Ball Valve 1B-PVC-ff	1 pc			
-039	- do - 1B-PVC-FF	1 pc			
-040	Glove Valve 1-1/4B-PVC-FF	1 pc			
-041	Ball Valve (T201) 1B-PVC-FF	1 pc			
-042	Ball Valve (T-202) 1B-PVC-FF	1 pc			
-043	Ball Valve (T-202 1-1/4B-PVC-FF	1 pc			
-044	Ball Tap(T-301) 1-1/4B-BC-SC	1 pc			
-045	Ball Valve (P-302) 1-1/2B-PVC-FF	1 pc			
-046	Glove Valve 1-1/4B-PVC-FF	1 pc			
-047	Ball Valve 1-1/4B=PVC-FF	1 pc			
-048	Glove Valve 1B=PVC-FF	1 pc			
-049	- DO - IB-PVC-FF	1 pc			
-050	- do - 1-1/4B-PVC-FF	1 pc			
-051	Ball Valve 1B-PVC-FF	1 pc			
-052	- do - 1-1/4B-PVC-FF	1 pc			
-053	- do - 1-1/4B-PVC-FF	1 pc			
-059	90° Elbow 1B-HT-PVC	50 pcs			
-060	- do - 1-1/4B-HT-PVC	60 pcs			
-061	90° Elbow 1-1/2B-HT-PVC	30 pcs			
-062	Tee 1Bx1B-HT-PVC	6 pcs			
-063	- do - 1-1/4Bx1B-HT-PVC	13 pcs			
-064	- do - 1-1/4Bx1-1/4B-HT-PVC	13 pcs			
-065	Socket 1B-HT-PVC	15 pcs			
-066	- do - 1-1/4B-HT-PVC	20 pcs			
-067	- do - 1-1/2B-HT-PVC	15 pcs			

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.R-11 (CASE)					
H2-068	Flange 1B-JISIOK-HT-PVC	21 pcs			
-069	- do - 1-1/4B-JISIOK-HT-PVC	17 pcs			
-070	- do - 1-1/2B-JISIOK HT-PVC	6 pcs			
-076	90° Elbow 1/2B-PVC	21 pcs			
-077	- do - IB-PVC	27 pcs			
-078	- do - 1-1/4B-PVC	46 pcs			
-079	- do -2B-PVC	43 pcs			
-080	- do - 2-1/2B-PVC	23 pcs			
-081	Tee 2Bx2B-PVC	6 pcs			
-082	Tee 2Bx1B-PVC	5 pcs			
-083	Reducer 1-1/4Bx1B-HT-PVC	8 pcs			
-084	- do - 2Bx1B-PVC	5 pcs			
-085	Reducer 2-1/2Bx2B-PVC	5 pcs			
-086	Socket 1-2B-PVC	9 pcs			
-087	- do - IB-PVC	16 pcs			
-088	- do - 1-1/4B-PVC	16 pcs			
-089	- do - 2B-PVC	41 pcs			
-090	- do - 2-1/2B-PVC	21 pcs			
-091	Valve Socket 1/2B-PVC	2 pcs			
-092	Flange IB-JISIOK-PVC	19 pcs			
-093	- do - 1-1/4B-JISIOK-PVC	11 pcs			
-094	- dO - 2B-JISIOK-PVC	9 pcs			
-095	- do - 2-1/2B-JISIOK-PVC	6 pcs			
-096	Gasket IB-JISIOK-TEF.	21 pcs			
-097	- do - 1-1/4BN-JISIOK-TEF.	17 pcs			
-098	- do - 1-1/2B-JISIOK-TEF.	6 pcs			
-099	- do - IB-JISIOK-EPT.	19 pcs			
-100	- do - 1-1/4B-JISIOK-EPT.	11 pcs			
-101	- do - 2B-JISIOK-EPT.	9 pcs			
-102	- do - 2-1/2B-JISIOK-EPT.	6 pcs			
-103	Bolt & Nut M16x70-SUS304	60 pcs			
-104	- do - M16x65-SUS304	50 pcs			
-105	- do - M16x60-SUS304	160 pcs			
-106	- do - M16x55-SUS304	160 pcs			
-107	- do - M12x55-SUS304	30 pcs			
-108	Nail for PVC 500g	12 pcs			
-109	Nail for HT-PVC	10 pcs			
-129	Spacer Pipe 1-,/4Bx200	4 pcs.			
-130	- do - 3/4Bx200	2 pcs			
-131	Gasket 1-1/4B-JISIOK	20 pcs			
-132	- do - 3/4B-JISIOK	14 pcs			
-133	- do - 1/2B-JISIOK	5 pcs			
-134	Bolt & Nut M16x55L	80 pcs.			
-135	- do - M12x45L	76 pcs			
-139	Flange 1-1/4B-JISIOK	12 pcs			
-140	- do - 3/4B-JISIOK	8 pcs			
-141	- do - 1/2B-JISIOK	4 pcs			
-142	Flange Cover 1-1/4B	20 pcs			
-143	- do - 3/4B	15 pcs			

- Concluded

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
C/NO.R-11 (CASE)					
H2-144	Flange Cover 1/2B	5 pcs			
-145	Pressure Gauge)-10KGxPF	1 pc			
-146	Glove Valve (P1-401) 3/8B-BC-SC	1 pc			
W1-04	Cable 600V CV 14sq - 3c	88 m			
-05	- do - 3.5sq -3c	104 m			
-06	- do - 2sq -3c	550 m			
-07	- do - 600V CVV 2sq - 2c	422 m			
-08	- do - 2sq -3c	20 m			
-09	- do - 2sq -5c	167 m			
-10	- do - 2sq -20c	14 m			
-11	- do - 600V CVV 2sq - 2c	4.2 m			
-12	- do - 2sq -3c	84 m			
-13	- do - 600V IV 38sq	31 m			
-14	- do - 14 sq	31 m			
-15	- do - 3.5sq	33 m			
-21	Lock Nut 22A	8 pcs			
-22	Bushing 22A	8 pcs			
-23	Flexible Tube with Water Proof #17	14 m			
-24	- do - #24	30 m			
-25	- do - #38	14 m			
-26	- do - #50	17 m			
-27	Box Connector #17 WBG	10 pcs			
-28	- do - #24	20 pcs			
-29	- do - #38	15 pcs			
-30	- do - #50	17 pcs			
-31	Solderless Terminal 2sq	500 pcs			
-32	- do - 3.5sq	50 pcs			
-33	- do - 14 sq	50 pcs			
-32	Coupling 22A	4 pcs			
-34	Clamp 22A	30 pcs			
-36	Connector for Grounding 50sq	12 pcs			
-37	Vinyl Bolt & Nut M16x65L	32 sets			
-38	Vinyl Tape 19W Black(Colored)	10 pcs			
-39	19W Transparency	5 pcs			
-40	- do - 19W Green(Colored)	3 pcs			
-41	Tag Plate 30ø	150 pcs			
-42	Dymo Tape 8Wx3.5M(Black)	3 pcs			
-43	Bind Wire 1ø L=300M	1 drum			
-47	Connection Plate WRG-1 for WR-30 WR-20	10 pcs			
-48	- do - MRG-1 for MK-12	10 pcs			
-49	Free Connection Plate WRB-1	30 pcs			
-50	Corner Plate MRZ-5 for MK-15	10 pcs			
-52	Fixed Plate MRU for MK-15	20 pcs			
-54	Cable Protect Plate WR30-M	30 pcs			
-55	- do - WR20-M	4 pcs			
-56	Hole in Anchor Bolt & Nuts ,12x70L	10 pcs			
-57	- do - M6x30L	100 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R-11					
PR-8	CR-201,301 COnductivity Recorder				
H2-024	PH Censor	1 pc			
-025	ORP Censor	1 pc			
-026	Junction Box	4 pcs			
-027	Cable for PH & ORP	60 M			
-028	Cable for CRA	60 M			
PR-8	PHRA-301 PH Recorder				
A3-01	PH/ORP Meter F-8L 300x270x121	1 set			
-03	ORP Electrode 6811-06C 20ϕ x 150L	1 pc			
-04	Powder for PH 7 Standard Solution 150-7 300x40x5 10pcs/set	1 set			
-05	Powder for PH 4 Standard Solution 150-4 300x40x5 10 pcs/set	1 set			
-06	Powder for PH 9 Standard Solution 150-9 300x40x5 10 pcs/set	1 set			
PR-8	CR-201,301 Conductivity Recorder				
A3-02	Conductivity Meter DS-8F 300x250x121	1 set			
PR-9	Maintenance Tool				
H2-224	Nipple 1/4B	2 pcs			
-225	Ball Valve 1/4B	1 pc			
-226	Tee 1/4B	1 pc			
-227	Pressure Gauge	1 pc			
-228	Gas Line Holder	1 pc			
-229	Gas Filter	100 pcs			
-230	Pressure Tank 20L	1 pc			
-231	Air Discharge Valve	1 pc			
-232	Teflon Tube Tube 1-3	1 pc			
-233	Polypropylene Tube 3	1 pc			
-234	Tweezers	1 pc			
-235	Filter Holder Polypropylene	1 pc			
-266	Tool Box	1 pc			
-267	Adjustable Angle Wrench 150L	1 pc			
-268	- ditto - 200L	1 pc			
-269	- ditto - 250L	1 pc			
-270	- ditto - 300L	1 pc			
-271	Pipe Wrench 300L	2 pcs			
-272	Six Set Wrench	1 set			
-273	Side Cutting Plier 150L	1 pc			
-274	Radio Plier 125L	1 pc			
-275	Nipper 125L	1 pc			
-276	Screw Drivers set	1 set			
-277	Hammer	1 pc			
-279	Hack Saw Frame	1 pc			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R -11					
H2-280	Cutter	1 set			
-281	Measure	1 pc			
-282	Edge for Hack Saw Wire	1 set			
-283	Brush	4 pcs			
-284	PVC Bucket 20L	2 pcs			
-285	Water Hose with Hose Band 30M	1 pc			
-286	Hand Tank 20L-PVC	4 pcs			
-287	Hand Pump PVC	2 pcs			
-288	Funnel 300m/m	1 pc			
-289	- do - 120m/m	1 pc			
-290	Apron	1 pc			
-291	Mask	1 pc			
-292	Gloves	2 pcs			
-293	Cloth	2 pcs			
-294	PVC Hose ϕ25-5000m/m	1 pc			
-295	Hose Band ϕ32	10 pcs			
-296	Nylon Tube ϕ6-5000m/m	1 pc			
-297	Tube Fitting ϕ6 x PT 1/4	6 pcs			
-298	- do - ϕ6 x PF 1/4	6 pcs			
-299	Seal Tape	10 pcs			
-300	Vaseline 100g	1 pc			
-301	Victaulic Joint G1-1-1/4B	4 pcs			
-302	- do - G1-1B	2 pcs			
-305	Handy Bottle for Paint ϕ200 x H250	1 pc			
-308	Brush	5 pcs			
A6-01	PH Test Paper Dispenser Type 11 F Type TC	100 pcs			
-02	Thermometer 01S 0-50 C	3 pcs			
-03	- do - 10S 0-100C	3 pcs			
-04	PE Bottle 5000CC	1 pc			
-05	- do - 1000CC	10 pcs			
-06	- do - 250CC	5 pcs			
-07	Messcylinder PP 1000CC	2 pcs			
-08	- do - PP 500CC	2 pcs			
-09	Beaker PE 100CC	10 pcs			
-10	- do - PE 200CC	10 pcs			
-11	Washing Bottle PE500CC	3 pcs			
-12	Pipet PE 2CC	10 pcs			
-13	Acid Proof Glove	1 pc			
-14	Dust Protective Goggle	1 pc			
-15	Residual Chlorine Meter 01H,04H,03H	1 pc			
-16	Tissue Paper 05 S-200 Type	10 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R-11					
PR-8	DORA-201 DESOLVED OXYGEN RECORDER				
A4-01	Meter Unit UC012 190x110x37 m/j	1 pc			
-02	Sensor ø2.5x134 m/m 5m Long lead wire	1 pc			
-03	Mombrane	5 pcs			
-04	Electrolyte 50mul	1 pc			
-05	Poly Beaker 100ml	1 pc			
-06	Tweezers	1 pc			
-07	Syring 10ml	1 pc			
-08	Electrode Adrasive 10g	1 pc			
-09	Tandem Bulb Sprayer	1 pc			
-10	Annydrow Sodium Sulfite 100g	1 pc			
-11	Exclusive Battery Charger	1 pc			
-12	Recorder Transmition Cable	1 pc			
-13	UC Meter Carrying Case 300x170x220 m/m	1 pc			
PR-3	SPIRAL WOUND TYPE RO EQUIPMENT				
PR-4	HOLLOW FIBER RO EQUIPMENT				
MS-01/04	Germicidal Lamp Quartz Glass	4 pcs			
MS.05	O-Ring SX-2 NBR	4 pcs			
MS.06	- do - SX-3 NBR	2 pcs			
MS.07	Fuse 5A Glass	4 pcs			
MS.08	O-Ring G-30 Viton	14 pcs			
PR-10	SPARE PARTS				
HS-154	Plunger oil Seal NBR	6 pcs			
-155	Crank Shft Oil Seal NBR	2 pcs			
-156	Plunger Wiper NBR	6 pcs			
-157	Water Seal (A) NBR	12 pcs			
-158	- do - (B) NBR	12 pcs			
-159	Water Seal Collar NBR	6 pcs			
-160	Water Seal O-Ring NBR	6 pcs			
-161	Female Adaptor Teflon	12 pcs			
-162	V-Packing (A) Cloth w/NBR	60 pcs			
-163	- do - (B) Teflon	48 pcs			
-164	Gland Spring SUS316	6 pcs			
-165	Valve Guide O-Ring NBR	6 pcs			
-166	Pressure Control Spring STP	2 pcs			
-167	Rod Guide O-Ring NBR	2 pcs			
-168	Rod O-Ring NBR	2 pcs			
-169	Valve Case O-Ring NBR	6 pcs			
-170	Cup Packing Viton	2 pcs			
-171	Seal Packing NBR	2 pcs			
-172	Seal SUS316	2 pcs			
-173	Ball SUS316	2 pcs			
-174	Valve Spring SUS316	2 pcs			
-175	Suction & Discharge Valve O-Ring NBR	12 pcs			

- To be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R-11					
H2-179	Crank Shaft Bearing No.5203	4 pcs			
-180	Oil Gauge	2 pcs			
-181	V-Blet No.B-59	12 pcs			
-184	Hanmering Inserter A.B. and Plunger for water seal Oil Seal	1 pc			
-185	Ball Bearing NTN6205LLB	6 pcs			
-186	- do - NTN6206LLB	6 pcs			
-187	Mrchanical Seal B1-JE4 ϕ25	6 pcs			
-188	O-Ring P.T.F.E. ϕ3.5 x 180id	3 pcs			
-189	- do - ϕ3.5 x 140id	1 pc			
-190	Ball Bearing NTN6305Z	1 pc			
-191	- do - NTN6306Z	1 pc			
-192	Mechanical Seal EX111 ϕ25	1 pc			
-193	O-Ring CR ϕ3 x 180id	1 pc			
-194	O-Ring P.T.F.E. ϕ3.5 x 158id	2 pcs			
-195	Bearing (G.S) SUJ 2 6304CM	2 pcs			
-196	- do - 6304VCMNS7	2 pcs			
-197	Oil Seal NBR TC2642B	2 pcs			
-198	Gasket (G.C) 206S 0.6t	1 pc			
-199	Gasket (S.C) 201S 0.1t	2 pcs			
-200	V-Belt Rubber A Type #36	1 pc			
-201	Teflon Hose for H2SO4	30 m			
-202	Pump PD-31P VTH-HWS	2 pcs			
-203	- do - 11P - do -	2 pcs			
-204	- do - CSD-31P	3 pcs			
-205	- do - CSD-22	1 pc			
-206	Blade Hose 6ID x 11OD for PD	100 m			
-207	- do - 5ID x 9OD for PVC	100 m			
-208	2 Way Connector 6 PVC	4 pcs			
-209	Upper Connector set	2 pcs			
	PD-FS PD-11P VTH	2 pcs			
-210	- do -	2 pcs			
	PD-FS PD-31P VTH	2 pcs			
-211	Lower Connector Set PD-FS PD-11P VTH	2 pcs			
-212	- do - PD-FS PD-31P VTH	2 pcs			
-213	Solenoid 200V-11P	2 pcs			
-214	- do - 200V-31P	2 pcs			
-215	Electric Circuit 200V-11P	2 pcs			
-216	- do - 200V-31P	2 pcs			
-217	Diaphragm 32T PD-31P,11P PVTH	4 pcs			
-218	Diaphragm 39MP Teflon	3 pcs			
-219	- do - 65W Teflon	1 pc			
-220	Check Ball 6.35 Hastelloy C	6 pcs			
-221	- do - 8.7 Seramic	2 pcs			
-222	Head Packing 10A	8 pcs			
-223	Valve stopper Fluorine Rubber	8 pcs			
-263	Fuse 3A	1 pc			
-264	Lamp 2W	30 pcs			
-265	Lamp Tool OR-22	1 pc			
-313	Thermo Meter PTI/2x0-100°C	8 pcs			
-314	Filter Element LLP-20-10	16 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
R-11					
H2-315	O-Ring LMO-10U	10 pcs			
PR-8	LSA-101,201,301,102 Level Switch				
H2-309	Level Switch LSA-101-1750L	1 pc			
-310	- do - LSA-102-2850L	1 pc			
-311	- do - LSA-201-1450L	1 pc			
-312	- do - LSA-301-1450L	1 pc			
PR-7	Piping and Electric Material				
H2-316	O-Ring G200	6 pcs			
-317	Back up Ring for G200	6 pcs			
PR-8	Control Panel				
W1-3	Anchor Bolt & Nuts 1/2B x 150L	10 pcs			
PR-10	Spare Parts				
	Chart Paper	4 pcs			
	Wrench 1m/m	4 pcs			
	Plastic Part 0884	8 pcs			
	- do - 0584	4 pcs			
	Fuse 200mA	2 pcs			
	- do - 315mA	2 pcs			
	Oil Feeder 1 l	1 pc			
	Glove (Nylon)	12 pcs			
	Nipple 1B-200L-SUS316	1 pcs			
	- do - 3/4-200L-SUS316	1 pc			
	Rubber Cap	1 pc			
	Flange ϕ250-SS(Zn)	2 pcs			
	Rubber sheet t2 x ϕ 250(NR)	1 pc			
	Ratchit 400m/m	1 pc			
	O-Ring G200	6 pcs			
	Back up Ring G200	6 pcs			
	O-Ring for and Plate	6 sets			
	Ball Tap 1-1/4B	1 pc			
	Ball Valve 10K-50A-PVC	7 pcs			
	- do - 10A-40A-PVC	1 pc			
	- do - 10I-25A-PVC	3 pcs			
	Check Valve 10K-25A-PVC	1 pc			
	Butterfly 10K-65A-PVC	2 pcs			
	Glove Valve 10K-65A-PVC	1 pc			
	Ball Valve 15A-TS-PVC	1 pc			
	Gate Valve 10K-50A-PVC	1 pc			
	Glve Valve 10K-20A-BC	1 pc			
	Glove Valve 30A-SC-BC	3 pcs			
	Needle Valve 8A-SC-SUS	8 pcs			
	- do - 15A-SC-SUS	1 pc			
	Ball Valve 8A-SC-SUS	6 pcs			
	Needle Valve 8A-SC-BC	1 pc			
	Dampner 10A-SUS	16 pcs			
	- do - 10A-BC	3 pcs			
	Gasket 10r-32A-V#15	26 pcs			
	- do - 10r-20A-V#15	24 pcs			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R-11	Gasket 10r-15A-V#15	11 pcs			
	Bolt Nut M16 x 70L(SUS)	44 pcs			
	- do - M16x65L(SUS)	31 pcs			
	- do - M12x45L(SS)	76 pcs			
	HT Flange 10K-15A	16 pcs			
	- do - 10K-20A	4 pcs			
	- do - 10K-25A	5 pcs			
	- do - 10K-40A	8 pcs			
	- do - 10K-50A	5 pcs			
	HT-90° Elbow 13	20 pcs			
	- do - 16	1 pc			
	- do - 25	1 pc			
	- do - 30	3 pcs			
	- do - 40	7 pcs			
	- do - 50	44 pcs			
	- do - 65	20 pcs			
	Ht-Tees 65	5 pcs			
	- do - 25 x 16	10 pcs			
	- do - 25 x 20	7 pcs			
	- do - 25 x 25	2 pcs			
	- do - 30 x 30	4 pcs			
	- do - 30 x 20	19 pcs			
	- do - 30 x 13	3 pcs			
	- do - 30 x 16	5 pcs			
	- do - 40 x 16	4 pcs			
	- do - 40 x 25	3 pcs			
	- do - 40 x 30	2 pcs			
	- do - 40 x 40	6 pcs			
	- do - 50 x 16	3 pcs			
	- do - 50 x 40	3 pcs			
	- do - 50 x 50	10 pcs			
	- do - 65 x 50	3 pcs			
	- do - 50 x 13	1 pc			
	HT-Socket 20 x 16	6 pcs			
	- do - 30 x 20	1 pc			
	- do - 40 x 30	1 pc			
	- do - 50 x 40	7 pcs			
	- do - 65 x 50	5 pcs			
	- do - 30 x 25	4 pcs			
	- do - 30	2 pcs			
	Bolt Nut M16 x 55	44 pcs			
	Bolt Nut M12 x 50	64 pcs			
	Teflon Packing 10K-15A	5 pcs			
	- do - 10K-20A	6 pcs			
	- do - 10K-25A	2 pcs			
	- do - 10K-32A	22 pcs			
	- do - 10K-40A	10 pcs			
	EPT Packing 10K-25A	2 pcs			
	- do - 10K-32A	19 pcs			
	- do - 10K-40A	8 pcs			
	- do - 10K-65A	7 pcs			
	90° Elbow (PVC) 40	1 pc			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight net	Weight gross	Measurement
R-11	90° Elbow (PVC) 50	2 pcs			
	- do - 25	3 pcs			
	- do - 20	15 pcs			
	- do - 16	2 pcs			
	Flange (PVC) 10K-40A	8 pcs			
	Socket (PVC) 65 x 50	1 pc			
	- do - 40 x 25	3 pcs			
	- do - 20 x 16	13 pcs			
	- do - 25	2 pcs			
	Tees (PVC) 65 x 50	2 pcs			
	- do - 65 x 40	2 pcs			
	- do - 50 x 40	3 pcs			
	- do - 50 x 20	1 pc			
	- do - 50 x 16	2 pcs			
	- do - 50 x 13	4 pcs			
	- do - 40 x 40	2 pcs			
	- do - 40 x 25	1 pc			
	- do - 20 x 20	2 pcs			
	Valve Socket (PVC) 50	4 pcs			
	Cap (PVC) 30	1 pc			
	Valve Socket (PVC) 30	8 pcs			
	Cap (PVC) 25	4 pcs			
	Gate 10K-50A-PVC	1 pc			
	Packing List	3 sets			
	Parts List	3 sets			
	Inspection Test Report	3 sets			
	Opeation & Maintenance Manual	3 sets			
R-12			2,750Kgs	2,980Kgs	4.056 M3
CASE)					(3.859)
PR-01	Chemical				
A2-02	Sodium Bisulfite 95% (Na2S2O5)	2400Kgs			
-03	Sodium Hexameta Phosphate 66% (P2O5)	200kgs			
-04	Citric Acid 99% (C6H8O7.H2O)	120Kgs			
R-13	Chemical		1,180Kgs	1,500Kgs	3.104 M3
					(2.898)
A2-01	Iron Chloride 37%(FeCl3-6H2O)	800Kgs			
-05	Ammonia Water 25%(NH3)	180Kgs			
-06	Formaline 37% (HCHO)	200Kgs			
R-14			32kgs	50kgs	0.094 M3
(CASE)					
PR-10	Spare Parts				
H2-182	Lubricating Oil for Pump PAN-X Motor Oil	15 L			
-183	- do - Beiel 1FBK Oil R0	30 L			

- to be continued -

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C/Nos.	Description of Goods	Quantity	Weight		Measure-ment
			net	gross	
R-15 (CASE)			26kgs	40kgs	0.075 M3
PR-2	Automatic Fouling Index Monitor				
H2-249	Touch up Paint	1 pc			
PR-9	Maintenance Tool				
H2-307	Spray	2 pcs			
-303	Touch up Paint for RO Skid	1 pc			
-304	Solvent for Paint 4 Kg	1 pc			
PR-10	Spare Parts				
	Paint for Belt Cover 500g	1 pc			
	Paint for Motor 500g	1 pc			
	PVC Adhesive 1 Kg	2 pcs			
	- do - 500g	3 pcs			
	HT Adhesive 100g	4 pcs			
	-following blank-				