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国際協力事業団	
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1 54年12月 ミッション

(第1次細目合意書交渉団)

1974

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- (資料) 別添1. Minutes of Meeting (日本側作成細目
R/D案, サウジ側の修正対案添付)
2. Main Changes of the Project
 3. Dec. 22nd 1979付 提出Documents
 4. Cost Comparison of the Field
Test Plant (Performance ratio
from 3 to 6)



1. 目 的

サウジアラビア王国との海水淡化技術協力に関し、昭和54年9月に締結した基本 R/D に基づき、サウジアラビア王国側実施機関と細目 R/D (案) に関する協議を行い、同案の事務レベルでの合意を得ることを目的とする。

2. 交渉団の編成

団 長	後 藤 藤 太 郎	工業技術院化学技術研究所 プロセス開発部第1課長
団 員	皆 川 茂 夫	(財)造水促進センター 脱塩技術部
	田 沢 雄 二 郎	〃
	今 井 正 昭	〃

3. 交渉日程

月 日	作業項目	作業内容	関係者(面接者)	所在地
11.29	20:35 成田発		ミッション(後藤, 皆川, 田沢 今井, 中川)	
11.30	21:30 リヤド着	今後の方針打合せ		リヤド
12. 1	SWCCと打合せ	・Jamjoon 副総裁を表敬訪問 ・Nasit 研究部長と今後の方針 打合せ 日本側よりR/D(Draft)を提出	Hassan Jamjoon Yousef Nasit, Habeeb Mohammed (境 長田)	〃
12. 2	SWCCと打合せ	・サ側よりCounter Draft (Agreement)を提出される ・日本側案との相違点を検討	Nasif, Habeeb (長田)	〃
12. 3	SWCCと打合せ SWCC officeで 作業	・サ側Agreementの内容に ついて検討	Nasif, Habeeb (長田)	〃
12. 4	SWCC officeで 作業	・日本側対策を作成	(長田)	〃
12. 5	〃	〃	(長田)	〃
12. 6	日サ事務局で作業	〃	(長田)	〃
12. 7	移動(リヤド→ジュッダ)	・今後の方針打合せ	向井書記官	ジュッダ
12. 8	SWCCと打合せ	・Abdul Nasit西部局長を 表敬 ・SWCCと今後の方針打合せ ・R,Oプラント見学	Abdul Nasi Nasif, Habeeb Saeed Najjar, (向井)	〃
12. 9	SWCCと打合せ	・主として技術的な面について 打合せる	Nasif Habeeb, Najjar (向井)	〃
12.10	SWCCと打合せ	・主としてcost estimate について打合せる	Nasif, Habeeb, Najjar (向井)	〃
12.11	YAMBU PLANT 見学(建設中)	・現地に於てSWCC, 三菱の説明 をうける	Habeeb Najjar (向井)	ジュッダ
12.12	(運転 建設中)	・運転上の問題点等を知る	Habeeb (向井)	〃
12.13	大使館にて作業	・コスト估算, 今後のスケジュール 作成, R/Dの検討	(向井)	〃

月 日	作業項目	作業内容	関係者(面接者)	滞 在 地
1214	大使館にて作業	・コスト積算, 今後のスケジュール作成, R/Dの検討	(向井)	ジュッダ
1215	移動(ジュッダ～ダーラン～ 見学(建設中))	・Daud Khumayyis東総局長表敬 ・現地にてSWCC, 三菱, 笹倉の説明をうける。質問書をSWCCに手渡す。	Daud Khumayyis, Abdulah Manasef, Habeb Najjar	アル・ジュベール
1216	AL-COHOBAR PLANT見学 (運転, 建設中)	・運転中の問題点等を聞く	Habeb, Najjar	〃
1217	SWCCと打合せ	・運転条件, 建設中等の質問書について説明をうける	Manasef	リヤド
	移動(ジュベール～リヤド)			
1218	日-サ事務所にて作業	・コスト積算 ・建設場所のコメントをまとめる	(向井)	〃
1219	SWCCと打合せ	・今後の方針, 各現場見学結果, 現在の問題点等について打合せる	Nasif, Habeb (境, 向井)	〃
1220	日-サ事務所にて作業	・最終R/D案, コスト積算等の作業	(境, 向井)	〃
1221	〃	〃	〃	〃
1222	SWCCと打合せ	・日本側提出書類に沿って説明(R/D, RO, 現場サイト, コスト等)	Nasif, Habeb	〃
1223	SWCCと打合せ	・前日に引き続き問題点の煮詰め ・Minutesの作成	Nasif, Habeb (境, 向井)	〃
1224	SWCCと打合せ	・Minutesにサイン ・Jamjoomに挨拶	Nasif, Habeb (境, 向井)	〃
1225	移動(リヤド～ロンドン)			ロンドン
1226	移動(ロンドン～成田)			
1227	16:30 成田着			

4. 交渉経過

(1) 12月1日 SWCCにイサム・ジューン副総裁を表敬訪問し、ナシーフ研究訓練部長と第1回の会談を行った。席上、日本側より Detailed R/D の日本案を提示し、ミッションの在サ中の日程について打ち合わせた。

(2) 12月2日 SWCCにおいてナシーフ部長よりサウジ側の Detailed R/D の対案が交された。サウジ側の対案は日本案をベースにしているものの、双方の考え方にかかなりの相違があり、早期妥結の困難なことが予想された。また、サウジ側は昭和52年11月当時の東京工業試験所の石坂所長が提案した“Tentative Proposal”（ナシーフ部長はこれを red book と称した）より今回の日本側は後退しているとの印象を受けた様子で、両者の相違点につき説明を求めた。日本側は今回の提案はプロジェクトの縮少ではなく、その後に得られた情報を入れ、技術協力をより実質的にするための改訂であると説明した。そして、両提案の差異を表にしてサウジ側に提出した。（別添2）

さらにサウジ側は逆浸透の分野についても日本側の技術協力を求めたのに対し、日本側は検討を約した。

(3) 日本側とサウジ側の Detailed R/D の主な相違点は次の通りである。

① 細目協定のタイトル

日本案 Detailed R/D

サウジ案 Agreement

② 細目協定の署名者

日本案 JICA および SWCC

サウジ案 JICA, SWCC, 造水センターおよび日-サ合同委の代表である大臣

③ Joint Technical Team の設立および運営

日本案 なし

サウジ案 双方の専門家からなる Joint Technical Team を作り、これにプロジェクトの運営を任せる。

④ 特許条項

日本案 なし

サウジ案 サウジ側がすべての権利をもつ案か両国政府が対等の権利をもつ案

⑤ 費用の支出法

日本案 なし

サウジ案 本協力にかかわるすべての支出は Joint Technical Team の勧告で SWCC が承認する必要がある。

⑥ 見積金額の表示

日本案 なし

サウジ案 細目協定の本文中に双方の見積り金額を明示する。

⑦ Force Majeure 条項

日本案 なし

サウジ案 Acts of God を含む Force Majeure により双方の責任は Suspend される。

⑧ Amendment, Extension or Termination 条項

日本案 なし

サウジ案 双方の合意が得られれば本協定の改正、延長あるいは中止ができる。中止の場合、60日以前に文書で通告する。

(4) 日本側ミッションは12月7日～14日 リアドからジェッダに移り、さらにナシーフ部長およびジェッダの SWCC 技術スタッフ と協議を行うとともにジェッダのプラントを視察し、技術討論を行った。(ジェッダ滞在中、ヤンプーの施設を訪問した。)その概要は次の通りである。

① 日本側よりフィールド・テストプラントの透水費を3から6に変更する場合の費用の増加分をサウジ側が負担するならば、透水費を6にすることを検討すると述べた。

(別添 4)

② サウジ側はフィールド・テストプラントにつき長管式と短管式を組み合わせた方式の試験を希望した。日本側は組み合わせ方式の技術的可能性、それをを用いる試験の意義について検討することを約束した。

③ サウジ側より本プロジェクトに必要な全項目(たとえば職員住宅、厚生施設、サウジ国内の旅費なども含める。)についての費用見積もりをしてほしい旨、要求があった。

④ サウジ側よりプロジェクトの行われるサイトについてはジェッダの可能性は極めて少なく、アルジュベール、ヤンプーなどが有力な候補地であるとの説明があった。

(5) 12月15日より18日まで日本側ミッションはアルコパールおよびアルジュベールの施設を視察し、サイトの条件を調査すると同時に現地技術者と技術問題について話し合いを行った。

(6) 12月19日より再びリアドに戻り、24日までナシーフ部長を長とするサウジ側と協議した。その概要は次の通りである。

① 細目協定のタイトルは Agreement でなく、R/D とする。しかし、これを Endorse する形で Covering letter をつけ、サウジ側はナゼル企画大臣、日本側はこれに対応する大臣が署名する。R/D の署名は JICA と SWCC の間で行う。

- ② サウジ側の対案を基礎に一部を修正し、(イ) Method of Payment (ロ) Responsibility of Joint Technical Team (ハ) Termination をペンディングとする他は原則的に両者で合意した。日本側はペンディング条項を検討し、再度日本案を提案することになった。
- ③ 日本側よりサイトの候補地であるジェッダ、アルコパール、アルジュベールおよびヤンブーの長所、および短所を説明した。
- ④ 日本側より本プロジェクトの全項目についての見積もり概算書およびそのベース・データを提出した。
- ⑤ サウジ側より昭和52年の Tentative Proposal (赤本)の改訂版を費用見積もりを含めて提出してほしい旨、要請があり、日本側はこれを了承した。なお、研究項目には逆浸透のモジュール・テストを入れることで合意した。
- ⑥ サウジ側が支出する項目についてはすべて国際入札にかけるのが SWCC の基本方針であり、これは今後とも変えることはできないとの説明があった。

5. 交渉の結果

協議結果を確認するため、Minutes (別添 1) を作成し、12月24日、後藤団長とナシーフ部長の間で署名した。主な結果は次のとおりである。

- (1) R&Dの Annex (Technicalの概要) について合意を得ることができた。

ただし、ROの Module Test を追加することとする。

- (2) R&Dの本文について

- ① Method of Payment
- ② Responsibility of Joint Technical Team
- ③ Termination

を除き、合意に達することができた。

ただし、" Article 9 Patents " の項で

日側案の JICA and SWCC に対し

サ側案の Both Government と一致をみていない。

(注) サ側はサインするまで、すべての項は Negotiable という態度である。

- (3) Tentative Proposal (赤本)の改訂を行うことになった。これは Culture および Language の異なる日-サで誤解を生じないようにするため、是非必要で、両国間 Contract のベースになるものである。したがって、Technical, Cost Estimate および R/D など必要な項目すべてを含むものでなければならない。

(Nasif 局長の話)

6. 今後検討すべき事項

- (1) R/D の Pending 条項の検討
- (2) 赤本の改訂
- (3) Cost Estimate の見直し
- (4) 日本側で是非負担しなければならない項目の見直し
- (5) Joint Technical Team の役割検討
- (6) International Tender の対策
- (7) わが国負担項目の見直し
- (8) ミッションの役割とメンバー選定

R/D の見直しが得られたので、今後は Implementing Procedure の論議をする必要がある。

- (9) RO の協力方針検討
- (10) サイト決定の促進
- (11) 国内体制と管理費の検討
- (12) サ例予算での予備費

7. 参 考

(1) 提出書類

- ① Document NO. SA - J 101 R&D
" " 102 Research Theme
(NO. SA - J 103. 4 および 5 は未提出)
- ② Main Change of the Project (別添 2)
- ③ Tentative Cost Estimate for the Project
- ④ R&D ドラフトの日-サ相異点
- ⑤ 主要機械のカタログ
- ⑥ RO の研究に関する後藤私案
Phase I : Module Test
Phase II : System
- ⑦ Deco. 22 nd, 1979 付提出 Documents (別添 3)
- ⑧ 造水比 6 での Long および Cross の概念図
- ⑨ 造水比 3 → 6 のコスト比較表 (別添 4)

(2) 受領書類

- ① サ例 R&D の対案

② サ倒 Revised R&Dドラフト

③ サイトのデータ

a. Yanbu および Al - Jubail のプロットプラン

b. " " の海水成分

c. Al - Jubail の気象

(別添 1)

KINGDOM OF SAUDI ARABIA
Saline Water Conversion Corporation

Our Ref. No. _____

Date _____

MINUTES

December 24, 1979

The Japanese Mission dispatched by the Japan International Cooperation Agency (JICA) held several meetings with the engineers of the Saline Water Conversion Corporation (SWCC), concerning the technical cooperation on sea water desalination technology (hereinafter referred to as the Project), during their stay in the Kingdom of Saudi Arabia from the 30th of November to the 25th of December 1979. The Mission also made visits to Jeddah, Yanbu, Al-Khobar and Al-Jubeil.

The outline of the meetings is as follows:

(The list of attendants to the meetings is attached in ANNEX ①)

1. The Japanese side submitted to the Saudi side the draft of the detailed R/D (ANNEX ②), and then the latter presented to the former its counter-draft of the Agreement which was revised in the process of meetings to come out as the attached document (ANNEX ③). The discussion of the two draft led to the following result:

- (1) Both sides agreed, in principle, that the title of the document should be R/D which would be signed by the responsible officials of the implementing agencies, namely JICA & SWCC, and that the heads of both sides in the Saudi-Japanese Joint Committee would sign on some sort of covering letter to the R/D (in case the signature of the R/D took place prior to the meeting of the next Joint committee, the signer of the Japanese side might be its Ambassador in Jeddah).

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(2) Both sides agreed, in principle, to the contents of the counter-draft of the Saudi side except the following points which would remain pending:

- (a) The method of payment
- (b) Responsibility of Joint team
- (c) Termination.

2. Upon the request of the Saudi side, the Japanese side agreed to revise its Tentative Proposal on the Project, including the cost estimate which was prepared and submitted by it to the Saudi side. The Japanese side agreed also to study the pending points and revise the draft of R/D in the light of this study.

On the other hand, the Saudi side agreed to review the cost estimate mentioned above.

3. Both sides agreed to further consult each other after completing the afore-mentioned steps and expressed their strong desire that the R/D should be signed as soon as possible, hopefully on the occasion of the next Joint Committee.

4. The Saudi side sought to insert a comprehensive study on Reverse osmosis in the R/D. The Japanese side agreed to add a study on module test to be described in an additional Annex to the R/D and expressed its readiness to further examine the comprehensive plan of reverse osmosis research.

7.3
1/10
5. The Saudi side asked the technical possibility of having both cross tube and ~~long-tube~~ evaporators in the Test Plant. The Japanese side answered affirmatively and showed the layouts of a ~~long-tube type~~ and a ~~long-cross-tube type~~ of the Test Plant with a performance ratio of 6.

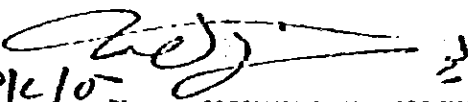
KINGDOM OF SAUDI ARABIA
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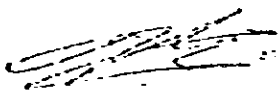
Our Ref. No. _____

Date _____

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6. Concerning the cost estimate, the Japanese side first introduced a tentative one, but upon the request of the Saudi side presented the cost estimate which covers all the items of expenses in the Project, such as Material Research Laboratory, Research, Accommodation and Joint Technical Meeting, with the base data for the cost, implementing procedure and remarks on implementing procedure.
7. Concerning the implementing procedure, the Saudi side pointed out the basic Saudi SWCC's policy that obligates an international tender for all the contracts that SWCC shares the expense totally or partly. The Japanese side expressed its anxiety that, if this policy was applied to the design and fabrication of the Test Plant and to the A/E services for the Laboratory building and the Field Test Plant, a smooth implementation of the Project would be difficult. Japanese side would consider the possibility that some part of A/E services be funded totally by Japanese side.
8. The Japanese side presented the comments on the different sites, explaining advantages and disadvantages as the candidate for the Project.


R/c/10
Eng. YOUSUF H. NASSIF
Director, Dept. of Research
S. W. C. C.


Dr. TOTARO GOTO
Team leader
JAPANESE DELEGATION.

KINGDOM OF SAUDI ARABIA
Saline Water Conversion Corporation

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ANNEX (1)

Japanese Mission

Dr. Totaro Goto

Team Leader
Director, 1st Section of Process
Development, Institute of Chemical
Technology, MITI.

Mr. Hamio Minugawa

Senior Engineer for Plant Design,
Desalination Technology Division,
Water Re-use Promotion Center.

Mr. Yujiro Tazawa

Senior Engineer for Plant Construction,
Desalination Technology Division,
Water Re-use Promotion Center.

Mr. Hasaaki Imai

Senior Engineer for Laboratory Design
Desalination Technology Division,
Water Re-use Promotion Center.

Mr. Kazuo Nakagawa

Coordinator
Staff, Development Technology Division,
Mining and Industrial Cooperation,
Department, JICA.

(with attendance of)

Mr. Haruo Hanawa

Japanese Representative for the
Secretariat to the Saudi-Japanese
Joint Committee.

Mr. Naotoshi Osada

Deputy Representative for the
Secretariat to the Saudi-Japanese
Joint Committee.

Mr. Kiyotaka Inakai

First Secretary, the Embassy of
Japan, Jeddah.

S V C C .

Mr. Youssif H. Nassif

Director, Research and Technical
Department.

Mr. Habeeb Hohoamed

Engineer, Research and Technical
Department.

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Mr. Saeed Hajjar Technical advisor
Engineers from Western Province
Engineers from Easter Province.

PROJECT FOR THE TECHNICAL COOPERATION
ON SEA WATER DESALINATION
BETWEEN JAPAN AND THE KINGDOM OF SAUDI ARABIA

RECORD OF DISCUSSIONS

DOCUMENT NO. SAJ-101

NOVEMBER 1979

ON THE RECORD OF DISCUSSIONS
BETWEEN THE DELEGATE OF THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND THE SALINE WATER CONVERSION CORPORATION
OF THE GOVERNMENT OF THE KINGDOM OF SAUDI ARABIA (DRAFT)

The delegate of the Japan International Cooperation Agency visited Saudi Arabia from the 30th of November, 1979, to the th of , 19 , for the purpose of making detail agreement of the Project for the technical cooperation on seawater desalination between Japan and the Kingdom of Saudi Arabia (the Project).

Both delegates worked out details of the Project on the basis of the results of the basic agreement concluded between the Japan International Cooperation Agency and the Saline Water Conversion Corporation on the 6th, September, 1979 and made the attached Record of Discussions.

The Record of Discussions includes the construction stage of the Material Research Laboratory and the Field Test Plant, and the research stage.

The Saline Water Conversion Corporation will take the necessary measures for obtaining the financial allocations from the Government of the Kingdom of Saudi Arabia.

The delegate of the Japan International Cooperation Agency will recommend to their own Government the matters referred to in the Record of Discussions attached herewith.

Written in duplicate in English at. on the th of
, 19 .

For The Japan International
Cooperation Agency

For the Saline Water
Conversion Corporation

RECORD OF DISCUSSIONS

1. The Japan International Cooperation Agency (JICA) and the Saline Water Conversion Corporation (SWCC) will cooperate with each other, in accordance with the Agreement on Economic and Technical Cooperation between the Government of Japan and the Government of the Kingdom of Saudi Arabia (the Agreement), and the recommendation of the Japan-Saudi Arabia Joint Committee, in implementing the research project on desalination technology (the Project) for the purpose of securing desalinated water in the future by transferring the technology which the Agency of Industrial Science and Technology, the Ministry of International Trade and Industry, the Government of Japan, has developed under the National Research and Development Project.
2. The Outline of the Project
On the basis of the seawater desalination technology, characterized by a long tube-type multistage flash evaporation method, the Project will be carried out on the study of the materials which are required for adaptation to the natural conditions of the Kingdom of Saudi Arabia, under the time schedule of a five-year program as indicated in ANNEX I.
 - (1) Consultation and Exchange of Information
A joint meeting of high-level officials or specialists of both countries will be established in order to have consultations and exchange of information about the technology for seawater desalination and to promote the Project.
During the Project, the meetings are scheduled to be held alternately in Japan and in the Kingdom of Saudi Arabia.

(2) Establishment of Material Research Laboratory

The Material Research Laboratory will be established in SWCC and furnished with necessary research equipments.

(3) Construction of Field Test Plant

Attached to the Material Research Laboratory, the Field Test Plant, capable of desalting $500\text{m}^3/\text{day}$, will be constructed.

(4) Research

Research will be undertaken on the durability of the concrete evaporator shell, and the prevention of corrosion and scale deposition, by the effective utilization of the Material Research Laboratory and the $500\text{m}^3/\text{day}$ Field Test Plant. The research themes of this study are listed in ANNEX II.

3. The Measures to be Taken by JICA:

(1) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide, at its own expense, the requisite services of Japanese specialists (ANNEX V) through the normal procedures under the Technical Cooperation Scheme of Japan for the purpose of conducting the Project as mentioned in the above 2.

(2) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to receive, at its own expense, the Saudi Arabian personnel connected with the Project for technical training in Japan, through the normal procedures under the Technical Cooperation Scheme of Japan.

(3) a. In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide, at its own expense, the Field Test Plant,

capable of desalting 500m³/day, and the main equipment for the Material Research Laboratory through the normal procedures under the Technical Cooperation Scheme of Japan. Specifications for the 500m³/day seawater desalination Field Test Plant and the list of laboratory equipment are indicated in ANNEX III and ANNEX IV, respectively.

b. The Field Test Plant and laboratory equipment referred to above will be utilized exclusively for the implementation of the Project upon the advice of the Japanese specialists.

(4) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to meet:

- a. Expenses for drawing the concept design of the Material Research Laboratory.
- b. Expenses for holding the Japan-Saudi Arabia joint meeting in Japan.
- c. Expenses for dispatching senior Japanese officials of specialists to the Kingdom of Saudi Arabia to attend the Japan-Saudi Arabia joint meeting.

4. The Measures to be Taken by SWCC:

(1) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take the necessary measures to provide at its own expense:

- a. The services of the Saudi Arabian counterpart personnel for the Project (including the operation of the Test Plant) as listed in ANNEX V.
- b. Requisite land for the Material Research Laboratory and the Field Test Plant.

- c. Buildings and their necessary facilities for the Material Research Laboratory, Site office and Boiler house for the Field Test Plant.
 - d. Equipment, machinery, instruments and other materials necessary for the Material Research Laboratory and the Field Test Plant except for those provided by JICA at its own expense.
 - e. Separate office room in the Material Research Laboratory and Site office for the Japanese specialists.
 - f. A fully furnished suitable accommodation for each Japanese specialist and his family.
- (2) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take the necessary measures to meet:
- a. Expenses necessary for the domestic transportation of the goods provided by JICA as well as for their installation (including foundation works, and construction of seawater supplies and drainage systems and fresh water distribution system and road and facility of first transform substation and telephone).
 - b. All running expenses necessary for the implementation of the Project.
 - c. Customs duties and any other charges, if any, as may be imposed upon the goods provided by JICA to SWCC.
 - d. Expenses for the internal travel in the Kingdom of Saudi Arabia of the Japanese specialists on duty.
 - e. Expenses for vehicles with drivers for the Japanese specialists during working hours.
 - f. Expenses for holding the Japan-Saudi Arabia joint meeting in the Kingdom of Saudi Arabia.

9. Expenses for dispatching senior Saudi Arabian officials or specialists to Japan to attend the Japan-Saudi Arabia joint meeting.
5. (1) SWCC will appoint a senior SWCC official as Director listed in ANNEX V.
(2) JICA will appoint a Japanese specialist as Chief Representative listed in ANNEX V.
(3) Research in the Material Research Laboratory and operation of the Field Test Plant will be directed jointly by the Director and the Chief Representative.
6. SWCC and JICA will jointly review the progress of the implementation of the Project at the forum of the joint meeting and take measures necessary to secure smooth and effective cooperation and otherwise consult with each other in respect of any matter that may arise from or in connection with this understanding.
7. According to Article 3 (c) of the Agreement, the Japanese specialists, their families and the missions who are to be dispatched for the Project will be granted, in the Kingdom of Saudi Arabia, the privileges, exemptions and benefits.
8. SWCC undertakes to bear claims, if any arise, against the Japanese specialists resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Saudi Arabia, excepting those claims arising from the willful misconduct of gross negligence of the Japanese specialists.
9. SWCC and JICA shall keep, in general, confidential any information or data provided by another partner or generated as a result of the work under the Project. In the case of

mutual agreement, however, SWCC and JICA or their employee can publish the information or data.

10. Implementation under this Record of Discussions shall be subject to the budgetary appropriations in SWCC and JICA.
11. The duration of the Technical Cooperation for the Project will be five years from th, , 19 .

KINGDOM OF SAUDI ARABIA
Saline Water Conversion Corporation

Our Ref. No.

(Annex 3)

Date _____

RECORD OF DISCUSSIONS BETWEEN
THE SALINE WATER CONVERSION CORPORATION
AND
JAPAN INTERNATIONAL COOPERATION AGENCY FOR
TECHNICAL COOPERATION IN DESALINATION.

Article 1. SCOPE, PURPOSE AND OBJECTIVES

A. The Japan International Cooperation Agency (JICA) and the Saline Water Conversion Corporation (SWCC) will cooperate with each other, in accordance with the Agreement on Economic and Technical Cooperation between the Government of Japan and the Government of the Kingdom of Saudi Arabia (the Agreement), and the recommendation of the Japan-Saudi Arabia Joint committee, in implementing the research project on desalination technology (the project) for the purpose of securing desalinated water in the future by transferring the technology which the Agency of Industrial Science and Technology, the Ministry of International Trade and Industry, the Government of Japan, has developed under the National Research and Development Project.

B. The Outline of the Project

On the basis of the seawater desalination technology, characterized by a long tube-type multistage flash evaporation method, the Project will be carried out on the study of the materials which are required for adaptation to the natural conditions of the Kingdom of Saudi Arabia, under the time schedule of a five-year program as indicated in ANNEX I.

(i) Consultation and Exchange of Information

A joint meeting of high-level officials or specialists of both countries will be established in order to have con-
.../...

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sultations and exchange of information about the technology for seawater desalination and to promote the Project.

During the Project, the meetings are scheduled to be held alternately in Japan and in the Kingdom of Saudi Arabia.

(ii) Establishment of Material Research Laboratory

The Material Research Laboratory will be established in SNCC and furnished with necessary research equipments.

(iii) Construction of Field Test Plant

Attached to the Material Research Laboratory, the Field Test Plant, capable of desalting 500m³/day, will be constructed.

(iv) Research

Research will be undertaken on the durability of the concrete evaporator shell, and the prevention of corrosion and scale deposition, by the effective utilization of the Material Research Laboratory and the 500m³/day Field Test Plant. The research themes of this study are listed in ANNEX II.

Article 2. The Measures to be taken by JICA:

- (1) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide, at its own expense, the requisite services of Japanese specialists (ANNEX V) through the normal procedures under the Technical Cooperation Scheme of Japan for the purpose of conducting the Project as mentioned in the above.

Article 1(i) / ...

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- (2) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to receive, at its own expense, the Saudi Arabian personnel connected with the Project for technical training in Japan, through the normal procedures under the Technical Cooperation Scheme of Japan.
- (3) a. In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide at its own expense, the Field Test Plant, capable of desalting 500m³/day, and the main equipment for the Material Research Laboratory through the normal procedures under the Technical Cooperation Scheme of Japan. Specifications for the 500m³/day seawater desalination Field Test Plant and the list of laboratory equipment are indicated in ANNEX III and ANNEX IV, respectively.
- b. The Field Test Plant and laboratory equipment referred to above will be utilized exclusively for the implementation of the Project upon the advice of the Japanese specialists.
- (4) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to meet:
- a. Expenses for drawing the concept design of the Material Research Laboratory.
- b. Expenses for holding the Japan-Saudi Arabia joint meeting in Japan.
- c. Expenses for dispatching senior Japanese officials of specialists to the Kingdom of Saudi Arabia to attend

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the Japan-Saudi Arabia joint meeting.

Article 3. The Measures to be taken by SWCC:

- (1) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take the necessary measures to provide at its own expense:
 - a. The services of the Saudi Arabian counterpart personnel for the Project (including the operation of the Test Plant) as listed in ANNEX V.
 - b. Requisite land for the Material Research Laboratory and Field Test Plant.
 - c. Buildings and their necessary facilities for the Material Research Laboratory, Site office and Boiler house for the Field Test Plant.
 - d. Equipment, machinery, instruments and other materials necessary for the Material Research Laboratory and the Field Test Plant except for those provided by JICA at its own expense.
 - e. Separate office room in the Material Research Laboratory and Site office for the Japanese specialists.
 - f. A fully furnished suitable accommodation for each Japanese specialist and his family.

- (2) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take necessary measures to meet:
 - a. Expenses necessary for the domestic transportation of the goods provided by JICA as well as for their installation (including foundation works, and construction of sewer for

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- supplies and drainage systems and fresh water distribution system and road and facility of first transform substation and telephone).
- b. All running expenses necessary for the implementation of the Project.
 - c. Customs duties and any other charges, if any, as may be imposed upon the goods provided by JICA to SWCC.
 - d. Expenses for the internal travel in the Kingdom of Saudi Arabia of the Japanese specialists on duty.
 - e. Expenses for vehicles with drivers for the Japanese specialists during working hours.
 - f. Expenses for holding the Japan-Saudi Arabia joint meeting in the Kingdom of Saudi Arabia.
 - g. Expenses for dispatching senior Saudi Arabian officials or specialists to Japan to attend the Japan-Saudi Arabia joint meeting.

Article 4. OPERATIONAL MANAGEMENT

- (1) SWCC will appoint a senior SWCC official as Director listed in ANNEX V.
- (2) JICA will appoint a Japanese specialist as Chief Representative listed in ANNEX V.
- (3) Research in the Material Research Laboratory and operation of the Field Test Plant will be directed jointly by the Director and the Chief Representative.

Article 5. Function of the joint Technical team

SWCC and JICA will jointly review the progress of the implement-
.../...

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tation of the Project at the forum of the joint meeting and take measures necessary to secure smooth and effective co-operation and otherwise consult with each other in respect of any matter that may arise from or in connection with this understanding. The joint technical team will prepare and transmit to Governor of SWCC quarterly reports covering the overall status and progress of work as well as areas of concern and recommendations.

The joint technical team will monitor and direct all work and review all submittals by the contractors.

1. The joint technical team will invite qualified firms having interest in assisting SWCC to serve as A/E or construction contractors.
2. The joint technical team will evaluate the proposals, select the contractor and recommend it to SWCC for portions totally funded by SWCC for approval.

Article 6. PRIVILEGES

The Japanese specialists, their families and the missions who are to be dispatched for the Project will be granted, in the Kingdom of Saudi Arabia, the privileges, exemptions and benefits according to Article 3(c) of the Agreement.

Article 7. CLAIMS

SWCC undertakes to bear claims, if any arise, against the Japanese specialists resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Saudi Arabia, excepting those claims arising from the willful misconduct or gross negligence of the Japanese specialists.

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SWCC and JICA shall keep, in general, confidential any information or data provided by another partner or generated as a result of the work under the Project. In the case of mutual agreement, however, SWCC and JICA or their employee can publish the information or data.

Article 9.

PATENTS

- (1) If inventions or discovery arise out of any work performed under the project.
 - a. Each Govt. shall acquire all rights, title and interest in and to any such invention or discovery in its own country.
 - b. Both Govts. shall acquire, in general, equal rights, title and interest in and to any such invention or discovery in a third country.
- (2) The Govt. which owns an invention referred to in the subparagraphs of (1) above shall license such inventions to the nationals of the other country on terms and conditions most favorable under the laws and regulations of the owner country.

Article 10. Estimated costs:

Given below are the estimates of magnitude which will be refined with the progress of work to accomplish the objectives of the R/D.

.../...

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The total cost of services to be provided by Japanese side as outlined in the appendices is estimated to be \$ _____.

Other costs to be incurred by SWCC during the implementation of the project by way of direct contracts to private industry for civil works, transportation, procurement of equipment not provided by the Japanese side are estimated to be \$ _____.

The total estimated costs for the project for a duration of five years is \$ _____.

Article 11. Budgetary appropriations:

Implementation under this R/D shall be subject to the budgetary appropriations in SWCC and JICA.

Article 12. Method of Payment:

Any project expenditure not provided by the Japanese side such as, (1) personnel costs, travel, accommodation and any other personnel benefits not less favorable than those granted to the specialists and their families of a third country in the Kingdom of Saudi Arabia, and (2) procurement of materials, chemicals, equipment and any other expenditure related with the Test Plant or the materials laboratory, shall be submitted by the joint team with recommendations to SWCC for approval. After SWCC approval the amount will be paid from the allotted funds for the agreement.

Article 13. Effective Date:

a. This agreement shall become effective after signature of the representatives of the parties, and shall remain in effect until terminated in accordance with article 14 below, or the termination of the technical and Economic cooperation

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agreement of March 1, 1975, whichever shall occur first.

- b. The duration for the technical cooperation for the project will be five years from _____ to _____

Article 14. Force Majeure.

If any party to this agreement is rendered unable because of force majeure to perform its responsibilities under this agreement, these responsibilities shall be suspended during the period of continuance of such inability. The term "Force majeure" means acts of God, acts of public enemy, war, civil disturbances, and other similar events not caused by nor within the control of the parties. During the period of suspension of the performance caused by force majeure, SWCC may continue to pay normal costs of maintaining the Japanese team in Saudi Arabia. In the event of suspension of a party's duties because of force majeure the parties shall consult and endeavour jointly to resolve any attendant difficulties.

Article 15. Amendment, extension or termination.

- A- This agreement may be amended or extended by mutual agreement in writing.
- B- This agreement may be terminated by any party notifying the others 60 days in advance in writing.

Article 16. Resolution of difficulties

SWCC and JICA upon request of any party, regarding any matter relating to the terms of this agreement shall endeavor jointly in a spirit of cooperation and mutual trust to resolve any difficulties or misunderstanding that may arise.

ANNEX I

Schedule of the Project

Year	1980	1981	1982	1983	1984
1. Field Test Plant					
(1) Decision of Site	↔				
(2) Designing	←→				
(3) Fabrication	←→				
(4) Civil Works		←→			
(5) Transportation			↔		
(6) Installation			→		
(7) Operation				←→	→
2. Material Research Laboratory					
(1) Decision of Site	↔				
(2) Concept Designing	←→				
(3) Detailed Designing and Construction		←→			
(4) Research Activity				←→	→
3. Research Equipment					
(1) Procurement		←→			
(2) Transportation and Installation		←→			
4. Report					
(1) Annual Report	↔	↔	↔	↔	
(2) Final Report					←
5. Personnel					
(1) Saudi Arabian side	←→	←→	←→	←→	←→
(2) Japanese side	←→	←→	←→	←→	←→
6. Joint Meeting					
	v	v	v	v	v

ANNEX II

Research Themes

The main research themes are as follows:

1. Operation of the 500 m³/day Field Test Plant
 - (1) First research operation
 - (2) Second research operation
 - (3) Material inspection
 - (4) Corrosion testing with a mini-brine heater
2. Study in Material Research Laboratory
 - (1) Corrosion study
 - examination of metallic corrosion in the Field Test Plant and a mini-brine heater, and study on typical corrosion phenomena in the desalination environment and instantaneous measurement of corrosion velocity (corrosion monitoring)
 - (2) Chemical study
 - study on chemical analysis, corrosive environment, corrosion products and scale deposition
3. Recommendation
 - Proposal of the most recommendable plant on the basis of the results obtained in the project.

ANNEX III

Specification of Field Test Plant

1. Capacity	500 m ³ /day
2. Type of plant	Brine recirculating type long tube design multi-stage flash evaporator
3. Material of shells	Concrete
4. Scale prevention	pH control by sulfuric acid injection
5. Scale elimination	Ball cleaning system
6. Performance ratio	3.0
7. Number of stages	Heat recovery: 6 stages Heat rejection: 2 stages
8. Sea water	TDS 48,200 ppm (max.) Temperature (max.): 32.2°C Intake quantity: 385 t/h
9. Steam (1) Heating (2) Steam ejector	7 t/h (1.5 kg/cm ² G) 0.5 t/h (10 kg/cm ² G)
10. Concentration ratio	1.24
11. Flow rate of recirculating brine	174 t/h
12. Recirculating brine maximum temperature	120°C

ANNEX IV

Laboratory Equipments

1. Equipment for Corrosion Test
 - (1) Corrosometer
 - (2) Corrator
 - (3) Metallurgical microscope
 - (4) Roughness meter
 - (5) Potentiostat/galvanostat
 - (6) Immersion corrosion testing equipment
2. Equipment for Water and Chemical Analysis
 - (1) Atomic absorption and flame photometer
 - (2) Spectrophotometer
 - (3) X-ray diffractometer
 - (4) Automatic titrater
 - (5) pH meter
3. General Equipment
 - (1) Analytical balance
 - (2) Drying oven
 - (3) Muffle furnace
 - (4) Vacuum pump
4. Glassware and Others
5. Laboratory Furniture
6. Machine and Tools
7. Process Analyzer

Note: Major equipments only.

For details, refer to Document No. SAJ-103.

ANNEX V

Personnel

	<u>No. of Person</u>
1. Saudi Arabian side	
Director	1
Administrative Office	
General Affairs	1
Accountant	1
Purchaser	1
Field Test Plant	
Operation Engineer	1
Mechanical Engineer	1
Instrument & Electrical Engineer	1
Concrete Engineer	1
Operation Crew	8
Material Research Laboratory	
Corrosion Researcher	1
Chemistry Researcher	1
	<hr/>
Total	18
2. Japanese side	
Chief Representative	1
Field Test Plant	
Operation Engineer	1
Mechanical Engineer	1
Instrument & Electrical Engineer	1
Concrete Engineer	1
Operation Crew	2 (1)
Inspector & Maintenance Engineer	2
Material Research Laboratory	
Corrosion Researcher	1
Chemistry Researcher	1
Inspector of Corrosion & Scale	2
	<hr/>
Total	13 (12)

(別添 2)

MAIN CHANGES OF THE PROJECT

Item	Previous	Present
(1) Construction period	2 years	2.5 years
(2) Joint meeting	twice/year	once/year
(3) Reporting	none	annual and final
(4) Plant operation	short, 100 and 1200 long x 2	first, 80 → 100 → 1200 second
(5) Corrosion monitoring		
Test Plant	yes	no
MRL	no	yes
(6) Research theme	economic. analysis	recommendation
(7) Personnel		
Saudi Arabia	36 persons	18 persons
Japan	average 7 persons	13 persons
(8) Site office (Plant Control)	420 M ²	276 m ²
(9) Mini-brine heater	none	added
(10) Loop test	yes	deleted.

MEMO

	<u>Page</u>
1. Comparison of the Japanese and Saudi drafts	1
2. Title for the document of agreement	2
3. Patents	3
4. Joint funds	4
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6. Supplement	6
- Signers-	
- Estimated costs -	
- Termination -	
7. Cost estimate	Annex 1
- The tentative cost estimate for the Project -	
- Base data for cost -	
- Implementing procedure -	
- Remarks on implementing procedure -	
8. Research on reverse osmosis	Annex 2
9. Comments on Research sites	Annex 3

December 22nd, 1979

J I C A

1. Comparison of the Japanese and Saudi drafts

No.	Japanese side	Saudi Side	Remarks of Japanese side
1	Covering Letter and Attached document (R/D)	Document (Agreement) without covering letter	Pending
2	R/D <u>between</u>	Agreement <u>among</u>	Not understandable
3	None	Title of the Articles	Not necessary
4	1. and 2.	(Art. 1)	Acceptable
5	None	(Art. 5) Quarterly reports	Acceptable
6	None	(Art. 9) Patents	Not acceptable. Alternative prepared
7	None	(Art.10) Force Majeure	Acceptable
8	None	(Art.11) Estimated costs	Pending.
9	None	(Art.12) Method of Payment	Not acceptable. More discussion needed
10	11. Effective date	(Art.13) A: added B:	Not understandable
11	None	(Art.14) A: Amendment & Extension B: Termination	Acceptable
12	None	(Art.15) Resolution	Not suitable
13	10. Budgetary appropriations	None	Acceptable

Pending connected with No. 8.

Order of the Articles after Article 9. Patents

10. Estimated Cost
11. Budgetary Appropriations
12. Method of Payment
13. Effective Date
14. Force Majeure
15. Amendment, Extension or Termination
16. Resolution of Difficulties.

2. Title for the document of agreement
(R/D or Agreement)

An agreement to be concluded by the Government of Japan is usually subject to the debate and approval of the Diet (Japanese parliament) which require complicated procedures and take quite a long time. The Government of Japan, therefore, prefers to avoid the form of agreement in case of technical cooperation.

In stead of that, it is customary for the Government of Japan to use the form of R/D as general procedure to implement the governmental basis technical cooperation. R/D is to be signed by the responsible officials of the implementing agencies of both countries and endorsed by the exchange of a Note Verbale with R/D as annex between the two governments through diplomatic channel. This practice has been long adopted between the Government of Japan and many other governments without causing any trouble.

Concerning our technical cooperation on desalination, the form of R/D was already signed last September and used as the document which constitutes the basic agreement of our cooperation, and the Article 7 of the said R/D stipulates that "the detailed Record of Discussion should be agreed and signed by JICA and SWOC at the earliest possible date". On this basis, the Japanese team headed by Dr. Totaro Goto has submitted to the Saudi side the draft of detailed R/D.

It is to be mentioned, furthermore, that this draft refers to the Agreement on Economic and Technical Cooperation between the two Governments, thus attaching to itself the significance derived from the "mother" Agreement.

3. Patents

The Project will be carried out jointly on the materials which are required for adaptation to the natural conditions of the Kingdom of Saudi Arabia. JICA has been taking as much necessary measures as possible to provide the various services at its own expenses, in accordance with the laws and regulations in force in Japan.

Japanese Government is desirous that all the inventions and proprietary information which will arise out of any work performed in the Project shall remain the property of both the Saudi and Japanese sides. They will revert

- to the Saudi side in the Kingdom of Saudi Arabia.
- to the Japanese side in Japan.
- to both sides jointly in the third countries.

The alternative by the Japanese side for the Article "Patents" is as following:

- (1) If inventions or discovery arise out of any work performed under the Project,
 - a. In and to any such invention or discovery, SWCC or JICA shall acquire all rights, title and interest in its own country.
 - b. In and to any such invention or discovery, SWCC and JICA shall acquire, in general, equal rights, title and interest in a third country.
- (2) SWCC or JICA which owns an invention referred to in the subparagraphs of (1) above shall take necessary measures to license such inventions to the nationals of Japan or the Kingdom of Saudi Arabia on terms and conditions most favourable under the laws and regulations of the owner-country.

4. Joint Funds

It is impossible to keep, at the start of the Project, the joint funds which could cover all the expenses during whole the period of the Project, because JICA can only prepare its budget annually and can spend each item of the budget only for its own purpose.

Fixing the percentage of cost sharing between the two parties is also impossible for the same reason.

5. Reverse Osmosis

The Japanese side is prepared to cooperate on the reverse osmosis project in conducting experiment in module test (on the assumption that the utilities of other installations will be made available for this project also), and accepts the addition of a relevant Annex.

The cost for this cooperation is estimated very roughly as below:

(million Japanese Yen)

(a) Fabrication, transportation, etc. of the module

42

(b) Dispatch of Japanese Experts (21 man-months)

30

(c) Personnels of the Saudi side (23 man-months)

16

Concerning the sharing of the above cost, (a) and (b) will be borne by the Japanese side, and (c) will be borne by the Saudi side.

6. Supplement

- Signers -

In case the Saudi side insists on the participation of the Saudi-Japanese Joint Committee in the conclusion of the document of agreement, the Japanese side proposes that the heads of both sides in the Joint Committee sign on some sort of covering letter to the R/D which will be signed by the responsible officials of the implementing agencies, namely JICA and SWCC. (If the signature takes place prior to the meeting of the Joint Committee, the signer for the Japanese side may be its ambassador in Jeddah).

- Estimated cost -

The Japanese side accepts Article 11 of the Saudi draft, on the following condition:

1. The portion of the Japanese side will remain as offered by it.
2. Article 10 of the Japanese draft will be kept as it is.

-Termination-

Sub paragraph B of Article 14 of the Saudi draft seems to be taken from Article 13 of the Saudi-American agreement of Technical Cooperation in Desalination, which does not have its own duration.

On the other hand, the period of Saudi-Japanese cooperations is expected to be five years. Therefore, subparagraph B is not suitable to the latter.

However, if the Saudi side insists on keeping it, the Japanese side agrees to it on the condition that the following paragraph should be added as "C" :-

C. However, in case there are some ongoing programs at the time of the termination of this R/D in accordance with subparagraph B above, they shall be continued until their completion under the provision of this R/D.

THE TENTATIVE COST ESTIMATE FOR THE PROJECT (1/2)

(Unit 10³ US\$)

19 December 1979.

Work Items	Item Cost	Saudi Arabian Portion	Japan Portion	Description
1. Material Research Laboratory (1) Laboratory Building	(4,439)			
1) A/E	120	40	80	
2) Construction	3,055	3,055	0	
3) Laboratory Equipments	955	0	955	The laboratory furniture is included The main equipments to be provided are listed in Annex IV. C.I.F.
4) Transportation of Equipments (in Saudi Arabia)	9	9	0	
5) Installation & Adjustment of Equipment	300	0	300	
(2) Field Test Plant	(5,630)			
1) Design	220	76* **	144	Performance ratio : 6, long tube type
2) Fabrication	2,200	859* **	0	Process & Mechanical design
3) Transportation in S.A	110	110 **	0	C.I.F.
4) Installation	830	688 **	142	
5) A E for Plant Civil, Control Room & Boiler House	70	70*	0	
6) Civil Work	1,000	1,000	0	
7) Control Room & Boiler House	1,200	1,200	0	Foundation of equipments, intake & discharge facility
(3) Ancillary Facilities for Material Research Laboratory	(484)			
1) A/E	14	14	0	A guard house, fence, gardening, lamp posts & pavements will be included in this item.
2) Construction	470	470	0	It is recommendable that A/E service will be done by the Japanese side at a charge of the Saudi Arabian side.
2. Research	(2,689)			
(1) Research Personnel	986	986	0	
1) The Saudi Arabian Side	986	986	0	
2) The Japanese side	1,703	0	1,703	The expected personnel will be 352 Man-month.

THE TENTATIVE COST ESTIMATE FOR THE PROJECT (2/2)

(Unit 10³ US\$)

Work Items	Item cost	S.Arabia Portion	Japan Portion	Description
(2) Consumable Materials	48	48	0	
(3) Utility	287	287	0	Expense for maintenance of Field Test Plant and the research building.
(4) Maintenance	562	562	0	Expenses for vehicles and domestic trips
(5) Transportation	165	165	0	
3. Accommodation				It is recommendable that
(1) A/E	330	330	0	A/E service will be done by the Japanese side at a charge of the Saudi Arabian side.
(2) Construction	(14,200)			
1) Housing	11,000	11,000	0	
2) Mosque	1,200	1,200	0	
3) Gymnastic facility	200	200	0	A pool, two (2) tennis courts will be provided.
4) Utility	300	300	0	
5) Ancillary facilities	1,500	1,500	0	
(3) Maintenance	500	500	0	The man-power cost for guardsmen, janitors, etc., is included
4. Joint Technical Meeting	180	80	100	
TOTAL	29,514	24,749	4,765	

* Implementation by the Japanese side is essential.

** The additional expense due to increase performance ratio to 6 is charged to the Saudi Arabian side.

NOTE: 1. The estimated cost for the Project is a preliminary one. Especially, the local construction costs are estimated under certain assumption. Therefore, they must be refined after a detailed investigation.

2. This estimate does not reflect the increase in costs generated by inflation in the future.

22 DEC. 1979

BASE DATA FOR COST

1. Material Research Laboratory	X 10 ³ US\$
(1) Laboratory Building	
1) A/E	120
<p>The cost includes specifications, calculations, drawings and tender documents, but excludes supervision of the construction. Total A/E cost for laboratory building is assumed to be 4% of the construction cost.</p>	
2) Construction	3,055
Office furniture	82
Building materials & equipments for HVAC	1,167
Transportation of materials, equipments & insurance. (from Japan to Saudi Arabia)	1,160
Construction of building & HVAC for 1400m ²	1,573
Temporary construction	
3) Laboratory Equipments (C.I.F) (Refer to Annex IV)	955
Equipment for corrosion test	169
Equipment for chemical analysis	221
General equipment	65
Glassware and others	58
Laboratory furniture	133
Machine and tools	65
Process analyzer	8
Standard data booklets	13
Transportation to Saudi Arabia	<u>223</u>
4) Transportation of Equipments in Saudi Arabia Disembarkation and inland transportation	9
5) Installation and Adjustment of Equipment	300
Installation, (3 persons x 6 months)	180
Adjustment, (2 persons x 6 months)	120

(2) Field Test Plant

1) Design	
Process and mechanical design	220
8800 ^{hr} x 25 \$/hr @ \$220,000	
2) Fabrication (C.I.F.)	2,200
Evaporator	1,150
Long tube type evaporator using concrete shell 4 modules (17 stages)	
Auxilliary equipments	250
Brine heater, deaerator, decarbonator, pumps and etc.	
Electric & instrument equipments	250
Boiler (capacity 10 t/hr) & Oil day tank	300
Transportation to Saudi Arabia	250
Max. unit weight 120 ton	
3) Transportation in Saudi Arabia	110
Disembarkation and inland transportation	
4) Installation	830
Japanese supervisor	220
22 man-month x \$ 10,000 @ \$ 220,000	
Local labour	420
280 man-month x \$ 1500 @ \$ 420,000	
Construction equipments	130
Others	60
5) A/E for Plant Civil, Control Room and Boiler House	70
A/E for civil work	34
A/E for control room & boiler house	36
6) Civil Work	1,000
Foundation of equipment	500
Intake facility	400
Discharge facility	100
7) Control Room & Boiler House	1,200
Control room (276 m ²)	1,100
Boiler house (66 m ²)	100

(3) Ancillary Facilities for Material Research Laboratory	
1) A/E	14
The area for material research laboratory is assumed to be 20,352 m ² .	
2) Construction	470
Site preparation	24
Road and pavement	330
Gardening	46
Fence and gate	28
Lamp posts	42
2. Research	
(1) Research Personnel	2,689
1) The Saudi Arabian side	
\$986,000	
2) The Japanese side	
Trial operation	
\$10,000 x 23 man-month = \$230,000	
Research	
\$1,470,000	
(2) Consumable Materials - for research	48
\$6000/year x 4 men x 2 year = \$48,000	
(3) Utility	287
For laboratory building	
\$6,800 x 3 year ÷ = \$20,000	
For trial operation of plant	
\$30/hr x 400 hr = \$12,000	
For research operation of plant	
\$21,300/month \$255,000	
* Utilities unit price	
Fuel oil \$ 16/ton Sulphuric acid \$ 480/ton	
Electric \$ 24/10 ³ kwh Anti-foam agent \$ 8/kg	

(4) Maintenance	562
Maintenance labour for laboratory building	
$\$800/\text{man-month} \times 11 \text{ men} \times 27 \text{ month} = \238×10^3	
Spare parts and maintenance for the plant	
$\$324 \times 10^3$	
(5) Transportation	165
1) Vehicles	75
Engineers and their Families	
5 sedans and a mini-bus	
2) Domestic Trips by Air to Riyadh	90
$3 \text{ man} \times 12 \text{ times/year} \times 5 \text{ year} = 180 \text{ times of 2 nights trip.}$	
3. Accommodation	
(1) A/E	330
Specifications, calculations, general layout, drawings and drawings and the tender book will be prepared.	
(2) Construction	14,200
1) Housing	11,000
15 houses for 15 families with 3 bed rooms, a dining room, a living room and 1 bathroom. (3000 m ²)	
4 houses for 32 singles with a canteen and a play room. (2000 m ²)	
2) Mosque (150 m ²)	1,200
3) A pool (25m x 12m) and two tennis courts	200
4) Water supply system, sanitary sewer and storm drainage.	300
5) Guard house, fence and gate, gardening pavement and lamp posts.	1,500
(3) Maintenance	
$800 \text{ \$/man} \times 10 \text{ man} \times 12 \text{ month} \times 5 \text{ year} = 480,000$	500
4. Joint Technical Meeting	
5 times	180
In Saudi Arabia 3 times	
In Japan 2 times	

I T E M S	Cost Share		Agency of order	
	Saudi Arabia	Japan	SWCC	JICA WRPC
Material Research Laboratory				
(1) Laboratory Building				
1) A/E	0	0	0	Japanese company
2) Construction	0		0	international tender
3) Laboratory Equipments		0	0	Japanese company
4) Transportation of Equipments (in Saudi Arabia)	0		0	Saudi Arabian company
5) Installation & Adjustment of Equipment		0	0	Japanese company
(2) Field Test Plant				
1) Design	0	0	0	Japanese company
2) Fabrication	0	0	0	Japanese company
3) Transportation in Saudi Arabia	0		0	Saudi Arabian company
4) Installation	0	0	0	WRPC (S/V) & international tender
5) A/E for Plant Civil, Control Room & Boiler House	0		0	Japanese company
6) Civil Work	0		0	international tender
7) Control Room & Boiler House	0		0	international tender
(3) Ancillary Facilities for Material Research Laboratory				
1) A/E	0		0	Japanese company
2) Construction	0		0	international tender
Research				
(1) Research Personnel				
1) The Saudi Arabian Side	0		0	-
2) The Japanese side		0	0	-
(2) Consumable Materials	0		0	-
(3) Utility		0	0	-
(4) Maintenance		0	0	-
(5) Transportation		0	0	-
Accommodation				
(1) A/E	0		0	Japanese company
(2) Construction	0		0	international tender
1) Housing				
2) Mosque				
3) Gymnastic facility				
4) Utility				
5) Ancillary facilities				
	0	0	-	

REMARKS ON IMPLEMENTING PROCEDURE

1. A/E Services

It is recommendable that the whole A/E services for the Project will be implemented by the Japanese side although most of the charge is paid by the Saudi Arabia side. The reasons are:

- (1) Since the research work in laboratory is firmly associated with the operation of the Field Test Plant, the whole planning must be made by one contractor.
- (2) A laboratory building requires more severe and sophisticated functions than an office building. Only experienced architects can satisfy these requirements through consultation with the researchers and engineers who will use the laboratory.
- (3) In addition to that, the cost of the contract as a whole is expected to be lower than the sum of the individual A/E services.
- (4) Those facts lead to a conclusion that a Japanese contractor recommended by WRPC can offer the best A/E service.

2. Design and Fabrication of Field Test Plant

The Saudi Arabian side is expected to pay the additional cost due to the increase in performance ratio from 3 to 6. The shares from the both sides will join and be appropriated to design and fabricate the Field Test Plant. The implementation should be performed by the Japanese side.

3. Installations of Laboratory Equipments and the Field Test Plant

The laboratory equipments will be installed by the Japanese side at its own expense.

Concerning the Field Test Plant, the Japanese side will bear the cost of preparation for the tender book and the cost of the supervisors. The Saudi Arabian side will tender for the installation of the plant - erection of equipments, piping, cabling, insulation, etc.

4. Construction

The Saudi Arabian side will tender for the following construction works based on the tender books.

- (1) Laboratory building
- (2) Civil work for Field Test Plant
- (3) Control room and boiler house
- (4) Ancillary facilities for Material Research Laboratory
- (5) Accommodation

It is recommendable that the whole construction will be implemented by the Japanese side, because;

- (1) Since these constructions are associated closely in function and distance, it is convenient to be contracted by one constructor.

The requirements can be met mostly by Japanese firm recommended by WRPC.

- (2) The laboratory building must be equipped and furnished with various special facilities, such as fume hood, service slots, trenches, etc. Reliability of the building functions for research is very important. These special qualities of laboratory building can be made by a well-experienced constructor.

RESEARCH ON REVERSE OSMOSIS

22 December 1979.

Reverse osmosis is expected to be one of the most promising processes in future, and extensive studies are being conducted in the world. The first module for sea water desalination appeared on market in the U.S., but the Japanese industry with high potential of polymer chemistry has been developing modules with higher recovery rate and less m-value than the forerunner's one.

The Water Re-use Promotion Center, a public organization in charge of desalination development, runs Chigasaki Laboratory under the leadership of a technical committee on reverse osmosis. The Committee that consists of specialists from university, national laboratory etc., selects modules from private firms, plans experiments and analyzes the data obtained. They have already developed some new technologies in the process of research.

The Water Re-use Promotion Center has started a study on reverse osmosis process in 1974. The present study is being made with two units of test plant, each having 800 m³/day fresh water capacity. The modules are Toray's SC 5200 and Toyobo's Hullosep HR 8650.

The Japanese mission would like to recommend the same modules as the ones used by the Water Re-use Promotion Center at Chigasaki. They showed excellent performance with rather simple pretreatment. Consequently, the main purpose of the study will be test of durability under the site conditions.

RESEARCH ON REVERSE OSMOSIS
(TENTATIVE)

1. General :

The natural conditions of sea water in Saudi Arabia are characterized by higher salinity and temperature. Consequently, the main problem is durability of modules. In this study, durability tests will be performed with Japanese modules.

2. Test Plant:

2.1 Sea water

42,000 ppm TDS, 32°C max. and clear

2.2 Modules for test

(1) hollow fiber (Hollosep HR-8650S of Toyobo Co.)

diameter	8 inches
max. pressure	80 Kg/cm ²
shell	FRP and SUS 316 (stainless steel)
capacity	20 m ³ /day in single stage
salt rejection	99%
NaCl	42,000 ppm
Pressure	50 Kg/cm ²
Temperature	40°C
recovery	30%

(2) spiral wound (SC 5200 of Toray Industries Co.)

diameter	8 inches
max. pressure	80 Kg/cm ²
capacity	20 m ³ /day
salt rejection	99% in two stages
NaCl	42,000 ppm
pressure	70 Kg/cm ²
temperature	25°C (max. 40°C)
recovery	35%

2.3 Pretreatment

The sea water in Jeddah is rather clear and the fouling index (FI) is expected to be 5-6. If it is true, a direct coagulation and filtration will be enough for the pretreatment. A de-chlorination process is required for the spiral wound modules after the pretreatment.

- (1) Capacity: 150 m³/day
- (2) Filter with an automatic back washing
- (3) Tanks
5 m³ for feed and pretreatment each.

2.4 RO equipment

Capacity: 40 m³/day (20 m³/day x 2 plants)
Cartridge filter : 2
High pressure pump : 80 kg/cm², 11 kw x 2
Instruments : pressure gauge, flow meter, pH meter, electric conductivity etc.
Fresh water tank : 2 m³

2.5 Flow sheet

See "FLOW SHEET, TENTATIVE"

Area required :

- (1) outdoor : 5m x 7m
- (2) indoor : 5m x 6m

3- Schedule of Test :

	First year	Second year
1. Fabrication		
(1) investigation and designing.	↔	
(2) procurement of equipments	↔	
(3) fabrication	↔	
(4) transportation and installation	↔	
2. Experiment		
(1) Trial test		2.5 months
(2) Test of duration	↔	12 months
		↔

4- Personnel :

4.1 Japanese side

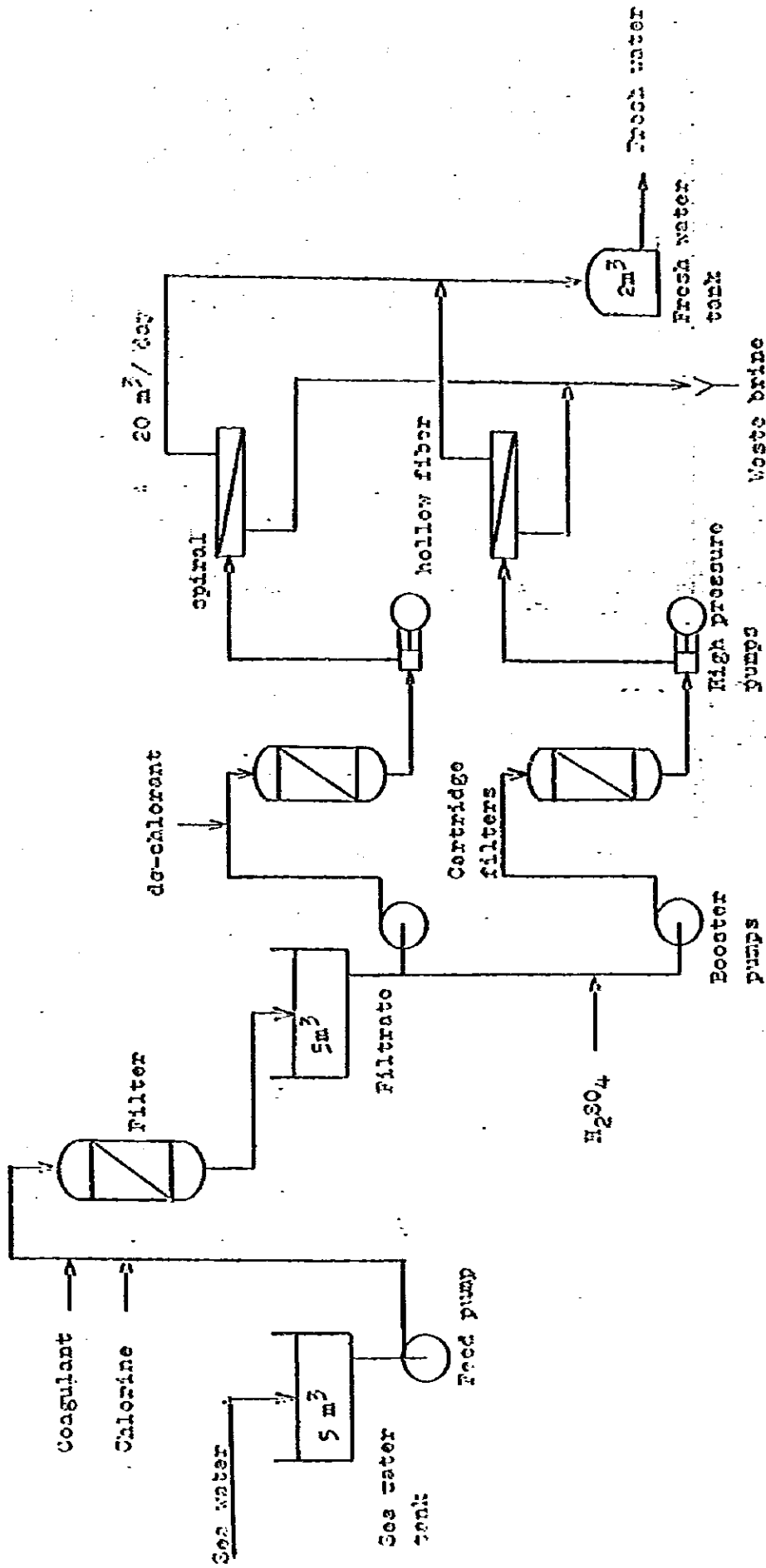
investigation : 0.5 month x 3 persons
 installation and trial: 3 months x 2 persons
 operation : 13 months x 1 person

4.2 Saudi Arabian side

Not yet decided, but about the same man-months as the Japanese.

5- Expense :

The expense will be approximately 300 thousand dollars, excluding auxiliary equipments such as intake, discharge, building, etc., and will be provided from the Japanese side except the expense for the Saudi Arabian personnel.



FLOW SHEET, NARRATIVE

Dec. 5, 1979

COMMENTS ON RESEARCH SITES

22 December 1979.

The Japanese mission visited the SWCC offices at Jeddah, Yambu, Al-Jubail and Al-Khobar as the candidates for the research site. The investigation was made from the view point of construction and running of a research center of sea water desalination in the Kingdom.

The mission found no significant difference in construction cost among the sites. The more important is the prices at the actual implementation of the Project, which varies greatly depending on the conditions.

In running the laboratory, research activity requires:

- (1) Co-operation with specialists outside the laboratory in different fields.
- (2) many kinds of measuring instrument
- (3) various scientific and engineering literatures, data and journals.

Universities or colleges are good sources of specialists and technical information. Also, they keep a variety of instruments and equipments with service. An industrial complex, or a large city can offer technical service and information to some extent. Consequently, while a laboratory connected to university, industrial area or large city has considerable advantage, an isolated one will be handicapped.

The mission would like to mention the advantages and disadvantages for each site as follows:

1. Jeddah:

Advantage

- (1) neighbor to the Western Province Office
- (2) close to university
- (3) close to industrial area
- (4) good circumstances for living
- (5) lower turbidity of sea water
- (6) existence of a reverse osmosis plant

Disadvantage

- (1) little consideration by SWCC
- (2) narrow space

2. Yambu

Advantage

- (1) clean sea water
- (2) close to industrial area in future
- (3) easy access to intake and discharge

Disadvantage

- (1) isolated from technical information and service
- (2) close to discharge device
 - possibility of mist and moisture
- (3) close to turbine and generators
 - possibility of noise and vibration to delicate instruments.

3. Al-Jubail

Advantage

- (1) close to industrial area
- (2) some technical service
- (3) availability of accommodation

Disadvantage

- (1) probably high turbidity of sea water to reverse osmosis
- (2) Saudi-U.S Training Center

4. Al-Khobar

Advantage

- (1) close to university
- (2) close to industrial area
- (3) various technical service
- (4) good circumstances for living
- (5) probable availability of accommodation

Disadvantage

- (1) change of salinity of sea water
- (2) probably high turbidity of sea water to reverse osmosis
- (3) low recovery for reverse osmosis in case of high salinity.

As described above, Jeddah has the most advantages and the least disadvantages. However, if SWCC has no intention to take it for the site, the second best will be Al-Jubail. When the research themes involves reverse osmosis, the feed sea water at Al-Khobar will have considerably important defects-high salinity close to 60,000 ppm and its change. The former will result in a lower recovery and the latter will require some device for adjustment.

If the research center should not locate at the same site for the training center at Al-Jubail, Yanbu will be the second best.

(別添 4)

Cost comparison of the Field Test Plant
(Performance ratio from 3 to 6)

(Unit ; 10³ US\$)

Items	Cost estimated		in Feb. 1978		in Dec. 1979	
	Performance ratio		3	6	3	6
1) Design						220
2) Fabrication (C.I.F.)	}	}	1,146	+ 708	}	2,200
3) Transportation in Saudi Arabia			242			1,545
4) Installation						830
Total			1,388	2,096	2,096	3,360
From 3 to 6	Additional cost		708 (170 million YEN)		1,264	
	Ratio		50 % up		60 % up	

Ⅱ 55年2月 ミッション

(第2次細目合意書交渉団)

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5. Equipments List in Fabrication of Field Test Plant	

1. 目 的

サウジアラビア王国との海水淡水化技術協力に関し、昭和54年9月に締結した基本R/Dおよび昭和54年12月に実施した第1次細目R/D協議結果に基づき、サウジアラビア王国側実施機関と細目R/D(案)に関する第2次協議を行い、同案の事務レベルでの、最終合意に達することを目的とする。

2. 交渉団の編成

団 長	後 藤 藤 太 郎	工業技術院化学技術研究所 プロセス開発部第1課長
団 員	牧 野 征 男	通商産業省通商政策局経済協力部 技術協力課課長補佐
"	角 田 周 一	通商産業省工業技術院総務部 国際研究協力官補佐
"	立 石 勝	国際協力事業団総工業計画調査部 資源調査課
"	菊 地 邦 雄	(財)造水促進センター 税塩技術部部長
"	皆 川 波 夫	(財)造水促進センター 税塩技術部
"	今 井 正 昭	(財)造水促進センター 税塩技術部

3. 交渉日程

2月15日	東京発	移 動
" 16日	リヤド着	移動、日・サ合同委員会事務局と交渉方針打合せ
" 17日	リヤド	SWCCイサム・ジャムジュール副総裁表敬、 ナシーフ部長と Detailed R/D(案)の内容 について討議
" 18日	"	SWCCナシーフ部長と Detailed R/D(案) の内容について討議
" 19日	"	"

2月20日	リヤド	}	Detailed R/D(案)の修正作業, 日・サ合同委員会, 事務局への交渉経過報告及び対処方針検討打合せ
" 21日	"		
" 22日	"		SWCCへの提出資料及び Minutes of Meetings Draftの作成作業
" 23日	"		作成資料の提出と説明, Minutes of Meetings の Draftについて討議
" 24日	"		Minutes of Meetingsの署名
" 25日			技術的内容に関する質疑応答
" 26日			日・サ合同委員会事務局への結果報告
" 27日	リヤド発ジェッダ着		移動, 在ジェッダ日本大使館表敬及び帰国報告
" 28日	ジェッダ発ロンドン着		移動
" 29日	ロンドン発		"
3月 1日	東京着		"

4. 交渉経過

ナシーフを長とするサウジ側チームに修正 Detailed Record of Discussions案, Technical Documents および Estimated Cost を一括取りまとめた資料(いわゆる青本)を手渡し, 前回との相違を中心に概略説明を行った。両者の主な論議の内容は次のとおりである。

(1) 造水比の変更

- 1) サウジ側より造水比は3より6にすべきであるとの要望があった。
- 2) 日本側は増加分の経費はサウジ側負担とすること, 日本側の負担は蒸発器および計装設備のみとすることを確認し, 造水比の変更に同意した。
- 3) その他の機器については国際入札の原則が適用される旨, サウジ側が採認を求め, 日本側はそれを了承した。

(2) Joint Technical Team

- 1) サウジ側は Joint Technical Team の活動は主としてサウジ国内において行なわれることの確認を求め, 日本側はこれを肯定した。
- 2) サウジ側より次の要望がなされた。

Detailed R/D 調印後, 速やかに Joint Technical Team をサウジアラビアに設置しなければならない。このため, 1~2名の日本側委員の派遣が必要である。ただし, このための資質としては Specialist である必要はなく, このプロジェク

トの全期間を通じてたずさわり、本プロジェクトに熟知していることが必要である。

- 3) 日本側は 2) に対し、サイト調査、建設計画等所要の準備が整った後に派遣することとすべきである旨回答し、またプロジェクトの進捗、フェーズに応じ適当な人材は自づから異なる旨体言した。

(3) アスベストの安全性

- 1) 研究材料ならびに建築材料としてアスベストが使用されていることについて、サウジ側より健康に悪影響を及ぼす恐れがないか、またその代替物を用いる可能性について質問があった。

日本側は安全性について特段の問題がない旨説明し、さらに安全性に関する資料を後日提出することを約した。

(4) SWCC 業務への技術的助言

- 1) サウジ側より本プロジェクトの協力内容には情報の交換も含まれており、SWCC の一般業務において発生する技術的問題についても日本から派遣された技術者に Consultation をして欲しいとの要望があった。

日本側は本プロジェクト自体の遂行に支障を生じない範囲で対応することとし、この旨 Minutes of Meetings に記載することを提案しサウジ側はこれを了承した。

- 2) 本件につき、日本側より派遣される Chief Representative の判断により弾力的に運用出来るものとすべき旨サウジ側より要望があり、日本側はこれを原則的に了承した。

(5) 細目 R/D の署名

- 1) 細目 R/D は 3 月末から 4 月にかけて予定される農水大臣および企画大臣の訪日の際にそれぞれ調印、Endorse が行われる様日・サ双方が最大限の努力を払うことに双方が同意した。

- 2) これらが困難となった場合には、日・サ双方の別途協議により、代る手段を採すことを確認した。

(6) サイトの決定

- 1) サウジ側より本研究施設の電力供給について、どのように考えているかとの質問があった。また水、ガス、電話等はサイトの条件によっては外部からの供給が不可能の場合もある、大気温度条件も細目 R/D に記載されているよりも厳しい等の指摘があった。日本側はこれに対し、電力供給施設、そのほかの基礎的施設が既にあるものとしてこの計画を策定していると返答し、具体的にはサイト決定後詳細検討を待つ必要がある旨伝え、サイトの早期決定を要望した。

- 2) これに対し、サウジ側は速やかにサイトを決定し日本側に通知することを約した。

(7) その他

1) サウジ側より、本プロジェクトに関する 1977年以降の Minutes を添付し、5部作成(3部大臣用、2部 SWCC用)提出するよう要望があった。

日本側はこれを作成提出する旨約した。(資料リスト及び見本は提出済)

2) Field Test Plant の Installation Cost の JICA Portion は据付工事の円滑化を図るための Supervisor の費用である旨説明した。

5. 交渉の結果

後藤团长およびナシーフ部長との間で双方の事務レベルで合意をみた細目 R/D (案) およびその早期署名等を確認する Minutes (添付) を作成し署名した。

6. 今後の進め方

以下の項目について今後早急に検討および対策を取る必要がある。

- (1) 細目 R/D の調印
- (2) 行政ベースでの Endorsement
- (3) Site の決定促進
- (4) Site 調査
- (5) Joint Technical Team の日本側要員の派遣。

7. 提出資料

- (1) Detailed Record of Discussions
- (2) Technical Documents (別添 2) (青本)
- (3) Estimated Cost (別添 3)
- (4) Equipment List in Fabrication of Field Test Plant (別添 5)
- (5) 経緯資料 (JICA 作成経緯資料 I より抜粋) (資料のリストは別添 4)
- (6) List of Correction
- (7) Minutes of Meetings (FEB. 1980) (別添 1)

Minutes of Meeting

February 27, 1980.

The Japanese mission dispatched by Japan International Cooperation Agency (JICA) held several meetings with the engineers of the Saline Water Conversion Corporation (SWCC) concerning the technical cooperation on sea water desalination technology (hereinafter referred to as the PROJECT), during their stay in the Kingdom of Saudi Arabia from the 16th to the 27th of February 1980.

(The list of attendants to the meetings is attached in Annex 1).

The outline of the meetings is as follows:-

- 1- The Japanese side submitted to the Saudi side a draft of Detailed Record of Discussions, Technical Documents and Estimated Cost (Tentative).
- 2- Both sides agreed as to the Field Test Plant as follows:
 - (1) The performance ratio is increased from 3 to 6.
 - (2) The incremental cost due to the increase in performance ratio will be borne by the Saudi side:
 - (3) JICA will provide the evaporators and the instrumentation equipments only for the plant.
- 3- The Japanese side stated that the Japanese representative of the Joint Technical Team would be dispatched after the completion of necessary preparations such as detailed investigation of the site and planning of construction.
- 4- The Saudi side asked about safety of asbestos and its possible alternative. The Japanese side replied that no harm would be caused by using asbestos in building and laboratory materials, and promised to supply SWCC with technical information on this matter.
- 5- The Saudi side expressed their desire that the dispatched Japanese experts would advise SWCC on technical problems besides the PROJECT. The Japanese side stated that the experts would advise SWCC as long as the implementation of the PROJECT was not hindered due to such an additional work.

- 6- Both sides agreed to the final draft of the Detailed Record of Discussions attached herewith. The Saudi side expressed their approval on the Technical Documents and Estimated Cost (Tentative).
- 7- Both sides agreed to make their best efforts for signing of the detailed Record of Discussions on the occasion of the visit of H.E. Minister of Agriculture and Water and designated Governor of SWCC, the Kingdom of Saudi Arabia to Japan, scheduled next March or April, and also for the endorsement of the PROJECT on the occasion of the visit of H.E. Minister of Planning and the Head of Saudi Side in the Saudi-Japanese Joint Committee, the Kingdom of Saudi Arabia to Japan expected next March or April.
- 8- In case that the above mentioned procedures become difficult, adequate alternative arrangements will be made through the consultation between both sides.
- 9- The Japanese side stressed the importance of reaching to the decision on the site as soon as possible with regard to the implementation of the PROJECT. The Saudi side assured the Japanese side of making this decision without delay and informing it to the latter.

Eng. YOUSUF H. NASSIF
Director, Dept. of Research
SWCC.

Dr. TOTARO GOTO
Team Leader
JAPANESE DELEGATION
JICA.

ANNEX 1

Japanese Mission

Dr. Totaro Goto

Team Leader
Director, 1st Section of Process
Research & Development Division.
National Chemical Laboratory for
Industry
Agency of Industrial Science and
Technology
Ministry of International Trade
and Industry.

Mr. Ikuo Makino

Policy Adviser
Deputy Director, Technical Coopera-
tion Division
Economic Cooperation Department
International Trade Policy Bureau
Ministry of International Trade
and Industry.

Mr. Shuichi Tsunoda

Planning Adviser
Deputy Director, International
Research & Development Cooperation
Agency of Industrial Science and
Technology
Ministry of International Trade
and Industry.

Mr. Masaru Tateishi

Coordinator
Deputy Director, Natural Resources
Survey Division
Mining & Industrial Planning and
Survey Department
Japan International Cooperation Agency

Mr. Kunio Kikuchi

Saline Conversion Technical Adviser
General Manager, Desalination
Technology Division
Water Re-Use Promotion Center

Mr. Namio Minagawa

Saline Conversion Technical Adviser
Senior Engineer for Laboratory Design
Desalination Technology Division
Water Re-Use Promotion Center

Mr. Masaaki Inai

Saline Conversion Technical Adviser
Senior Engineer for Plant Design
Desalination Technology Division
Water Re-Use Promotion Center.

(With attendance of)

Mr. Naotoshi Osada

Deputy Representative for the
Secretariat to the Saudi-Japanese
Joint Committee.

Mr. Takeshi Komori

Expert from Japan International
Cooperation Agency (JICA) to the
Secretariat of the Saudi-Japanese
Joint Committee.

S V C C

Mr. Youssif H. Nassif

Director, Research and Technical
Department.

Mr. Habeeb Mohammed

Engineer, Research and Technical
Department.

DETAILED RECORD OF DISCUSSIONS
BETWEEN THE JAPAN INTERNATIONAL COOPERATION AGENCY AND
THE SALINE WATER CONVERSION CORPORATION OF
THE KINGDOM OF SAUDI ARABIA
(DRAFT)

The delegate of the Saline Water Conversion Corporation headed by _____, visited Japan from the _____th of _____, 1980, to the _____th of _____, 1980, for the purpose of making detailed agreement of the project for the technical cooperation on sea water desalination between Japan and the Kingdom of Saudi Arabia (hereinafter referred to as the PROJECT) with the Japan International Cooperation Agency.

Both delegates worked out details of the PROJECT on the basis of the results of the basic Record of Discussions concluded between the Japan International Cooperation Agency and the Saline water Conversion Corporation on the 6th of September, 1979 (hereinafter referred to as the BASIC R/D), and agreed as follows:

Article 1. Scope, Purpose and Objectives

A. The outline of the Cooperation

The Japan International Cooperation Agency (JICA) and the Saline Water Conversion Corporation (SWCC) will cooperate with each other, in accordance with the BASIC R/D, the Agreement on Economic and Technical Cooperation between the Government of Japan and the Government of the Kingdom of Saudi Arabia, of 1st of March, 1975 (hereinafter referred to as the AGREEMENT) and the recommendation of the Japan-Saudi Arabia Joint Committee in implementing the PROJECT for the purpose of securing desalinated water in the future by transferring the technology developed by the

Ministry of International Trade and Industry, the Government of Japan.

B. The Outline of the PROJECT

On the basis of the sea water desalination technology of multi-stage flash evaporation process and reverse osmosis process developed by the Ministry of International Trade and Industry, the Government of Japan, the PROJECT will be carried out on the study required for adaptation to the natural conditions of the Kingdom of Saudi Arabia under the tentative time schedule of a five-year program as indicated in ANNEX 1.

(1) Consultation and Exchange of Information

A joint meeting of high-level officials or specialists of the both countries will be established in order to have consultations and exchange of information about the technology for sea water desalination and to promote the PROJECT.

During the PROJECT, the meetings are scheduled to be held alternately in Japan and in the Kingdom of Saudi Arabia.

(2) Establishment of Desalination Research Laboratory

A research laboratory for desalination technology (hereinafter referred to as the Desalination Research Laboratory) will be established in SWCC and furnished with necessary research equipment.

(3) Construction of Field Test Plant and Module Test Plant

Attached to the Desalination Research Laboratory, a field test plant of multi-stage flash evaporation process, capable of desalting 500 m³/day (hereinafter referred to as the Field Test Plant) and a module test plant of reverse osmosis process, capable of desalting 40 m³/day (20 m³/day x 2 units) (hereinafter referred to as the Module Test Plant) will be constructed.

(4) Research

Research will be undertaken on the durability of the concrete evaporator shells and the prevention of corrosion and scale deposition by the effective utilization of the Desalination Research Laboratory and Field Test Plant, and also the durability of reverse osmosis modules by the effective utilization of the Desalination Research Laboratory and Module Test Plant. The research themes of this study are listed in ANNEX II.

Article 2. The Measures to be taken by JICA

- (1) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide, at its own expense, the requisite services of Japanese specialists (ANNEX VI) through the normal procedures under the Technical Cooperation Scheme of Japan for

the purpose of conducting the PROJECT as mentioned in the Article 1. (B).

- (2) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to receive, at its own expense, the Saudi Arabian personnel connected with the PROJECT for technical training in Japan, through the normal procedures under the Technical Cooperation Scheme of Japan.
- (3) a. In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to provide, at its own expense, the Field Test Plant (evaporator and instrument only) and Module Test Plant, and the main equipment for the Desalination Research Laboratory through the normal procedures under the Technical Cooperation Scheme of Japan. Specifications of the Field Test Plant and Module Test Plant and equipment list of the Desalination Research Laboratory are indicated in ANNEX III, ANNEX IV and ANNEX V respectively.
- b. The Field Test Plant, Module Test Plant and Desalination Research Laboratory equipment referred to above will be utilized exclusively for the implementation of the PROJECT upon the advice of Japanese specialists.
- (4) In accordance with the laws and regulations in force in Japan, JICA will take the necessary measures to meet:

- a. Expenses for drawing the concept design of the Desalination Research Laboratory.
- b. Expenses for holding the joint meeting in Japan.
- c. Expenses for dispatching Japanese senior officials or specialists to the Kingdom of Saudi Arabia to attend the joint meeting.

Article 3. The Measures to be taken by SWCC

(1) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take the necessary measures to provide at its own expense:

- a. The services of the Saudi Arabian counterpart personnel for the PROJECT, including the operation of the Field Test Plant and Module Test Plant as listed in ANNEX VI.
- b. Requisite land for the Desalination Research Laboratory, Field Test Plant and Module Test Plant.
- c. Building and their necessary facilities for the Desalination Research Laboratory, control room and boiler house for the Field Test Plant.
- d. Equipment, machinery, instruments and other materials necessary for the Desalination Research Laboratory, Field Test Plant and Module Test Plant, except for those provided by JICA, at its own expense.

- e. Separate office room in the Desalination Research Laboratory and control room for the Japanese specialists.
 - f. A fully furnished suitable accommodation for each Japanese specialist and his family.
- (2) In accordance with the laws and regulations in force in the Kingdom of Saudi Arabia, SWCC will take necessary measures to meet:
- a. Expenses necessary for the domestic transportation of the goods provided by JICA as well as for their installation (including foundation works, and construction of sea water intake and discharge systems and fresh water distribution system and road and facility of transform substation and telephone).
 - b. All running expenses necessary for the implementation of the PROJECT.
 - c. Customs duties and any other charges, if any, as may be imposed upon the goods provided by JICA to SWCC.
 - d. Expenses for the internal travel in the Kingdom of Saudi Arabia of the Japanese specialists on duty.
 - e. Expenses for vehicles with drivers for the Japanese specialists during working hours.
 - f. Expenses for dispatching senior Saudi Arabian officials or specialists to Japan to attend the joint meeting.

Article 4. Operations Management

- (1) SWCC will appoint a SWCC senior official as Director listed in ANNEX VI.
- (2) JICA will appoint a Japanese senior specialist as Chief Representative listed in ANNEX VI.
- (3) Research in the Desalination Research Laboratory and operation of the Field Test Plant and Module Test Plant will be directed jointly by the Director and the Chief Representative.

Article 5. Function of the Joint Technical Team

SWCC and JICA will jointly review the progress of the implementation of the PROJECT at the forum of the joint meeting and take measures necessary to secure smooth and effective cooperation and otherwise consult with each other in respect of any matter that may arise from or in connection with this understanding. The Joint Technical Team will prepare and transmit to the Governor of SWCC quarterly reports covering the overall status and progress of work as well as areas of concern and recommendations.

The Joint Technical Team will monitor and direct all work and review all submittals by the contractors.

- (1) The Joint Technical Team will invite qualified firms having interest in assisting SWCC to serve as A/E or construction contractors.
- (2) The Joint Technical Team will evaluate the proposals, select the contractor and recommend it to SWCC for portions totally funded by SWCC for approval.

Article 6. Privileges

The Japanese specialists, their families and the missions who are to be dispatched for the PROJECT will be granted, in the Kingdom of Saudi Arabia, the privileges, exemptions and benefits according to Article 3(c) of the AGREEMENT.

Article 7. Claims

SWCC undertakes to bear claims, if any arise, against the Japanese specialists resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in the Kingdom of Saudi Arabia, excepting those claims arising from the willful misconduct of gross negligence of the Japanese specialists.

Article 8. Confidentiality

SWCC and JICA shall keep, in general, confidential any information or data provided by another partner or generated as a result of the work under the PROJECT. In the case of mutual agreement, however, SWCC and JICA or their employee can publish the information or data.

Article 9. Patents

(1) If inventions or discoveries arise out of any work performed under the PROJECT:

a. SWCC or JICA shall acquire all rights, title and interest in and to any such invention or discovery in its own country.

b. SWCC and JICA shall acquire, in general, equal rights, title and interest in and to

any such invention or discovery in a third country.
(2) SWCC or JICA which owns an invention referred to in the subparagraphs of (1) above shall license such inventions to the nationals of the other country on terms and conditions most favorable under the laws and regulations of the owner country.

Article 10. Estimated Costs

Given below are the estimates of magnitude which will be refined with the progress of the PROJECT.

The total cost of services to be provided by JICA is estimated US\$5,125,000. Other costs to be incurred by SWCC during the implementation of the PROJECT by way of direct contracts to private industry for civil works, transportation, procurement of equipment not provided by JICA are estimated to be US\$24,926,000.

The total estimated costs for the PROJECT is US\$30,051,000.

Article 11. Budgetary Appropriations

Implementation under this Detailed Record of Discussions (hereinafter referred to as the DETAILED R/D) shall be subject to the budgetary appropriations in JICA and SWCC.

Article 12. Method of Payment

Any project expenditure not provided by JICA such as, (1) personnel costs, travel, accommodation and any other personnel benefits not less favorable

than those granted to the specialists and their families of a third country in the Kingdom of Saudi Arabia, and (2) procurement of materials, chemicals, equipment and any other expenditure related with the Field Test Plant, Module Test Plant or Desalination Research Laboratory shall be submitted by the Joint Technical Team with recommendations to SWCC for approval. After SWCC approval, the amount will be paid from the allotted funds for the PROJECT.

Article 13. Effective Date

(1) This DETAILED R/D shall become effective after signature of the representatives of the parties, and shall remain in effect until terminated in accordance with Article 15. below, or the termination of the AGREEMENT, whichever shall occur first.

(2) The duration for the technical cooperation of the PROJECT will be five years from _____ to _____.

Article 14. Force Majeure

If any party to this DETAILED R/D is rendered unable because of force majeure to perform its responsibilities under this DETAILED R/D, these responsibilities shall be suspended during the period of continuance of such inability. The term "Force Majeure" means acts of God, acts of public enemy, war, civil disturbances, and other similar events not caused by nor within the control of the parties. During the period of suspension of the

performance caused by force majeure, SWCC may continue to pay normal costs of maintaining the Japanese team in Saudi Arabia. In the event of suspension of a party's duties because of force majeure the parties shall consult and endeavor jointly to resolve any attendant difficulties.

Article 15. Amendment, Extension or Termination

This DETAILED R/D may be amended, extended or terminated by mutual agreement in writing.

Article 16. Resolution of Difficulties

JICA and SWCC upon request of any party, regarding any matter relating to the terms of this DETAILED R/D, shall endeavor jointly in a spirit of cooperation and mutual trust to resolve any difficulties or misunderstanding that may arise.

Date: _____

Place: _____

(Signature)

J I C A

(Signature)

S W C C

ANNEX I

Tentative Schedule

Year	1980	1981	1982	1983	1984
1. Field Test Plant and Module Test Plant					
(1) Decision of Site	→				
(2) Designing	←				
(3) Fabrication	←	→			
(4) Civil Works		→			
(5) Transportation			←		
(6) Installation			↔		
(7) Operation				←	→
2. Desalination Research Laboratory					
(1) Decision of Site	↔				
(2) Concept Designing	↔				
(3) Detailed Designing and Construction	←	→			
(4) Research Activity				←	→
3. Laboratory Equipment					
(1) Procurement		←	→		
(2) Transportation and Installation		←	→		
4. Report					
(1) Annual Report	↔	↔	↔	←	
(2) Final Report					←
5. Personnel					
(1) Saudi Arabian side	←				
(2) Japanese side	←				
6. Joint Meeting	▽	▽	▽	▽	▽

ANNEX II

Research Themes

The main research themes are as follows:

1. Operation of the 500 m³/day Field Test Plant

- (1) First research operation
- (2) Second research operation
- (3) Material inspection
- (4) Corrosion testing with a mini-brine heater

2. Operation of the 40 m³/day Module Test Plant

- (1) First research operation
- (2) Second research operation
- (3) Module inspection

3. Study in the Desalination Research Laboratory

- (1) Corrosion study

---Examination of metallic corrosion in the Field Test Plant and a mini-brine heater, and study on typical corrosion phenomena in the desalination environment and instantaneous measurement of corrosion velocity (corrosion monitoring)

- (2) Chemical study

---Study on chemical analysis, corrosive environment, corrosion products and scale deposition

4. Recommendation

Proposal of the most recommendable plant on the basis of the results obtained in the PROJECT.

ANNEX III

Specification of Field Test Plant

1. Capacity	500 m ³ /day
2. Type of plant	Brine recirculating type long tube design multi-stage flash evaporator
3. Material of shells	Concrete
4. Scale prevention	pH control by sulfuric acid injection
5. Scale elimination	Ball cleaning system
6. Performance ratio	6.0
7. Number of stage .	Heat recovery: 15 stages Heat rejection: 3 stages
8. Sea water	TDS 48,200 ppm (max.) Temperature (max.): 32.2°C Intake quantity: 250 m ³ /hour
9. Steam (1) Heating	3.5 t/h (1.5 kg/cm ² G)
(2) Steam ejector	0.5 t/h (10 kg/cm ² G)
10. Concentration ratio	1.24
11. Flow rate of recirculating brine	174 t/h
12. Recirculating brine maximum temperature	120°C

ANNEX IV

Specification of Module Test Plant

1. Reverse Osmosis (RO) Unit

Capacity: 40 m³/day

Number of Unit: 2

RO Module :

(1) Hollow Fiber (1 unit)

Capacity: 20 m³/day

No. of Module: 1

Salt Rejection: more than 99%

Diameter: 8 inches

Method: Single stage desalination

(2) Spiral Wound (1 unit)

Capacity: 20 m³/day

No. of Module: 3

Salt Rejection: more than 99%

Diameter: 8 inches

Method: Single stage desalination

Operating Condition:

Pressure: 55 - 70 kg/cm²

Recovery Ratio: 30 - 40%

Temperature: 28 - 35°C

2. Pretreatment Unit

Capacity: 150 m³/day

No. of Unit: 1

System: In-line coagulation

3. Sea Water

Quality: TDS 48,200 ppm (max.)

Temperature: 32.2°C (max.)

Intake Quantity: 150 m³/day

ANNEX V

Laboratory Equipment

1. Equipment for Corrosion Test
 - (1) Corrosometer
 - (2) Corrator
 - (3) Metallurgical microscope
 - (4) Roughness meter
 - (5) Potentiostat/galvanostat
 - (6) Immersion corrosion testing equipment
2. Equipment for Water and Chemical Analysis
 - (1) Atomic absorption and flame photometer
 - (2) Spectrophotometer
 - (3) X-ray diffractometer
 - (4) Automatic titrater
 - (5) pH meter
3. General Equipment
 - (1) Analytical balance
 - (2) Drying oven
 - (3) Muffle furnace
 - (4) Vacuum pump
4. Glassware and Others
5. Laboratory Furniture
6. Machine and Tools
7. Process Analyzer

Note: Major equipment only.

محضر تفصيلي للجلسات
بين الوكالة اليابانية للتعاون الدولي
والمؤسسة العامة لتحلية المياه المالحة
في المملكة العربية السعودية
(مسودة)

قام الوفد الذي شكلته الوكالة اليابانية للتعاون الدولي برئاسة السيد _____
بزيارة المملكة العربية السعودية في الفترة من _____ ١٩٨٠، إلى _____ ١٩٨٠،
التي لايحات حول تحلية مياه البحر بين اليابان والمملكة العربية السعودية (والذي يشار اليه
فيما بعد ، "بالسجل الاساسي لمحضر الجلسات) ، مع المؤسسة العامة لتحلية المياه المالحة .

وقد اجري كل من الوفدين تفصيلات "المشروع " على اساس نتائج السجل الاساسي لمحضر
الجلسات المنعقدة بين المؤسسة العامة لتحلية المياه المالحة في السادس من سبتمبر ، ١٩٧٩
(والذي يشار اليها فيما بعد " بالسجل الاساسي لمحضر الجلسات) ، واتفقا على مايلي :-

المادة ١ . المضمار ، الاسباب والمواضيع
١ . مخطط التعاون

سوف تتعاون كل من الوكالة اليابانية للتعاون الدولي والمؤسسة العامة
لتحلية المياه المالحة ، فيما بينهما ، وفقا للمحضر الاساسي لجلسات اتفاقية
التعاون الاقتصادي والفني ، بين حكومة اليابان وحكومة المملكة العربية
السعودية ، الموقعة في الاول من مارس ، ١٩٧٥ (والتي يشار اليها فيما بعد
" بالاتفاقية ") ، وتزكية اللجنة المشتركة من اليابان — والمملكة العربية
السعودية في تنفيذ "المشروع " بغرض تأمين المياه المحلاة في المستقبل
ينقل التكنولوجيا من قبل وزارة الصناعة والتجارة الدولية ، لحكومة اليابان .

(٢)

ب. مخطط المشروع
على اساس تكنولوجيا تحلية مياه البحر المعيزة بعملية التبخير السريع
المتعدد المراحل وعملية التناضح العكاس من قبل وزارة الصناعة والتجارة
الدولية ، لحكومة اليابان ، سيتم تنفيذ "المشروع " بدراسة المواد المطلوب
توفيرها للظروف الطبيعية في المملكة العربية السعودية ضمن الجدول
الزمنى التجريبي لبرنامج السنوات الخمس كما هو مثار اليه في "الملحق "
الاول .

(١) التشار و تبادل المعلومات

سوف يتم اقامة اجتماع مشترك من اعلى المستويات الرسمية او من
الاختصاصيين لقرض الاستشارات و تبادل المعلومات حول التكنولوجيا
لتحلية مياه البحر من اجل دعم "المشروع " .
وخلال " المشروع " ، تم تقرير عقد الاجتماعات بالتناوب في اليابان والمملكة
العربية السعودية .

(٢) اقامة مختبر لايحات التحلية

سيقام مختبر ايحات لتكنولوجيا التحلية (يشار اليه فيما بعد ، بمختبر
ايحات التحلية) لدى المؤسسة العامة لتحلية المياه المالحة ، و يجهز
باجهزة الايحات اللازمة .
(٢) انشاء معمل ميداني للايحات ومعمل قياس للايحات

اضافة الى مختبر ايحات تحلية المياه، سيتم انشاء معمل ميداني للايحات
السرير المتعدد المراحل ، موهل لازالة ملوحة ٥٠٠ متر
مكب / يوما (يشار اليه فيما بعد بالمعمل الميداني للايحات) ومعمل
قياس للتجارب يتميز بعملية التناضح العكاس ، موهل لازالة ملوحة ٤٠ متر
مكب / يوما (يشار اليه فيما بعد بمعمل القياس للايحات)

(٤) الأبحاث

ستعد الأبحاث على تحمل قشرة التبخير الاسفنتية ومنع التآكل والترسب باستخدام الفعّال لمختبر أبحاث التحلية ومعمل القياس للأبحاث وأيضاً، قدرة احتمال قياس التناضح باستخدام الفعّال لمختبر أبحاث التحلية، ومعمل القياس للأبحاث. تم إدراج فرق الأبحاث لهذه الدراسة في "الملحق الثاني".

التدابير التي ستعمل بها الوكالة اليابانية للتعاون الدولي

المادة ٢٠٢

(١) وفقاً للأنظمة والقوانين المعمول بها في اليابان، سوف تتخذ الوكالة اليابانية للتعاون الدولي التدابير اللازمة لتزويدها على نفقاتها الخاصة، المستلزمة لخدمات المختصين اليابانيين (الملحق الرابع) وفقاً لاجراءات العادية التي تجرى ضمن مخطط التعاون الفني الياباني لغرض انجاز المشروع كما هو مذكور في المادة ١٠١ (ب).

(٢) وفقاً للأنظمة والقوانين المعمول بها في اليابان، سوف تتخذ الوكالة اليابانية للتعاون الدولي، التدابير اللازمة، للقبول، على نفقاتها الخاصة العاملين السعوديين المعيّنين في "المشروع" لتدريبهم فنياً في اليابان، من خلال الاجراءات العادية التي يتضمن عليها مخطط التعاون الفني الياباني.

(٣) ١. وفقاً للأنظمة والقوانين المعمول بها في اليابان، سوف تتخذ الوكالة اليابانية للتعاون الدولي التدابير اللازمة لتمويل المعمل الميداني للأبحاث علو، نفقاتها الخاصة، - (المبخر والاجهزة فقط) ومعمل القياس للتجارب، والاجهزة الرئيسية لمختبر أبحاث التحلية من خلال الاجراءات العادية التي يتضمن عليها مخطط التعاون الفني الياباني، يشار الى مواصفات المعمل الميداني للأبحاث ومعمل القياس للأبحاث وقائمة الاجهزة في "الملحق الثالث"، "الملحق الرابع"، "الملحق الخامس" بالتمثل.

ب. سوف يتم استخدام المعمل الميداني للأبحاث، ومعمل القياس للأبحاث، واجهزة مختبر أبحاث التحلية المشار إليها آنفاً بصفة خاصة من أجل تنفيذ "المشروع" وفقاً لتوصية الاختصاصيين اليابانيين.

(٤) وفقاً لللائحة والقوانين المعمول بها في اليابان ، سوف تتخذ الوكالة اليابانية للتعاون الدولي التدابير اللازمة للتفق مع :

- أ. نفاذ رسم تصميم الفكرة لمختبر أبحاث التحلية .
- ب. نفاذ عقد الاجتماع المشترك في اليابان .
- ج. نفاذ ارسال الرسميين والاختصاصيين من المرتبة العليا للملكة العربية السعودية ، لحضور الاجتماع المشترك .

المادة ٣. التدابير التي ستعمل بها المؤسسة العامة لتحلية المياه المالحة

(١) وفقاً لللائحة والقوانين المعمول بها في المملكة العربية السعودية ، سوف تتخذ المؤسسة العامة لتحلية المياه المالحة التدابير اللازمة وتمويلها على نفقاتها الخاصة :

أ. خدمات العاملين السعوديين للطرف الاخر من اجل "المشروع" ، بما في ذلك تشغيل المعمل الميداني للابحاث ومعمل القياس للابحاث كما هو مدرج

ب. الارض اللازمة لمختبر ابحاث التحلية ، ومعمل القياس للابحاث .

ج. المبنى والتسهيلات اللازمة لمختبر ابحاث التحلية ، وغرفة المراقبة وغرفة العرجل من اجل المعمل الميداني للابحاث .

تطالب المؤسسة العامة لتحلية المياه المالحة بحق الاختيار التالي :

يمكن ان تقوم المؤسسة العامة لتحلية المياه المالحة بتزويد المياني والتسهيلات المنشأة كجزء من مشاريع المؤسسة العامة لتحلية المياه المالحة عوضاً عن انشاء المياني والتسهيلات المذكورة اعلاه ، على ان تكون ملائمة لدعم الحركة وتتفق مع برنامج هذا المشروع .

د. الاجهزة والمعدات ، واجهزة القياس والمواد الضرورية الاخرى لمختبر ابحاث التحلية ، والمعمل الميداني للابحاث ، ومعمل القياس للابحاث ، ماعدا

تلك المزودة من قبل الوكالة اليابانية للتعاون الدولي ، على نفقاتها الخاصة .

هـ. غرفة مكتب مستقلة في مختبر ابحاث التحلية وغرفة مراقبة للاختصاصيين اليابانيين .

و. سكن مفروش تماماً لكل اختصاصي ياباني وعائلته ، حسب مقاييس المؤسسة

(٢) وفقاً للأنظمة والقوانين المعمول بها في المملكة العربية السعودية، سوف

تتخذ المؤسسة العامة لتحلية المياه المالحة التدابير اللازمة لتنسيق مع :

١. النفقات اللازمة للتنقلات المحلية للسلع المزودة من قبل الوكالة اليابانية للتعاون الدولي وايضا ما يترتب عن التركيبات الناتجة عنها (بمافي ذلك الاشغال الانشائية ، وانشاء امتصاص مياه البحر وانظمة التفريغ وانظمة توزيع المياه المالحة للشرب ، والطرق ، وتسهيلات تحويل محطة فرعية ، والهاتف) .

ب. كافة المصاريف الضرورية الجارية لتنفيذ " المشروع " .

ج. المكوس والجمارك والتكاليف الاخرى ، اذا كان هنالك اى منها ، على السلع المزودة من الوكالة اليابانية للتعاون الدولي الى المؤسسة العامة لتحلية المياه المالحة .

د. نفقات التنقلات الداخلية في المملكة العربية السعودية للاختصاصيين اليابانيين قيد العمل .

هـ. نفقات السيارات مع سائقها للاختصاصيين اليابانيين خلال ساعات الدوام

و. نفقات ايفاد الرسميين السعوديين ذوى المراتب العليا او الاختصاصيين الى اليابان لحضور الاجتماع المشترك .

المادة ٤ . ادارة العمليات

(١) ستعين المؤسسة العامة لتحلية المياه المالحة شخص رسمي من ذوى المراتب العليا لديها برتبة مدير كما هو مدرج في " الملحق الرابع " .

(٢) ستعين الوكالة اليابانية للتعاون الدولي اختصاصي من ذوى المراتب العليا برتبة رئيس ممثلين كما هو مدرج في " الملحق الرابع " .

(٣) سيتم ادارة الابحاث في مختبر ابحاث التحلية وتشغيل المعمل الميداني للابحاث وعمل القياس للابحاث بصفة مشتركة من قبل المدير ورئيس الممثلين .

المادة ٥ . مهام الفريق الفني المشترك

سوف تنظر كل من المؤسسة العامة لتحلية المياه المالحة والوكالة اليابانية

للتعاون الدولي تقدم تنفيذ " المشروع " اثناء منتدى الاجتماع المشترك .

واتخاذ التدابير اللازمة لتأمين التعاون السلس الفعال او التفاوض بينهما حول اى من الامور التي من المحتمل ان تنجم عن او فيما يتعلق بهذا الفهم . سوف يقوم الفريق الفني المشترك بالتحضير والتحويل لمحافظة المؤسسة العامة لتحلية المياه المالحة ، تقارير فملية تغطي الحالة الاجمالية وتقدم العمل بمافي ذلك المناطق المعنية بذلك وتوصياتها .

(١) سوف يقوم الفريق الفني المشترك بمراقبة وتوجيه كافة امور العمل ومراجعة

جميع المرفقات من قبل المتعاقدين .

(٦)

- (١) سوف يقوم الفريق الفني المشترك بدعوة مؤسسات مؤهلة تهتم بالتعاون مع المؤسسة العامة لتحلية المياه المالحة للخدمة بعثابة مهندسين معماريين أو متعهدي انشاء .
- (٢) سوف يقوم الفريق الفني المشترك بتخمين الاقتراحات ، وانتقاء المتعهد والتوصية به الى المؤسسة العامة لتحلية المياه المالحة من اجل الحصر المتواجدة اجماليا من قبل المؤسسة العامة لتحلية المياه المالحة للموافقة عليها .

المادة ٦ . الامتيازات

سوف يعطى للاختصاصيين اليابانيين ، وعائلاتهم وبعثاتهم الموفدة الى "المشروع" ، في المملكة العربية السعودية ، الامتيازات والاعفاءات والفوائد وفقا للمادة ٣ (ج) من "الاتفاقية" .

المادة ٧ . المطالب

ستتعهد المؤسسة العامة لتحلية المياه المالحة وتحمل المطالب ، اذا بدر اي شيء منها ، تجاه الاختصاصيين اليابانيين تكون ناتجة عن حدوث اولها اتصال بتنفيذ واداء مهامهم الرسمية في المملكة العربية السعودية ، على ان تكون هذه المطالب ناتجة عن الاعمال المتعدد من جانب الاختصاصيين اليابانيين .

المادة ٨ . السرية

سوف تحافظ كل من المؤسسة العامة لتحلية المياه المالحة والوكالة اليابانية للتعاون الدولي ، بصفة عامة ، على سرية اية معلومات او بيانات مزودة من قبل شريك آخر او تنشأ نتيجة العمل ضمن "المشروع" ، وفي حالة الاتفاقية المشتركة ، يحق للمؤسسة العامة لتحلية المياه المالحة ، مع ذلك ، او الوكالة اليابانية للتعاون الدولي او مستخدميها بنشر المعلومات او البيانات .

- (١) اذا نتجت اختراعات أو اكتشافات من جراء اي من الاعمال المعمول بها ضمن "المشروع" :
- أ. سوف تنال كل من المؤسسة العامة لتحلية المياه المالحة أو الوكالة اليابانية للتعاون الدولي كافة الحقوق ، الحق الشرعي والفائدة في اي من مثل هذه الاختراعات أو الاكتشافات في بلدها الخاص .
- ب. سوف تنال كل من المؤسسة العامة لتحلية المياه المالحة والوكالة اليابانية للتعاون الدولي بصفة عامة ، حقوق متعادلة ، الحق الشرعي والفائدة في اي من مثل هذه الاختراعات أو الاكتشافات في بلد ثالث .

- (٢) سوف تقوم كل من المؤسسة العامة لتحلية المياه المالحة أو الوكالة اليابانية للتعاون الدولي اللتان تملكان اختراع مثار اليه في الفقرات الفرعية (١) أنفا بترخيص مثل هذه الاختراعات لمواطني البلد الاخر ضمن اتفاق وشروط مقبولة ضمن الانظمة والقوانين في البلد المالك .

المبالغ الواردة ادناه هي التفقات المقدرة للمبلغ الذي سوف يصفى مع تقدم

- "المشروع" . تقدر التفقات الاجمالية للخدمات التي يجب ان تزود من قبل الوكالة اليابانية للتعاون الدولي بمبلغ ١٢٥٠٠٠٠٠٠ دولار امريكي . وتقدر التفقات الاخرى المترجيب استهدافها من قبل المؤسسة العامة لتحلية المياه المالحة خلال تنفيذ المشروع على سبيل العقود المباشرة للصناعة الخاصة للاشغال المدنية ، والنقل وتسيير الازمة الغير مزودة من الوكالة اليابانية للتعاون الدولي ، بمبلغ ١٦٠٠٠٠٠ دولار امريكي ، وتبلغ التفقات الاجمالية المقدرة " للمشروع " ١٥٠٠٠٠٠٠ دولار امريكي .

(A)

المادة ١١ . مخصصات الميزانية

يجب ان يكون التنفيذ الواقع ضمن محضر جلسات المحادثات (المشار اليه فيما بعد "بالمحضر التفصيلي للجلسات ") عرضة لمخصصات الميزانية لدى الوكالة اليابانية للتعاون الدولي والمؤسسة العامة لتحلية المياه المالحة .

المادة ١٢ . طريقة الدفع

يجب ارفاق نفقات اى مشروع غير مزود من الوكالة اليابانية للتعاون الدولي مثل (١) نفقات المستخدمين ، التنقلات ، الاسكان واى فوائد للمستخدمين لاقتل يثانها عن تلك الممنوحة للاختصاصيين اليابانيين وعائلاتهم لدولة ثالثة في المملكة العربية السعودية ، و (٢) وتدريب المواد ، والكيماريات ، والاجهزة ، واية نفقات اخرى تنطبق بالعمل الميداني للابحاث ، وعمل القياس للابحاث او مختبر ابحاث التحلية ، من قبل الفريق الفني المشترك وتوصيتها الى المؤسسة العامة لتحلية المياه المالحة للموافقة عليها . هذا وسوف يدفع المبلغ من النقود المخصصة "للمشروع" .

المادة ١٣ . تاريخ التنفيذ

(١) يجب ان يصبح محضر الجلسات التفصيلي هذا نافذ المفعول بعد توقيعه من قبل ممثلي كلا الطرفين ، وسوف يبقى نافذ المفعول حتى اتمامه وفقاً للمادة ١٥ ، اثناء ، او اتمامها " الاتفاقية " حسب حدوث الاولى .

(٢) سوف تكون مدة التعاون الفني للمشروع خمسة سنوات ابتداءً من _____ حتى _____

المادة ١٤ . القوة القاهرة

اذا حال اى من الاطراف دون تنفيذ محضر الجلسات التفصيلي هذا بسبب القوة القاهرة ، لاداء مسؤولياته ضمن نموس محضر الجلسات التفصيلي هذا ، لذلك ستصبح هذه المسؤوليات بطلقة خلال فترة متايعة عدم المقدرة هذه . تعني عبارة " القوة القاهرة " الاعمال الالكهية ، اعداء الشعب ، الحرب ، النزاعات المدنية ، او اى احداث اخرى مشابهة لذلك ، تتسبب غصبا عن ارادة الاطراف . وخلال مدة التعليق للاداء الناتج عن " القوة القاهرة " ، من المحتمل ان تواصل المؤسسة العامة لتحلية المياه المالحة دفع النفقات العادية للمحافظة على بقاء الطرف الياباني في المملكة العربية السعودية . وفي حالة حدوث تعليق واجبات اى من الاطراف بسبب " القوة القاهرة " ، سيتشاور الاطراف بالسعي المشترك لحل اية صعوبات للحضور .

(٩)

المادة ١٥ . التعديل ، والتعديل او الانهاء

يمكن تعديل محضر الجلسات التفصيلي هذا ، او تعديده او انهاءه باتفاقية
مشتركة خطيا .

المادة ١٦ . حل المصوبات

سوف تسعى كل من الوكالة اليابانية للتعاون الدولي والمؤسسة العامة
لتحلية المياه المالحة حسب طلب اي من الاطراف ، بما يتعلق في اي من
الامور المتصلة بالعبارة الواردة في محضر الجلسات التفصيلي هذا ، بصورة
مشتركة ، وبروح التعاون والثقة المشتركة لحل اية صعوبات او سوء تفاهم ربما
يظرا .

_____ : التاريخ

_____ : المكان

المؤسسة العامة لتحلية المياه
المالحة

الوكالة اليابانية للتعاون الدولي

الملحق الاول
البرنامج التجريبي

السنة	١٩٨٠	١٩٨١	١٩٨٢	١٩٨٣	١٩٨٤
٠١ المعمل الميداني للابحاث ومعمل القياس للابحاث (١) تقرير الموقع (٢) عملية التصميم (٣) عملية التصنيع (٤) الاثقال المعدنية (٥) التنقلات (٦) التركيبات (٧) التشغيل					
٠٢ مختبر ابحاث التحلية (١) تقرير الموقع (٢) فكرة عملية التصميم (٣) التصميم المفصل والانشاء (٤) نشاط الابحاث					
٠٣ اجهزة المختبر (١) التدابير (٢) التنقلات والتركيبات					
٠٤ التقرير (١) التقرير السنوي (٢) التقرير النهائي					
٠٥ المستخدمين (١) الجانب السعودي (٢) الجانب الياباني					
٠٦ الاجتماع المشترك					

الملحق الثاني
مواضيع البحث

مواضيع البحث الرئيسية هي كالتالي:

- ٠١ عملية اقامة معمل ميداني للابحاث لازالة ملوحة ٥٠٠ متر مكعب يوميا
 - (١) عملية البحث الاولى
 - (٢) عملية البحث الثانية
 - (٣) فحص النواد
 - (٤) فحص التآكل بواسطة دقاية صغيرة للمحلول الملحي

- ٠٢ عملية اقامة معمل لقياس الابحاث لتحلية ملوحة ٤٠ متر مكعب يوميا
 - (١) عملية البحث الاولى
 - (٢) عملية البحث الثانية
 - (٣) فحص القياس

- ٠٣ دراسة مختبر ابحاث التحلية
 - (١) دراسة التآكل
--- فحص التآكل المعدني في المعمل الميداني للابحاث والدقاية الصغيرة للمحلول الملحي والدراسة حول التآكل التقليدي الظاهري في بيئة التحلية والقياس الفوري لسرعة التآكل . (مرافية التآكل)
 - (٢) الدراسة الكيماوية
--- الدراسة حول تحليل الكيماويات والبيئة التآكلية ، والمنتجات المتآكلة ومقياس الرواسب .

- ٠٤ توصية
اقتراح افضل معمل يوصى به على اساس النتائج المحصول عليها من المشروع .

الملحق الثالث

مواصفات المعمل الميداني للابحاث

- ٠١ القدرة ٥٠٠ متر مكعب يوميا
- ٠٢ نوع المعمل يتميز بطريقة التبخير السريع المتعدد المراحل بواسطة انبوب طويل من الطراز المعاد الدوران للمحلول الملحي
- ٠٣ مواد القشرة استنتية
- ٠٤ وقاية القشرة ضبط درجة تركيز ايونات الهيدروجين بواسطة حقن حامض الكبريتيك والجزع الكيماوية .
- ٠٥ ازالة القشرة نظام تنظيف كروي
- ٠٦ نسبة الاداء ٦٠
- ٠٧ عدد المراحل استعادة حرارية : ١٥ مرحلة
رفض حراري : ٣ مراحل
صلاية اجتالية مذابة تتكون من ٤٨٢٠٠ جزء لكل مليون (حد اقصى)
- ٠٨ ماء البحر درجة الحرارة (القصوى) : ٢٢,٢ درجة مئوية
كمية الامتصاص : ٢٥٠ متر مكعب / ساعة
- ٠٩ البخار (١) الحرارة ، مقياس ضغط ، ٣ طن / ساعة (١٠ كلجم / م^٢)
(٢) فاذف البخار ، مقياس ضغط ، ٠ طن / ساعة (١٠ كلجم / م^٢)
- ١٠ نسبة التركيز ١٢٤
- ١١ نسبة تدفق اعادة دوران المحلول الملحي ١٢٤ طن / ساعة
- ١٢ اقصى درجة حرارة اعادة دوران المحلول الملحي ١٢٠ درجة مئوية

الملحق الرابع

موافقات معدل القياس للابحاث

٠١ وحدة التناضح المعاكس (آرساو)

القدرة ٤٠ متر مكعب يوميا

عدد الوحدات: ٢

مقياس: آرساو

(١) ليف اجوف (وحدة ١)

القدرة: ٢٠ متر مكعب يوميا

عدد المقاييس: ١

رقص الملح: ::::: اكثر من ٩٩ /

القطر: ٨ انش

الطريقة: تخطيط فردية المرحلة

(٢) جزء حلزوني (وحدة ١)

القدرة: ٢٠ متر مكعب يوميا

عدد المقاييس: ٢

رقص الملح: اكثر من ٩٩ /

القطر: ٨ انش

الطريقة: تخطيط فردية المرحلة

حالة التشغيل: الصفت: ٥٥-٧٠ كلجم / م٢

نسبة الاستعادة: ٢٠-٤٠ /

درجة الحرارة: ٢٨-٣٥ درجة مئوية

القدرة: ١٥٠ متر مكعب / يوميا

عدد الوحدات: ١

النظام: ترويب يخط مستقيم

٠٢ ماء البحر

صلاية اجمالية مذابة تتكون من ٤٨٢٠٠ جزء لكل مليون

(حد اقصى)

درجة الحرارة: ٢٢,٢ درجة مئوية (تمرى)

كمية الانتصام: ١٥٠ متر مكعب / يوميا

الملحق الخامس

اجهزة المختبر

- ٠١ اجهزة لتجارب التآكل
 - (١) مقياس للتآكل
 - (٢) آلة للتآكل
 - (٢) ميكروسكوب فلزي
 - (٤) مقياس خشونة
 - (٥) بوتيتنوستات / جالفانوستات
 - (٦) اجهزة فحص عمر التآكل
 - ٠٢ اجهزة لتحليل الماء والكيماويات
 - (١) فوتوميتر للامتصاص الذري واللهب
 - (٢) مقياس للشدة النسبية لاجزاء الطيف
 - (٣) ديغراممتر طيفي
 - (٤) مقياس رياضي الذرات
 - (٥) مقياس درجة تركيز ايونات الهيدروجين
 - ٠٣ الاجهزة العامة
 - (١) موازن تحليلي
 - (٢) فرن تشيف
 - (٣) فرن لاف
 - (٤) مضخة تفريغ
 - ٠٤ ادوات زجاجية ومماثله ذلك
 - ٠٥ مفروشات للمختبر
 - ٠٦ ادوات وماكينات
 - ٠٧ محلل للعمليات المتتالية
- ملاحظة : المعدات الرئيسية فقط .

الملحق السادس

المستخدمين

عدد الاشخاص

١. الجانب السعودي

مدير ١

المكتب الإداري (يشغل بمساعدة المدير)

الشئون العامة

محاسب

مسئول عن المشتريات

المعمل الميداني للأبحاث

مهندس التشغيل ١

مهندس ميكانيكي ١

مهندس لاجهزة القياس والكهرباء ١

مهندس الاسمنت ١

فريق التشغيل ٨

مختبر تجارب التحلية

مفتش التآكل ١

مفتش الكيماويات ١

مفتش التناضح العكاس ٢

المجموع ١٧

٢. الجانب الياباني

رئيس ممثلين ١

المعمل الميداني للأبحاث

مهندس التشغيل ١

مهندس ميكانيكي ١

مهندس لاجهزة القياس والكهرباء ١

مهندس الاسمنت ١

فريق التشغيل ٢ (١)

مهندس التفتيش والصيانة

مختبر تجارب التحلية

مفتش التآكل ١

مفتش التناضح العكاس ١

مفتش الكيماويات ١

مفتش التآكل والمغاييس ٢