Basic Design Study Report
on
the Procurement Project
of
Medical Equipment
in
Haiti

October, 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

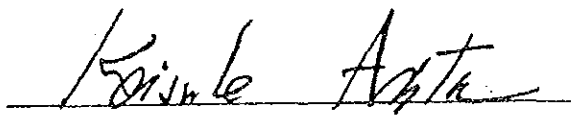
In response to the request of the Government of Republic of Haiti, the Government of Japan decided to conduct a Basic Design Study on the Procurement Project of Medical Equipment and entrusted the study to the Japan International Cooperation Agency (J I C A). The J I C A sent to Haiti a study team headed by Mr.Tadashi HIGUCHI, Senior Researcher, Dept. of Medical Care Administration, National Institute of Hospital Administration, Ministry of Health and Welfare, from the 7th July to the 14th July,1984.

The team had discussions with the officials concerned of the Government of Haiti and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Republic of Haiti for their close cooperation extended to the team.

October, 1984



Keisuke Arita

President

Japan International Cooperation Agency

Summary:

The condition of medical care and health in Haiti is staying on serious situation because of shortage of quantity in medical supply. While a few rich people are receiving higher medical services in private medical facilities, the majority of the Haitians are compelled to depend on public medical facilities managed by their Government, because medical expenses in private medical facilities are great. These facilities suffer from shortage of beds, doctors, nurses and so on and they can not supply enough medical services for these people.

The Ministry of Health and Population, Haiti considers that it is of urgent necessity to improve the above conditions and made two plans. The first one is to strengthen the medical organization in urban area by training of the medical personnels. For the above purpose, they intend to expand two core hospitals: Haiti National University Hospital and Isaie Jeanty National Maternity Hospital.

The second one is to strengthen the medical organization in rural area by improving the function of the core tuberculosis sanatorium, Sigueneau Sanatorium.

For the above plans, they intend to improve the facility by providing equipments.

However, under the insufficient financial situation of

the country, the budget for medical, as well as for hospital is in the reducing tendency. Therefore, they can keep only existing facilities but have no budgetary frame for expanding and improving facilities.

Under the circumstances, the Government of Republic of Haiti requested the Government of Japan to provide the grant aid for the improvement of medical equipments for the above hospitals. At their requests, the Government of Japan decided to implement the basic design study of the Procurement Project and despatched, through Japan International Cooperation Agency, a study team in July 1984.

In Haiti, the study team confirmed their requests and collected the basic data to evaluate the necessity of the project. The team investigated also the real conditions of these medical facilities. Furthermore, through the analysis of environment in medical demands and medical supply, for the National University Hospital, the medical equipments for surgical operation, radiology, laboratory, urology, pediatrics, surgery, orthopedic surgery, obstetrics and gynecology, ophthalmology, otorinolaryngology, pathology and internal medicine were decided to be provided. For Isaie Jeanty National Maternity Hospital, the medical equipment for gynecology, obstetrics, operation and emergency, were selected. For Signueneau Sanatorium, the medical equipments for treatment, diagnosis, radiology, surgical operation and linen supplies, were selected. For implementation of the

project as above stated, about eleven months are considered to be needed.

The contents are composed of equipments at a minimum, which enable Haiti Government to achieve their plans as above stated.

By the grant aid from Japan, shortage of quantity in medical supply in Haiti will be improved and training of medical personnel will be promoted. The basis of health and medical care of the country will be expanded.

It is obvious that the above activity will make a major support for promoting health and medical care system in this country. Therefore, this plan is very important for Haiti to improve the environment of health and medical care and at the same time appropriate as a grant aid project from Japan.

On the basis of long term vision, the project will become more effective and significant, when the Government of Republic of Haiti makes further budgetary arrangement to the facilities for managing and rebuilding.

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1.Introduction

In the fields of medical care and health in Haiti, one of the important problems is quantitative shortage of medical supply. Apart from private medical facilities, public medical facilities in Haiti have been insufficiently equipped and suffered from shortage of medical personnel. It has been too big an obstacle to overcome the above problems.

The problem are based not only on the shortage of medical educational facilities but also on the poor conditions of facilities which are the place for clinical study and education of medical personnel. To the above problems, educational facilities should be improved and expanded and medical personnel should be traind. Furthermore, it is important to improve local medical facilities where trained medical personnel take active part in future.

Under the above conditions, the Government of Republic of Haiti set up a long-term improvement plan of Haiti National University Hospital, Isaie Jeanty National Maternity Hospital and an improvement plan of Sigueneau Sanatorium. In order to implement the above plans, the Government of Republic of Haiti made requests to the Japanese Government of grant aid for the improvement of medical equipments in these facilities.

In respons to the above requests, the Government of Japan decided to implement the basic design study and despatched, through Japan International Cooperation Agency, a study team, headed by Mr. Tadashi Higuchi, Senior Researcher, Dept. of Medical Care Administration, National Institute of Hospital Administration, Ministry of Health and Welfare. The team studied conditions in Haiti from the 8th to the 14th of July in 1984.

The study team confirmed the contents of the plan and collected necessary data concerning the conditions of health and medical care, medical facilities, medical personnel, as well as attitude and budgetary arrangement of the Government of Republic of Haiti in order to confirm the proposal of the Government of Republic of Haiti. Furthermore, the study team surveyed and interviewed about operating system, medical activities, staff composition, future improvement plan, condition of the building, condition of supplied water and electricity, budgetary arrangement of the facilities to which procurement project is applied.

In the final stage in Haiti, concerning basic items of purpose, contents and extent of aids, the team discussed with the Government of Republic of Haiti and reached a mutual agreement. The agreed items are listed in the Minutes, which has been signed by the team leader and a representative of the Government of Republic of Haiti. (Please refer to Member list, Schedule, Minutes of Discussions).

1.Introduction

After returning to Japan, the team analized various data and informations obtained in Haiti, from the view point of medical demand and medical supply, and succeeded to complete a basic design study report.

2. Background:

The Ministry of Health and Population in Haiti divides their country into four regions, i.e., North, Transversal, West, and South. Each region has regional hospitals. Under the above organization there are fourteen district hospitals. On top of these hospitals they have Haiti National University Hospital, Isaie Jeanty National Maternity Hospital, and Tuberculosis Sanatorium in Port au Prince as the core hospitals.

In addition to these hospitals there are 17 private hospitals. In total, they have 38 hospitals. Besides, there are 49 Health Centers with beds, 70 Health Centers without beds, 275 dispensaries and 9 "asiles" for terminal cares. Among the facilities, the dispensaries with no doctors occupy the largest number. Here, auxiliary nurses treat the patients. The reason is that there are only 724 doctors in the country, i. e., 14.3 doctors per 100,000people, compared to Japan's figure of 137.2,(almost 1/10).

As to other medical personnel, there are 1.7 dentists (Japan 47.9), nurses, including auxiliary nurses, 33.3 (Japan 455.8), all per 100,000 which is obviously very few.

Under the above circumstances, the Ministry of Health and Poppulation intends to set up an effective organization for

the medical system. They plan to train doctors, dentists, nurses, pharmacists, laboratory technicians in Haiti National University Hospital and intend to provide medical personnel.

Besides, there are a private medical school, three nurse schools, three auxiliary nurse schools and private laboratory technicians schools also. (However, since there is no national examination for the laboratory technicians, the terms of training, the curriculum and the number of such schools are unclear.) Concerning radiologist, it is not recognized as independent division.

(1) Nature:

Haiti has two seasons, rainy season (April - May and August - October) and dry season (June - July and November - March). The highest temperature is 35 centigrade and the lowest is 22.8 centigrade, average being 27.4 centigrade. Average humidity is 65% - 69% throughout the year. According to the investigation of the team in Port-au-Prince, the temperature was 31 centigrade, and the humidity was 74%.

(2) Social and Economy:

In recent years, the field of handicraft, building materials

and assembling of I.C. parts, and so on have been developped remarkably in economic fields, but still agriculture remains as the main industry in Haitian economical structure. Its main products are coffee, cotton, cocoa, rice, sugar cane, and so on.

In the last two to three years, the main export product of coffee was depressed by worldwide stagflation. The economic condition of Haiti is not stabilized. Haiti's GNP of the last year was US$1,740 million, US$348/person. Following the above economic condition, the national budget is also on the reducing tendency. Then, the budget for medical care and health and for hospitals is compelled to become shorter than before.

(3) Health Environment:

1) Population:

The population in Haiti is, according to the official data, 5 million. However, actually it would be more than 6 million. Taking into account the official data, the team analized the population as follows: by region, by sex, by age, and the population pyramid. (Please refer to Tables 1, 2, 3 and Figure 1).

According to Table 1, from 1971 to 1980, during these nine years, the rates of the population increase is 17.2% for male,

16.3% for female and totally 16.7%. Although 5% of population moved out to the U.S.A. during a year in the last two to three years, this tendency continues if family planning is not taken into government's policy. Especially in the big cities as Port-au-Prince, the population is on the increasing tendency because people in rural area are migrating into the cities. Actually, Table 2 shows that West region including Port-au-Prince has 40% of the whole population of Haiti. In such regions, patient population seems to be increasing.

With reference to Table 3, population by sex, by age and Figure 1, population pyramid shows characteristic tendency in the developing countries. This means the rate of infant mortality is high and the population is decreasing in proportion to age spontaneously. These conditions are based on shortage of provisions and weakness of medical care and health system. The improvement of medical facilities and equipments is urgently needed in the near future.

Table 1. Population comparison by year

Sex	1971	1980	Increasing rate
Male	2,89,845	2,448,370	17.2%
Felame	2,240,146	2,605,422	16.3%
Total	4,329,991	5,053,792	16.7%

* Source: Ministry of Health and Population

Table 2. Population structure by region(1980)

Region	Population	Component ratio	No. of household	Population per household
North	753,575	14,9%	159,961	4.7
Transversal	1,387,933	27.5%	326,905	4.2
West	1,919,703	38.0%	429,134	4.5
South	992,581	19.6%	214,795	4.6
Total	5,053,792	100.0%	1,130,795	4.5

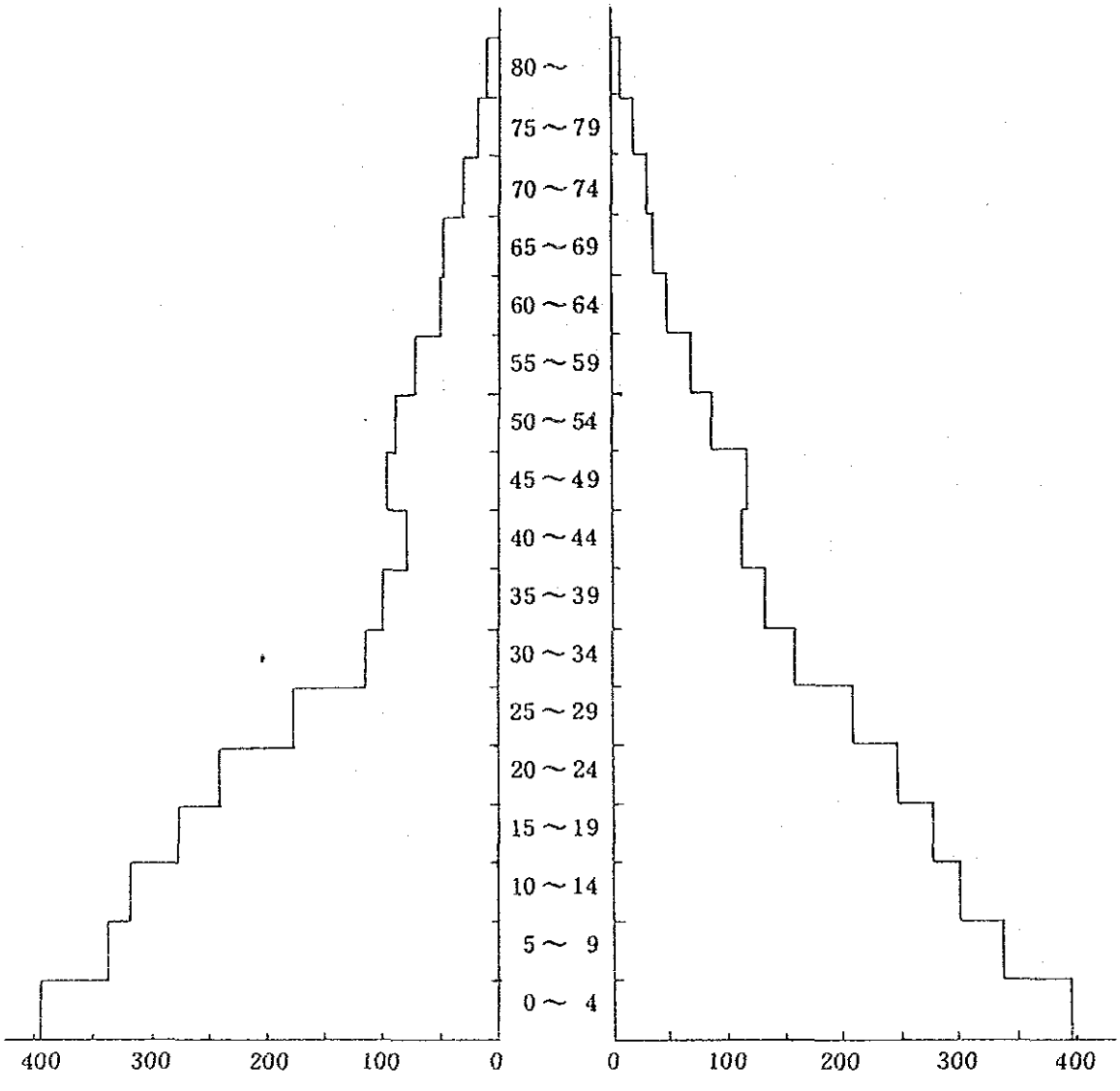
* Source: Ministry of Health and Population

Table 3. Population by sex, by age:

Age	Male/ thous.	Female/ thous.	Total/ thous.	Rate %
0 - 4	397	398	795	15.7
5 - 9	342	338	680	13,5
10 -14	320	301	621	12.3
15 -19	278	278	556	11.0
20 -24	242	248	490	9.7
25 -29	177	209	386	7.6
30 -34	115	161	276	5.5
35 -39	99	134	233	4.6
40 -44	79	114	193	3.8
45 -49	95	120	215	4.3
50 -54	89	90	179	3.5
55 -59	71	71	142	2.8
60 -64	49	50	99	2.0
65 -69	46	36	82	1.6
70 -74	25	30	55	1.1
75 -79	15	20	35	0.7
80 -	9	7	16	0.3
Total	2,448	2,605	5,053	100.0

* Source: Ministry of Health and Population

Figure 1. Population Pyramid:



(/thous.) Male Female (/thous

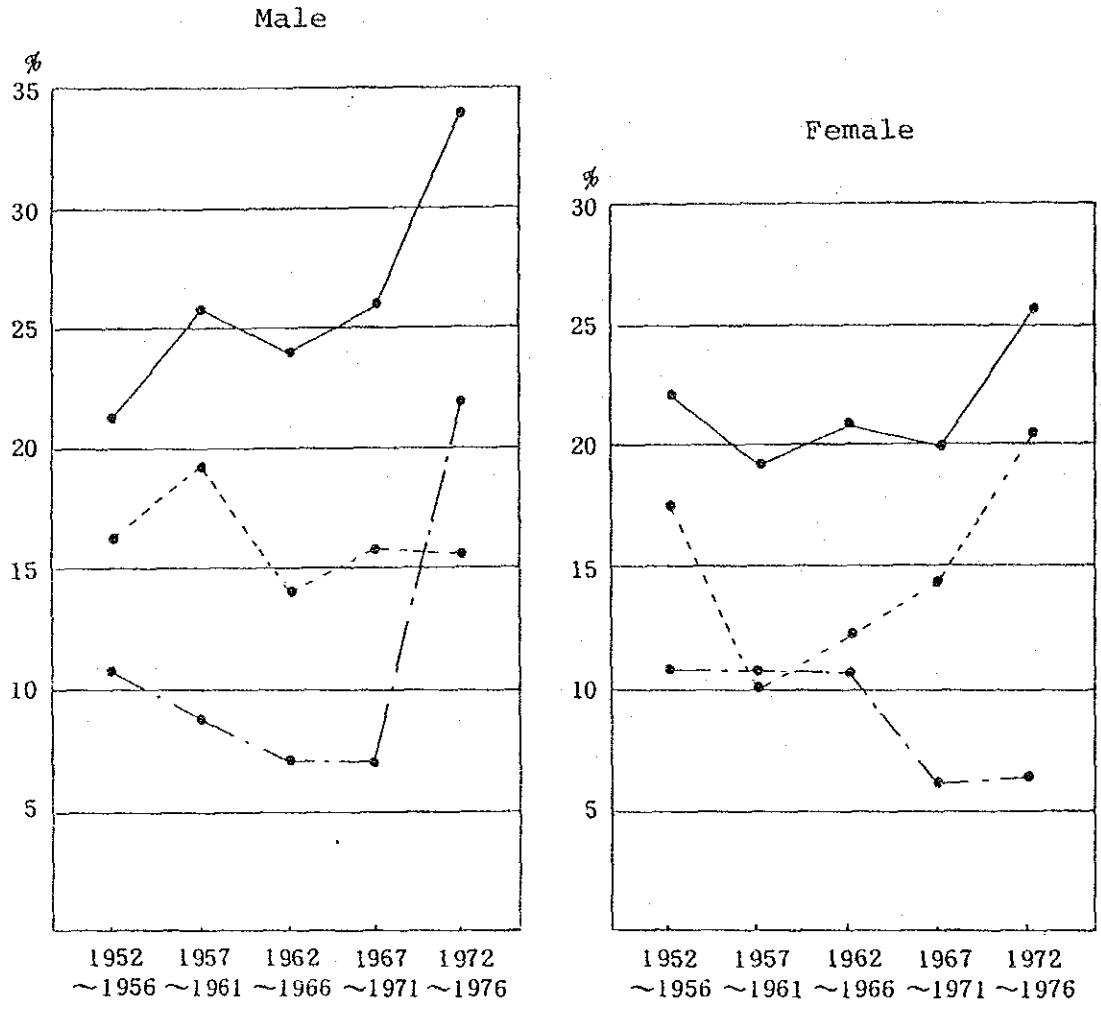
2) Fertility and Mortality

The number of Death in the hospitals is 5,989 for male, 5,211 for famale and totally 11,200 in 1983. Other data could not be obtained.

Regarding the number of birth, statistics could not be obtained. Annual infant mortality is calculated as 3635, but this number is also confirmed in the Hospitals. Accurate number could not be found out.

Moving of infant mortality is shown on Figure 2. Infant mortality of male shows higher increasing tendency than that of female.

Figure 2. Infant Mortality by sex, by age:



——— Infant Mortality till 5 years

—·—·— Infant Mortality till 4 years

- - - - - - Infant Mortality till 0 year

* Source:Ministry of Health and Population

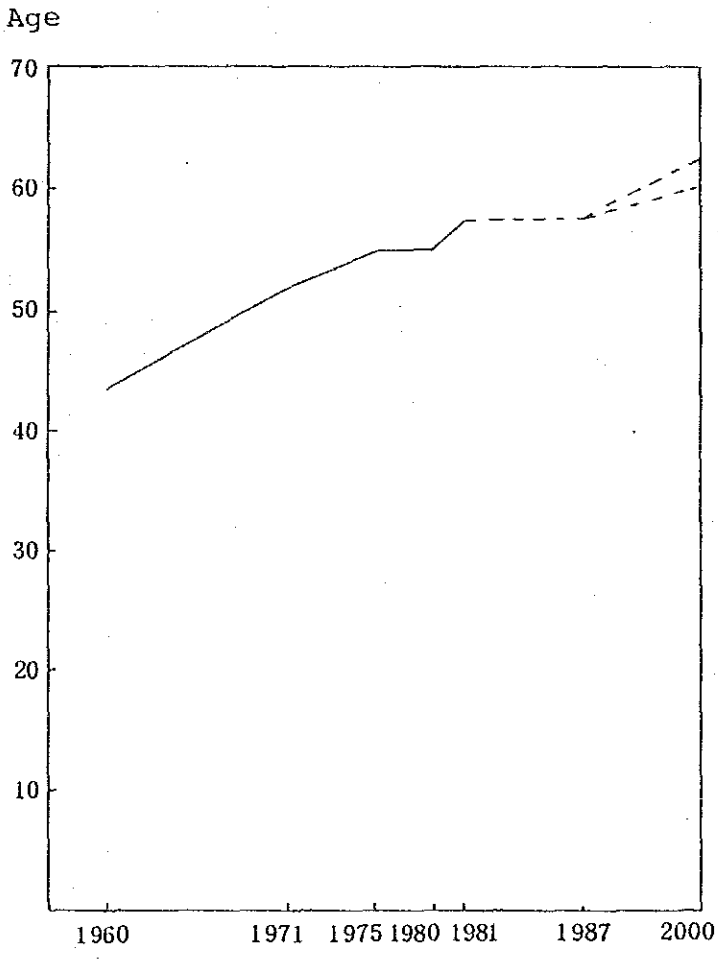
3) Life Expectancy

Moving of averaged life expectancy between 1960 - 1981 and forecast between 1981 - 2000 (prepared by the Ministry of Health and Population) are shown on Figure 3.

Life expectancy in 1960 was 43, in 1981 became about 57.

The Ministry of Health and Population intends to make it longer to 60 - 63 year 2000.

Figure 3. Life expectancy by year:



------- (Estimated data)

4) Causes of Death and Tendency of Diseases

Main causes of death are listed as follows:

1) Intestinal infections 2) Tuberculosis 3) Malnutrition 4) T.B. Meninges 5) Tetanus

In the above causes of death, infectious diseases shows majority. Table 4 shows patients statistics of infectious diseases (source: WHO), greater parts of which are T.B. patients.

Table 4. Number of Infectious diseases (1980):

Diseases	Total	Age 0	1-4	5-14	15-74	75-
1. Pulmonary T.B.	4,888	99	658	779	3,131	221
2. Typhoid & Paratyphoid fevers	1,711	27	266	499	727	192
3. Syphilis & Sequelae	1,480	15	4	13	1,240	208
4. Whooping Cough	812	171	346	230	39	26
5. Measles	507	65	291	84	12	55
6. Tetanus	282	181	15	20	52	14
7. TB Meninges & Central Nervous System	96	3	5	10	69	9
8. Viral Hepatitis	95	2	4	12	69	8
9. Acute Poliomyelitis	20	-	2	-	-	18
10. Diphtheria	23	9	7	6	1	-
11. Early Syphilis, Symptomatic	8	-	-	-	7	1

(4) Medical Conditions

1) Health and Medical Care System:

The Ministry of Health and Population in Haiti divides the country into four regions which are North, Transversal, West and South and in each region several districts are controlled.

In medical facilities (refer to Figure 4), Haiti National University Hospital on top, Isaie Jeanty National Maternity Hospital and Sanatorium of Port-au-Prince are placed as core hospitals of this country. Under the above 3 hospitals, 4 regional hospitals are located. 14 districts have their district hospitals respectively.

Furthermore, 49 health centers with beds and 70 health centers without beds are located. Besides, 275 dispensaries, where there is no doctor and assistant nurses take part mainly in disease prevention, and 9 asiles where incurable patients are treated.

Other than the above, although threre are several private hospitals and many private clinics, they are only available for rich people. There are some differences between regional hospitals and district hospitals. In district hospitals, four diagnosis departments of internal medicine, surgery, gynecological and pediatric are organized and in regional hospitals, three

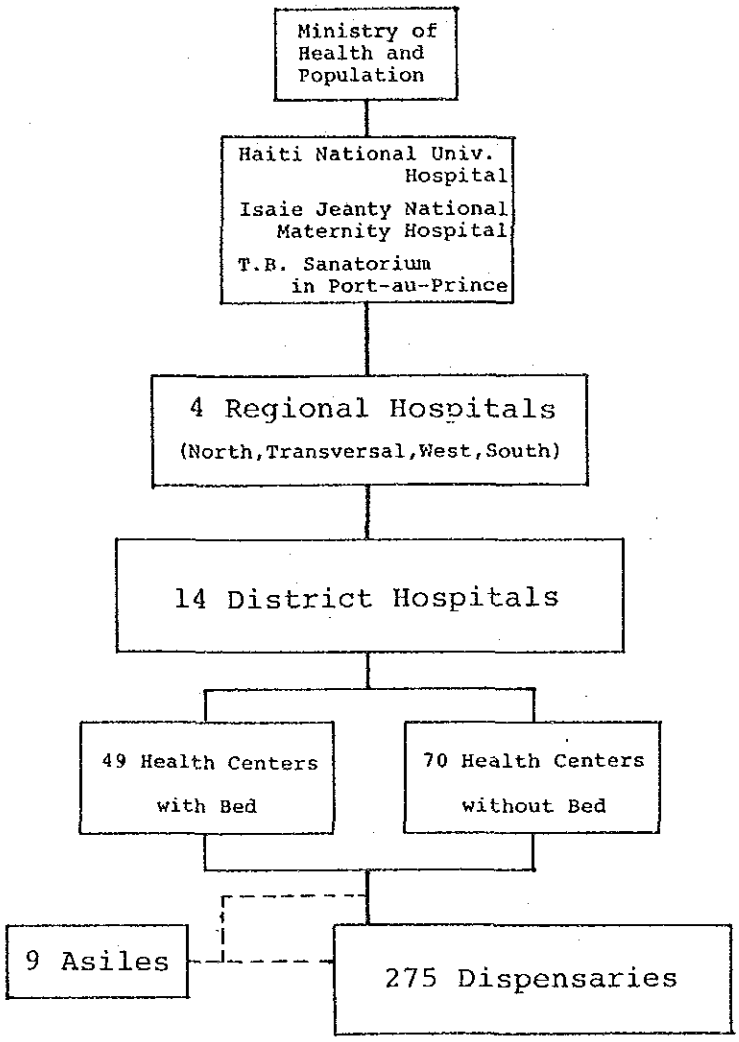
departments of ophthalmological, orthopedic and urological are added.

Expenditures to manage the costs of the above hospitals are defrayed by the budget of the Ministry of Health and Population. The correct figure of the annual budget of the Ministry could not be clarified. According to the information which was obtained in Haiti, it seems to be about 16% of the national budget. Under this assumption, the budget for the said Ministry is estimated as $5.7 mill.

As previously mentioned, in sections of Social, Economical and General Conditions, following the economization policy of the country, the budget of the Ministry of Health and Population is compelled to be reduced. Then, the Ministry cannot take any active policy than maintaining the poor existing facilities and they have no financial frame to improve and strengthen them.

They have 3,984 beds in their official facilities which means 73.9 beds per 100,000 and it is 1/10 compared to Japan's figure.

Figure 4. Organisation of Medical Facilities:



2) Medical facilities

Medical faciliites are shown on the Table 5.

Table 5. Number of Medical Facilities:

Type	Number of Facilities
Public Hospitals	21
Private hospitals	17
Health Center with beds	49
Health Center without beds	70
Dispensary	275
Asile	9

3) Medical Personnel

According to data of the Minsistry of Health and Population, number of medical personnel is shown on Table 6.

Pharmacist, Radiology Technician, and Laboratory Technician are estimated as 6, 20 and 95 persons respectively. (source: WHO).

However, in Haiti, for Radiology Technician the Government has no provision of its qualification.

For Laboratory Technician, while graduates of national training center can obtain national licence, private schools can't give them.

So that number is not clear and number of doctors per 1,000 thousand is as shown on table 6, 14.3 (Japan: 137.2), dentists 1.7 (Japan: 47.9) and Nurses 33.3 (Japan: 455.8).

Somehow, the number of each personnel are quite few.

Table 6. Number of medical personnel:

	Number	Number against 100,000
Physicians	724	14.3
Dentists	88	1.7
Nurses	567	11.2
Auxiliary Nurses	1,118	22.1

4) School for Medical Personnel

Schools for medical personnel, physicians, dentists, pharmacists, nurses and laboratory technicians are as follows:

Medical School	--- National (Port-au-Prince)	1
	--- Private (Cap Haitien)	1
	Total	2
Medical School for Dentists	--- National (Port-au-Prince)	1
School for Pharmacists	--- National (Port-au-Prince)	1
School for Nurses and Anxiliary Nurses	--- National (Port-au-Prince)	1
	ditto (Cap Haitian)	1
	ditto (Cayes)	1
	Total	3
School for Laboratory technicians	--- National (Port-au-Prince)	1
	--- Private	Many

In Haiti, there is no school for Radiology technicians. The educational courricula of National schools for physicians and Nurses are as follows:

For Physicians

Premedical	1 year
Medical	4 years
Internship	1 year
Social Service	1 year
Residency	3 - 4 years

There are many Physicians who study in foreign countries (mainly in U.S.A.) after completing their Internship course or Social Service.

For Nurses

Premedical	1 year
Specialized course	4 years
(semiology, anatomy, pathology, physiology, and so on.)	
Internship	2 years
Social Service	1 year

Concerning other data, three years for Pharmacists, one year and a half for Auxiliary Nurses.

3. Present Condition of Hospitals

The team observed the three Hospitals, to which Procurement Project are applied, and other related medical facilities. The team surveyed them and collected necessary data. The list of facilities is as shown on Table 7.

Table 7. List of Facilities surveyed:

	Name of Facility	Address
* 1.	Haiti National University Hospital (Hopital Universite d'Etat d'Haïti)	Rue Jn Marie Guilloux Port-au-Prince
* 2.	Isaie Jeanty National Hospital (Centre Obstevico Gynecologique Isaie Jeanty, Leon Audain Chamberelles)	Chancerelles, Port-au-Prince
* 3.	Siguneau Sanatorium (Sanatorium Sigueneau)	Sigueneau, Leogâne
4.	St. François Hospital (Hopital St. Francois de Sales)	Port-au-Prince
5.	Biological Investigation Laboratory (Laboratoire d'Investigations Biologiques)	29, Champ de Mars Port-au-Prince

* indicate the Hospitals, to which Procurement Project are applied.

(1) Haiti National University Hospital:

1) Contents of Facility and Improvement Plan:

Haiti National University Hospital is located in the central part of Port-au-Prince. This hospital, under Government administration, is regarded as top standard of medical care in Haiti.

The structure of the building shows usual form of regional hospital which is different from the image of university hospitals in Japan. Buildings of one-storied or two or three-storied which are constructed in R.C. structure (skeleton only). There are more than 10 buildings where each department are located.

700 beds are approved but 683 beds are available for patients. The form of each hospital ward is so-called "Nightingale Ward" which is composed of large rooms of 20-30 beds, including nurse station. (refer to Figure 5)

The team investigated the conditions of water and electricity, which affect the actual working of medical equipments. The result of water examination shows PH8.4 which is a little alkaline. The hardness is high, 300 ppm and many general bacillus, collon bacillus are found, and it is not suitable for

drinking. Since the remaining chlorine could not be found, purification seems to be not applied.

Concerning electricity, the source of electricity is supplied at 110V, 60Hz, sudden Voltage drop occurs frequently. The frequency of electricity does not show big change. The electrical failure occurs several times (refer to Annex data 5 conditions of supplied water and electricity).

While present situation of facilities has been stated in the above, the Ministry of Health and Population has a plan to improve and to expand them. (refer to Figure 6 and 7 and Table 8).

They intend to rebuild one-storied and two-storied buildings into three or four-storied buildings. According to the plan, each building is connected by the passages inside, although present passage is located outside. The number of beds is 683 at present. They plan to have 100 new beds for the patients paid by their own expenditures and 116 new beds for the patients paid by the Government.

However, the above plan is not covered by the financial arrangements of the Government. Therefore, the team concludes that for the selection of medical equipments, the plan should be proceeded based on the consideration to arrange in the present facilities.

Figure 5. The present conditions of Haiti National University Hospital:

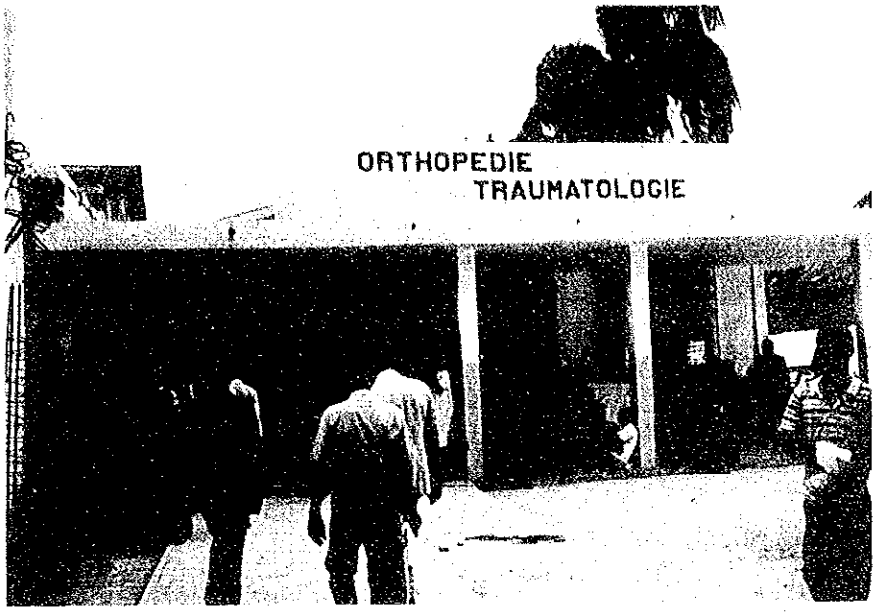
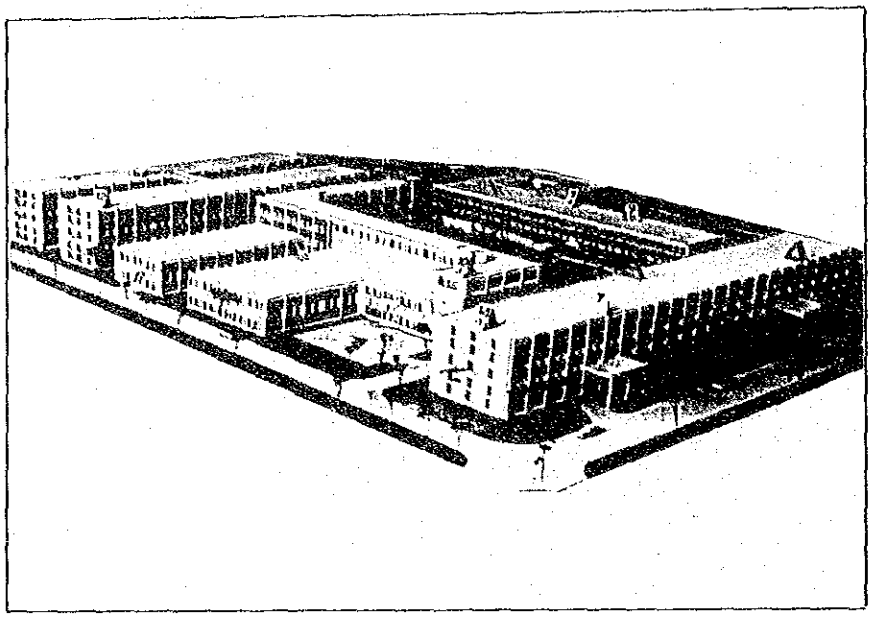


Figure 6. The model of the future plan:



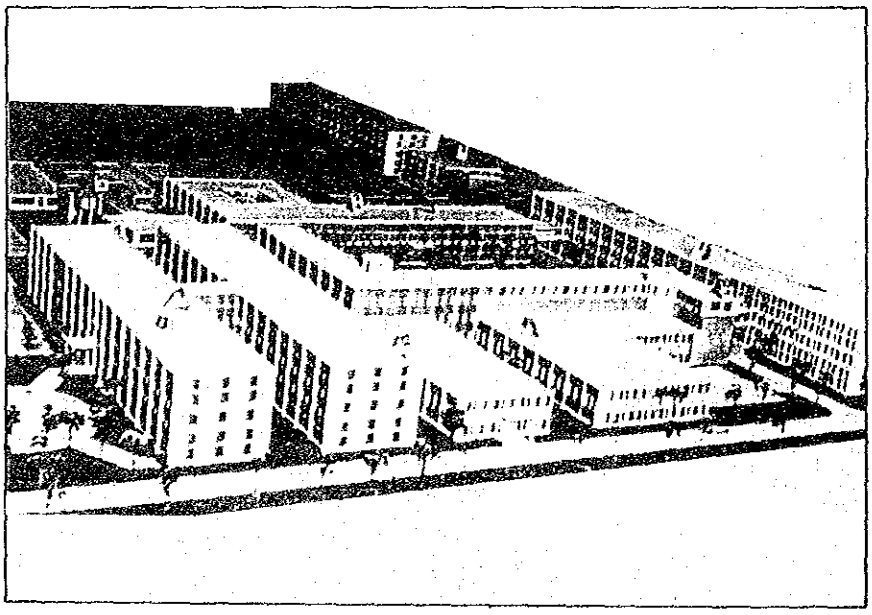


Figure 7. The future plan:

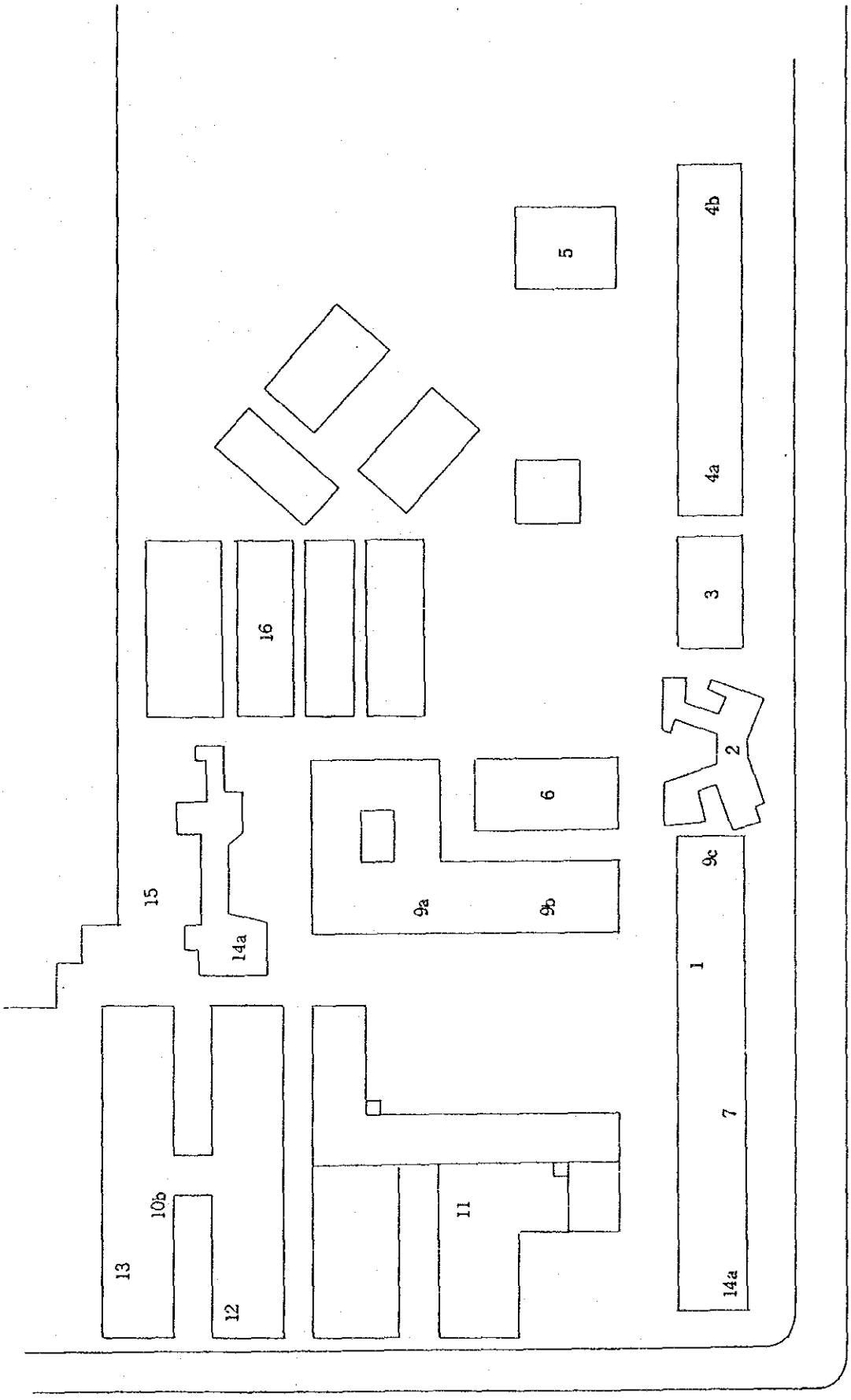


Table 8. List of building:

No. of Bldg.	Including:
1	1F: a: Emergency (out-patient unit) Radiology (out-patient unit) b: Pharmacy c: Consultation unit 2F: a: Administration Section b: Shops c: Medical records section d: Cafeteria 3F and 4F: Dormitory for male resident physicians
2	Nurse school
3	1F: Church 2F and 3F: Auxiliary nurse school
4a	Pediatric - 250 beds: Isolation 30 beds. 1F: a: Emergency b: IV c: Consultation unit 2F, 3F and 4F: wards
4b	Obstetric and Gynecological 170 beds. 1F: a: Emergency b: Staff room c: Night duty room d: Consultation unit 2F, 3F and 4F: Wards
4c	1F: Infant and maternal service Medical staff foom 2F: Operation unit (2)

No. of Bldg.	Including:
5	Medical Service Facility
6	Multi-purpose facility
7	Dormitory for nurses
8	Parking area (100 cars)
9a	1F and 2F: Internal medicine, 200 beds.
9b	1F: a: Isolation ward, 30 beds. b: Dermatological, 20 beds. 2F: Ward for Cancer patients and Radiological Dept.
9c	Radiological Dept.
10a	Surgical, 140 beds. 1F and 2F: Ward 3F and 4F: Dormitory for female resident physicians.
10b	1F: Urological, 60 beds. 2F: Otorinolaryngological and Ophthalmological, 30 beds. 3F and 4F: Dormitory for female resident physicians.
11	1F: Blood bank 2F: Operation Unit (1)
12	1F: a: Reception for visitors b: Staff entrance 2F: Staff locker room.

No. of Bldg.	Including:
13	1F: Orthopedic, 200 beds. 2F, 3F and 4F: Ward for patients paid by own expenditure, 100 beds.
14a	Dormitory for resident nurses.
14b	Dormitory for Sisters.
15	Water tower.
16	Auxiliary Dept. a: Morgue b: Laundry c: Kitchen d: Garbage pit

Total number of beds: 1,160 beds for patients paid by the Government.

100 beds for patients paid by own expenditure.

2) Organization, Operating System, Staff Composition and Budget

Departments of Haiti National University Hospital are Internal Medicine, Respiratory, Digestive, Circulatory, Pediatrics, Neuro, Surgery, Orthopedic, Plastic Surgery, Neurosurgery, Obstetric, Gynecology, Ophthalmology, Otorinolaryngology, Trachea Esophagus, Dermatology, Urology, Veneology, Proctology, Dental, Physical Therapy, Radiology and Anesthesia. Operating of facility is covered by the Ministry of Health and Population.

Any certain information is not available concerning the budget.

Staff composition is shown on Table 9.

Table 9. Staff composition by type of occupation:

Type of occupation	Number
Administrator	1
Physician	135
Nurse	146
Nursing worker	3
Radiology staff	7
Laboratory Technician	38
Physical therapist	1
Dentist	3
Dietitian	1
Cook	10
Medical record staff	12
Secretary	20
Telephone operator	5
Driver	10
Medical engineer	1
Boilerman	2
Electric engineer	1
Total:	565

3) Data of Medical Activity

Annual number of patients of Haiti National University Hospital (annual actual number) is shown on Table 10.

In number of Inpatients, number of Obstaric-Gynecology Department are major, which are almost half of whole patients.

Among Outpatients, patients of Ophthalmology, Otorhinolaryngology and Pediatric are 25%.

Treatment hour is basically from 9 - 12 in every weekday from Monday to Friday.

Table 10. Number of Patients (actual number in 1983):

Department	Number of In-patients	Rate(%)	Number of Out-patients	Rate(%)
Internal Medicine	1,748	12.3	9,792	13.2
Pediatric	2,732	19.2	19,440	26.2
Surgical	1,480	10.4	3,676	5.0
Oethopedic	332	2.3	7,612	10.3
Dermatological	112	0.8	3,816	5.1
Urological	280	2.0	5,584	7.5
Gynecological	7,224	50.8	4,384	5.9
(Ophthalmological ((Otorinolaryngological	324	2.3	19,888	26.8
Total:	14,232	100.0	74,192	100.0

(2) Isaie Jeanty National Maternity Hospital:

1) Contents of Facility and Improvement plan:

Isaie Jeanty National Maternity Hospital is located on Road No.1 and near the central part of Port-au-Prince. The hospital is the largest and the oldest in Haiti as a maternity hospital. The buildings are built on the R.C. one-storied structure with tin roofs. Arrangements of buildings are made in such a way to have the gynecology section located on the left side and preventive section (preventive inoculation, pregnancy guidance, and so on) on the right. With obstetric section as the central position. (Refer to Figure 8). In the above buildings, gynecological ward occupies the central part of the building. This ward has no partitions, apart from the walls, but these walls don't reach to the ceiling.

So, it is quite difficult to keep clean so that the infection in the hospital is induced frequently. In fact, blood poisoning occurs often. Because of the above reasons, and also since the building are too old, the improvement of the present buildings seem to be very difficult without rebuilding.

At present, the number of beds is 69 in obstetric section, 32 in gynecological section, 101 in total. The obstetric ward is "Nightingale ward" where 30 beds are arranged in a large room

with nurse station. For the gynecological ward, about 10 beds are arranged in one room.

The team also investigated conditions of water and electricity.

Concerning water, it shows alkaline character and its hardness is high, 350 ppm. Bacillus and colitis bacillus were found. It does not fit for drinking. Since the remaining chlorine could not be found, purification seems to be not applied.

Concerning electricity, its source is supplied at 110V, 60 Hz. Actualy, based on the investigation, it is only 90V and frequently decreased to 80V. However, wide change of frequency could not be found.

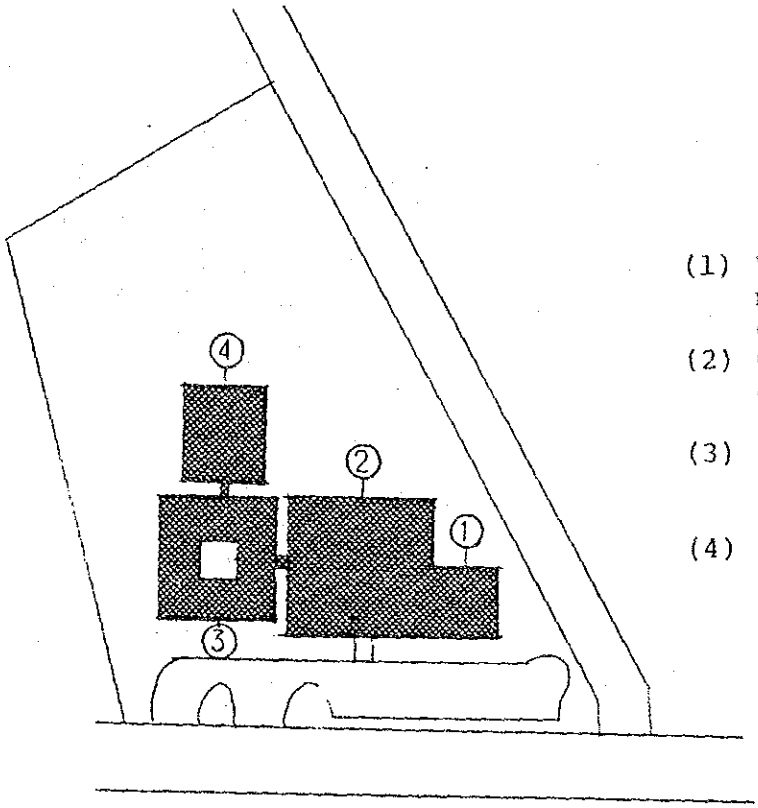
According to their future plan, they intend to set their own generation station in the hospital but its method and specification have not been completed. (refer to Annex data 5, conditions of supplied water and electricity).

The Ministry of Health and Population, Haiti, intends to rebuild the facilities of the hospital, because the old buildings are worn out and the hospital should become a core of medical training facilities concerning Gynecology and Obstetrics.

According to the future plan the buildings will be reconstructed in a three-storied building. The reconstruction plan, according to the hospital, will start in October 1984 and will be completed within two years. However, certain information on budgetary arrangements and detailed plans could not be obtained.

Under the circumstances, the team reached to the same conclusion as in Haiti National University Hospital , that is, for the selection of medical equipments, the plan should proceed based on the consideration to arrange in the present facilities.

Figure 8. The present condition of Isaie Jeanty National Maternity Hospital:



(1) Vaccination for infants, maternity consultation, etc.
(2) Obstetric ward, Reception office, staff room.
(3) Gynecological ward, Laboratory
(4) Communicationable disease ward

Figure 9. Model of future plan:

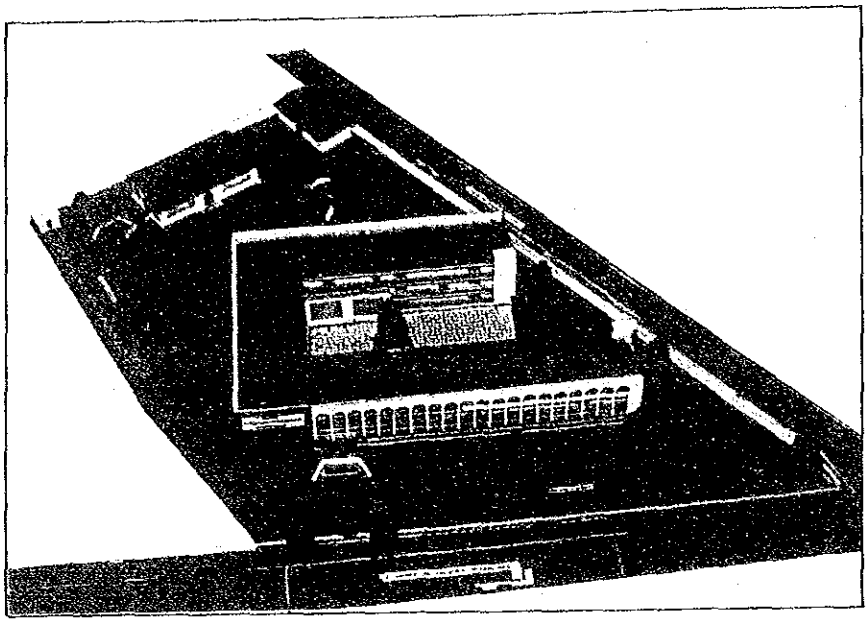
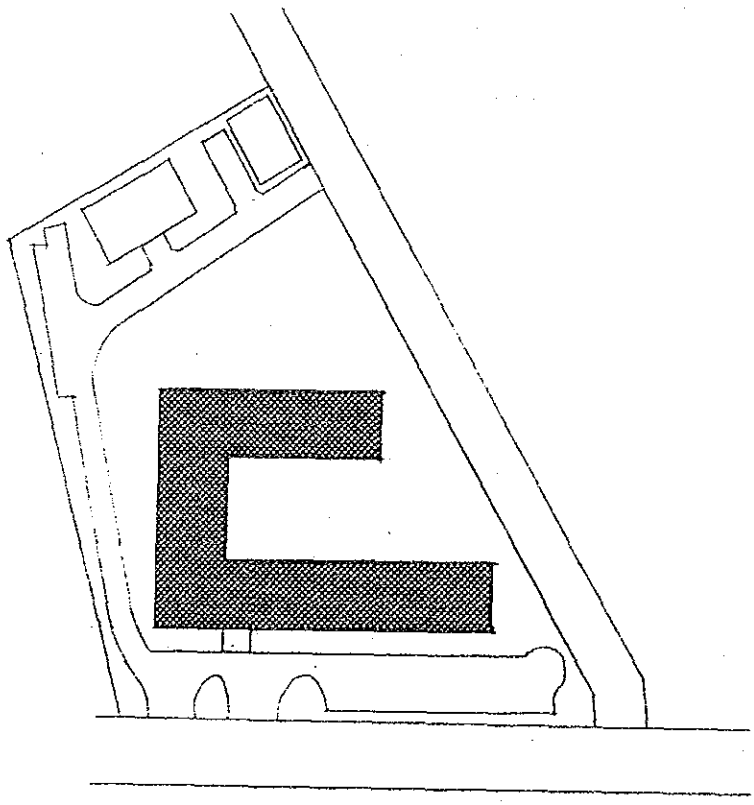


Figure 10. Model of future plan:



2) Organization, Operating System, Staff Composition, and Budget

Department of Isaie Jeanty Natiional Maternity Hospital, are obsteric and Gynecology. Besides there is also a department of Vaccination againt B.C.G. diphtheria, whooping cough and tetanus for the infants and maternity consultation.

Concerning the monthly budget, 5,000 US$ is provided by the Ministry of Institutes and 2,000 US$ by the Ministry of Health and Population, then 7,000 US$ in total.

Staff composition of the hospital is as shown on Table 11.

Table 11. Staff composition by type of occupation:

Type of occupation	Number
Administration	1
Physician	42
Nurse	47
Auxiliary nurse	51
Laboratory technician	3
Cook	5
Medical social worker	2
Medical record staff	4
Clerk	1
Worker	84
Secretary	1
Driver	2
Boilerman	1
Total	244

3) Data of Medical Activity

Number of patients during 1983 (actual number) is on Table 12.

Number of abortion is 14 per month in average, number of birth is 900 and average days of patients in hospital is two days.

Treatment time is from 9 - 12 in the morning, in every week day (from Monday to Friday).

Table 12: Number of patients (actual number in 1983):

Department	Number of Inspection	Rate (%)
Obstetric	9,138	52.5
Gynecological	8,257	47.5
Total	17,395	100.0%
Infant consultation	3,788	34.6
Maternal consultation	7,152	65.4
Total	10,940	100.0%

(3) Sigueneau Sanatorium:

1) Contents of Facility and Improvement Plan:

Sigueneau Sanatorium is located in Leogane which is 33 km west from Port-au-Prince and it works as a core sanatorium in Haiti. The facilities are composed of old buildings, and the new ward and the new building for consultation pharmacy and treatment which were constructed by Japan's aid in 1983.

The buildings, though inefficient, are constructed in R.C. one-storied tructure (only skeleton).

The number of approved beds is 200, but 165 bets are arranged at present (90 for male and 75 for female). Old wards are composed of big rooms with 16 beds average, without any nurse station and rooms have no window but only blocks with holes. The new ward has a nurse station between the ward for male (10 beds) and for female (10 beds). "Jalousie" windows are arranged in it.

The team investigated conditions of water and electricity.

Concerning water, the team examined two test samples of water obtained from the different wells. They were with little

alkaline and Ph8.0 and PH8.2, respectively. Hardness are high, 300 ppm and 450 ppm, respectively. In the first test sample, many bacillus and colitis bacillus were found and it does not fit for drinking. In the second one, little colitis baccilus were found but no bacillus.

Accordingly, concerning the equipments, which require water supply, special unit for water treatment may become necessary, if water of the second one is used.

Concerning electricity, it is supplied at 110V and 60Hz. However, it usually stays at 102 and goes down to 90V sometimes. Besides, impulse to 60V are found frequently. These bad conditions seem to be caused by the high impedance from inadequage applied lines in the house which exerts bad influence upon the equipment i.e. refrigerator. Frequency does not show big change. (refer to Annex data 5, conditions of supplied water and electricity).

Siguneau Sanatorium has at present no idea of rebuilding the facilities and medical equipments in the facilities have been arranged by the Japan's aid. However, because of shortage of consumer goods, bad condition of electricity insufficient maintenance, there are many equipments, utilized not effectively.

Figure 11. Block plan:

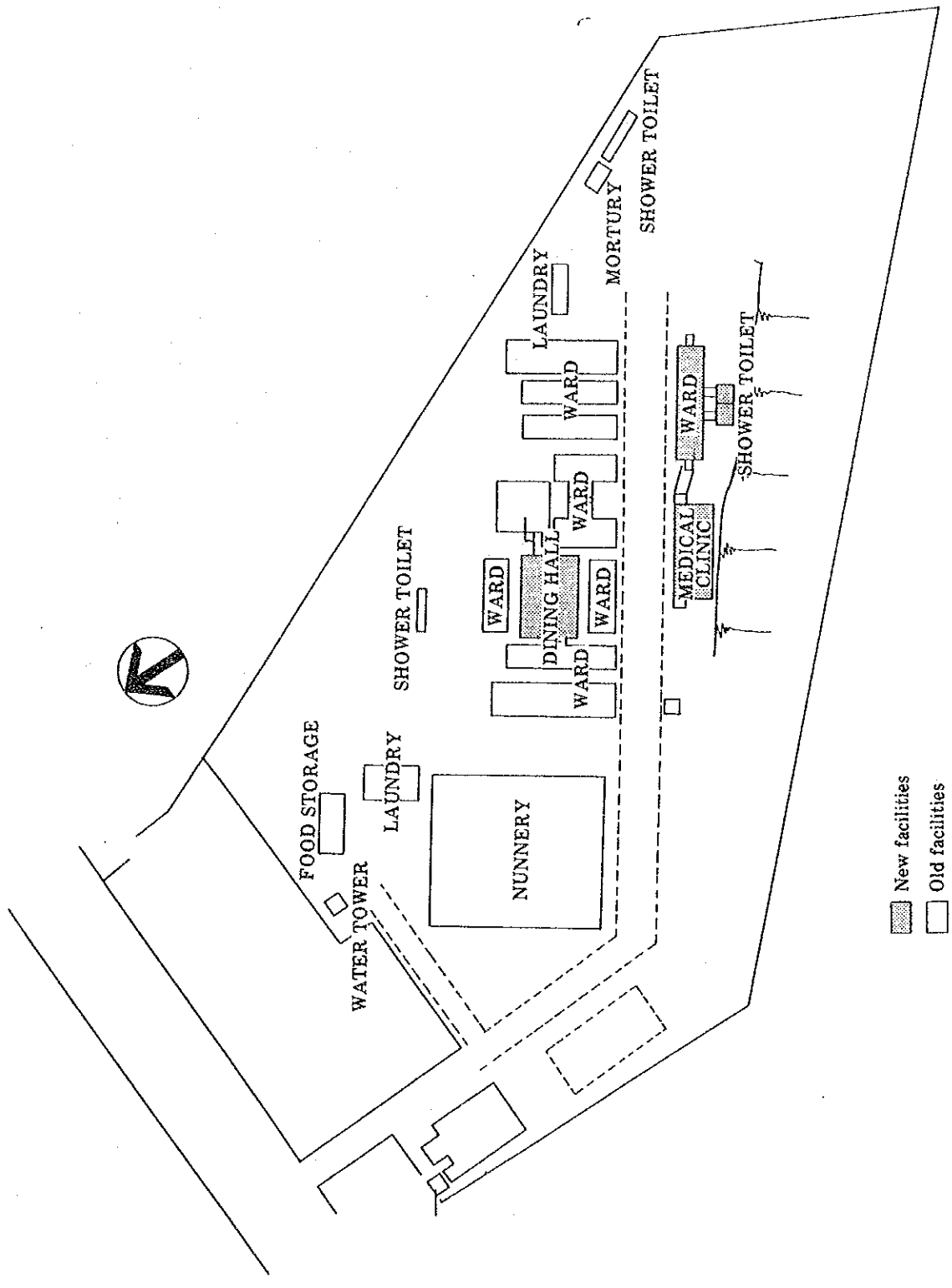
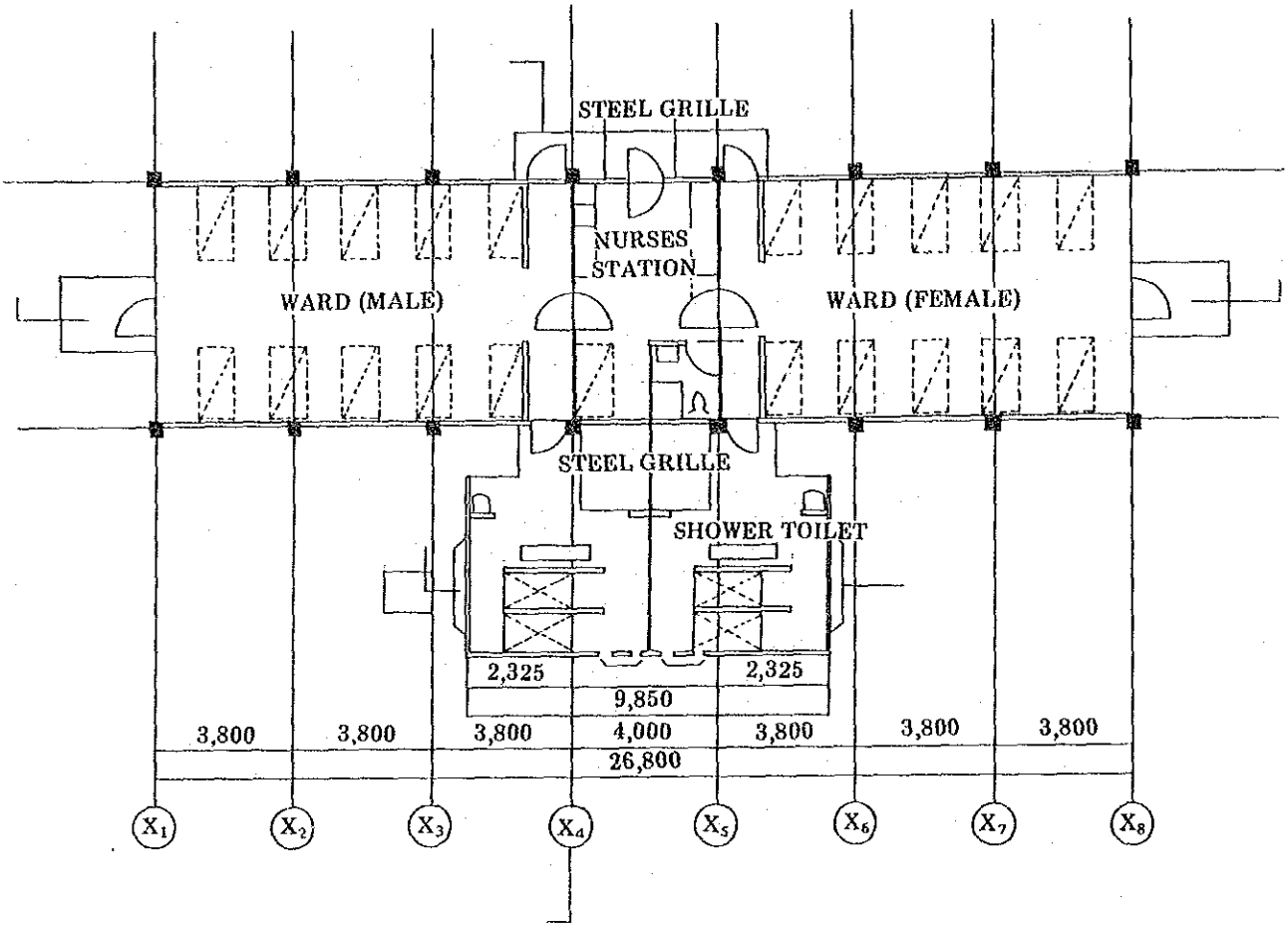


Figure 12. Plan and elevation of new ward:



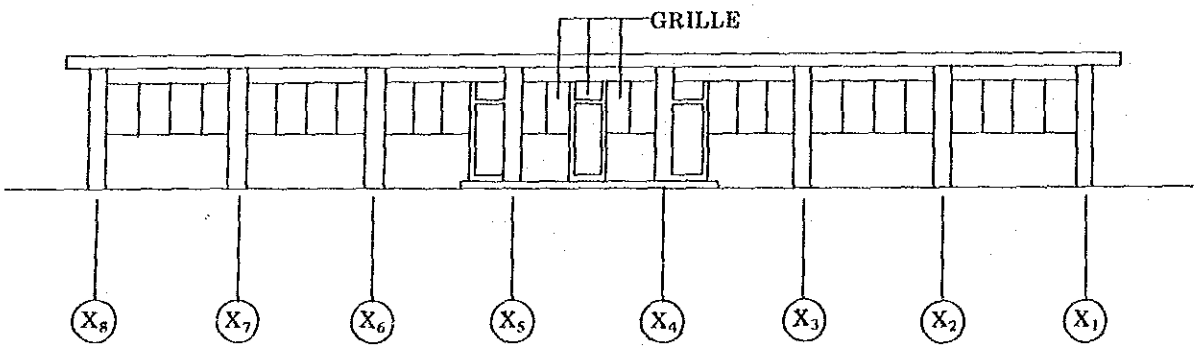
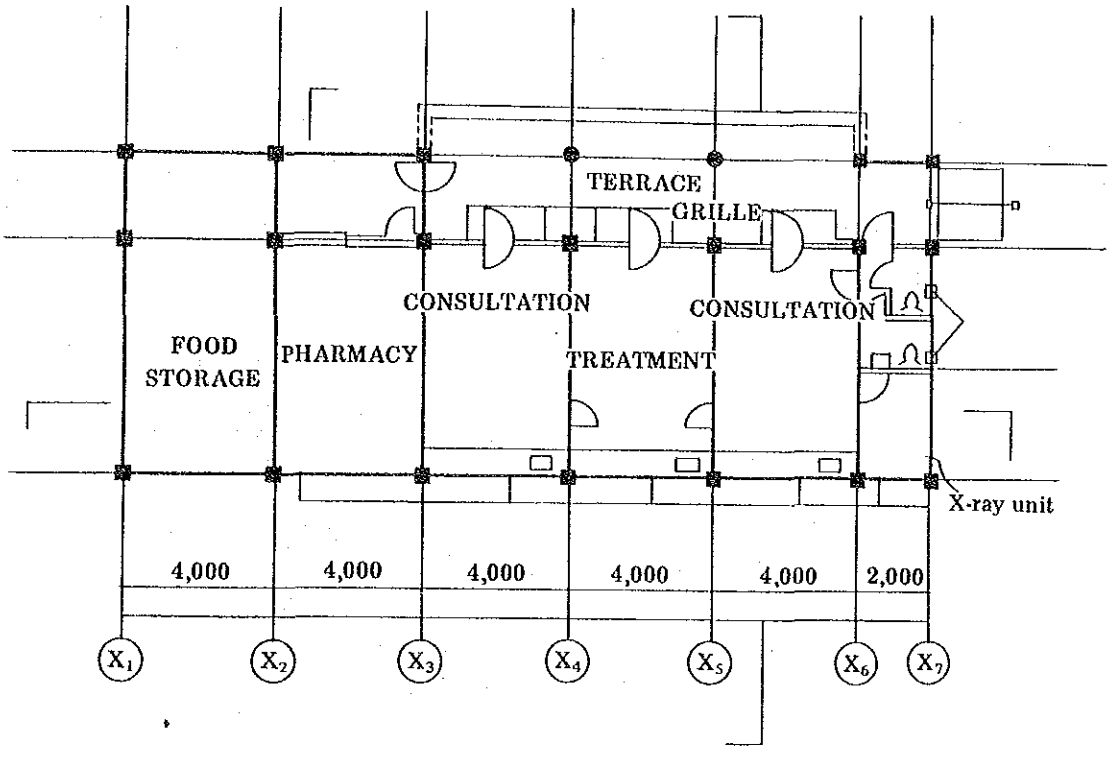


Figure 13. Plan and elevation of new facilities:

(Pharmacy, X-ray unit, Consultation unit)



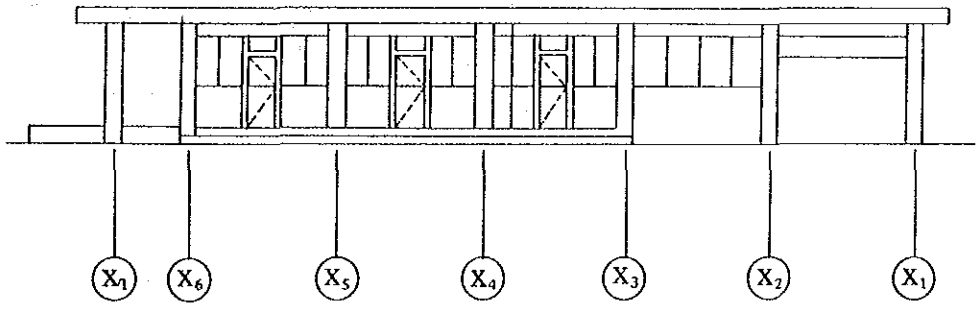
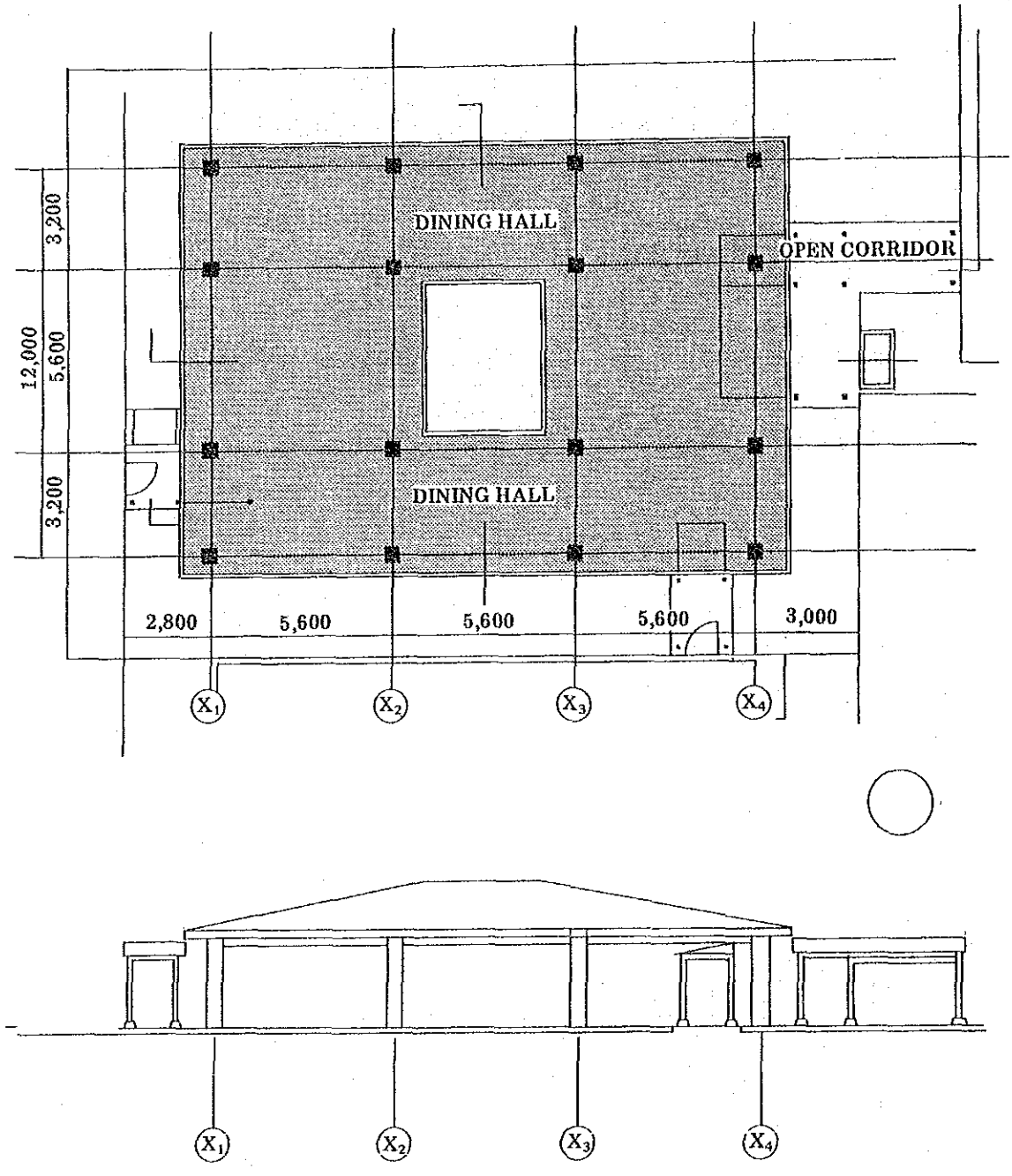


Figure 14. Plan and elevation of dining hall:



2) Organization, Operating System, Staff and Budget

Departments of Sigueneau Sanatorium is only respiratory. However, as a matter of fact, patients with complication are also in the hospital.

The budget is covered by the Ministry of Health and Population and monthly budget is 1,250US$ apart from personnel expenditure.

Staff composition of the hospital is shown on Table 13.

Table 13. Staff composition by type of occupation:

Type of occupation	Number
Administrator	1
Director	1
Physician	4
Radiology staff	1
Laboratory Technician	1
Nurse	1
Auxiliary nurse	13
Clerk	2
Cook	1
Assistant cook	7
Driver	1
Maintenance man	2
Laundry	6
Odd man	9
Night worker	4
Barber	1
Sweeper	1
Other workers	5
Total:	62

3) Data of Medical Activity

The number of patients is not taken in statistics in Sigueneau Sanatorium. Therefore, exact number of patients can not be obtained.

95 beds are always occupied and furthermore emergency patients are laid on stretcher, beyond the capacity of the facilities. So, considering these condition in Sigueneau Sanatorium, always over 100 patients are evacuated.

4. Contents of plan:

The Ministry of Health and Population, Haiti, requested the grant aid of medical equipment to the Government of Japan, which is a part of their long term improvement and development plan of Haiti National University Hospital, Isaie Jeanty National Maternity Hospital and Sigueneau Sanatorium.

The summary of the request is as follows:

(1) Summary of request:

Haiti National University Hospital:

1) Equipments for Operation
2) Equipments for Laboratory
3) Equipments for Radiology
4) Equipments for Urology
5) Equipments for Pediatric
6) Equipments for Surgical, orthopedics
7) Equipments for Gynecology,Obstetric
8) Equipments for Ophthalmo-Otorinolaryngological
9) Equipments for Pathology
10) Equipments for Internal medicine
11) Other equipments

Isaie Jeanty National Maternity Hospital:

1) Equipments for Gynecology

2) Equipments for Obstetric

3) Ambulance

Sigueneau Sanatorium:

1) Equipments for Diagnosis and Treatment

2) Consumables (Xray films, and so on)

3) Medicine (antibiotics, and so on)

(2) Position of Plan:

The Republic of Haiti has a plan to educate and train medical personnel in order to recover the related system of medical supply and also its shortage , and also to improve the facilities of Haiti National University and Isaie Jeanty National Maternity Hospital as core hospitals of the education.

For this plan, to implement such future design, the Government requested Japan for a grant aid of medical equipment. But as to plan for reconstruction is not covered by their budget and the date for its completion is not set.

Under the circumstances, to proceed with this plan efficiently, it should be better to induce medical equipments into

present facilities instead of new ones.

For Sigueneau Sanatorium, though the equipments and facilities were improved under grant aid from Japan, but there are many equipments which are not working, because of condition of power,the shortage of supplies, and of insufficient maintenance support. However, after implementation of this plan,the equipments installed must work more efficiently.

5. Basic Design:

After clarification of guide lines for the procurement of medical equipments, based on the present conditions, Basic Design was completed.

(1) Design Policy:

Medical equipments were designed carefully in order to satisfy the following 12 guide lines:

1) Installing work for equipments should be kept at minimum, because of installing the equipments, firstly, in the present building, and then it must be transferred into the new facilities.

2) Structure of equipments should be simple and substantial for easy maintenance and repairing due to poor maintenance support system in Haiti.

3) It should be easy to operate and no training needed.

4) It should not be sensitive to the voltage fluctuation there.

5) As to the equipment which is sensitive to line voltage fluctuation, Line voltage stabilizer should be attached. The iron resonance type line voltage stabilizer should be used in Port-au-Prince where line frequency is stable. In the suburb, static type line voltage stabilizer should be used due to unstable frequency.

6) To avoid malfunction caused by line noise, the equipment should not include complicated digital circuit.

It should not be connected directly to the faucet because water is supplied at low pressure and at high hardness.

7) The equipment should not be sensitive to temperature or humidity because the present facilities are not airconditioned.

8) The running cost of the equipment should be lower. And all necessary supplies for initial operation should be included.

9) The equipment should have demanded workload to utilize effectively.

10) The equipment should be optimum to the number of patients and skill of medical personnel in the present and future plans.

11) Equipment for diagnosis and treatment, should be of high effectiveness in the education and training for medical

personnel.

12) Physiological test apparatus should be operated speedily and should not give much pain to the patients. It should be of "fail safe" system and safe for patients and operators.

(2) Outline of Basic design:

Requested equipment is classified 3 groups: for Clinical Dept., Central Service Dept., Auxiliary Dept., by their function in Haiti National University Hospital. Further, Clinical Dept. is classified into 9 sections; internal medicine, pediatrics, obstetric and gynecology, general surgery, orthopedic, ophthalmology, urology and otorhinolaryngology. Central Service Dept. is classified into four sections, clinical laboratories, pathology, operating room, radiology. These sections are inter-related and put the affairs into effect in accordance with the conditions. The equipments were selected taking into account the above conditions. The result is shown in Figure 15 which indicates the scale of equipments for Haiti National University Hospital. (The circles indicate the scale of equipments).

While Figure 16 shows the scale for Isaie Jeanty National Maternity Hospital, Figure 17 shows the scale for Sigueneau Sanatorium.

The result of basic design is listed on the table "List of Basic Design's Outline".

For Haiti National University Hospital, the equipments, they requested, include RI Scintigraph and Angiograph. Because the present building is narrow and not airconditioned, they could not be installed. Blood gas analyzer was requested also, because the adjustment for normal operation is very critical and supply for reagent seems to be so serious due to short expiration date of them. Based on the above reasons the said equipments were rejected from the list.

As to Shadowless Light and Surgical Table, movable type were selected instead of fixed type. As to automatic glassware washer, the automatic one has been changed into Pipet washers, because water pressure was insufficient and quality of water was unfit. Boold cell counter was divided into WBC/RBC Counter and Hematocrit Centrifuge because full automatic one is risky. As to Echograph, A mode one and B mode one was selected separately instead of A/B/M all mode type, to avoid a risk from malfunction.

As to Laboratory Test Equipments, the necessary modules, consumable parts or reagents were attached on the basis of estimated volume of operation because the main frame doesn't work as stand-alone.

For Isaie Jeanty National Maternity Hospital, operational system was designed and required equipments were

selected based on the results of survey of present situation and future plan because the requested equipments were not completed. The facility has not been installed by any suitable equipments. It should be kept by equipments of adequate standard. The equipments should be improved to the higher standard, than present level because this hospital is a core center of obstetric and gynecology in Haiti. For installation of the above equipments, training to operate is indispensable.

For Sigueneau Sanatorium, the team agreeds to provide same equipments as they requested, because requested list was prepared properly on the present situation and listed up within the equipments, on which they had experiences to use. However, some adjustment were added in listed function.

(3) Contents of Basic Design

Items and conditions to design equipments were classified according to each section and function as follows:

1) Objective field and installed Section: Working field of equipments or Section, where equipments are located.

2) Selection of equipments and its reason

(i) Name of equipments: The name is shown by funct ional one

(ii) Purpose of introduction: It is examined by the following ideas:

Medical level: To improve medical standard.

Medical service: To expand provision of medical service.

Patients service: To reduce pains of patients and to urge patient's survice.

Personnel education: To educate and train medical personnel.

Others : Other than the above, if necessary.

(iii) Reason of introduction: Relation between selected equipments and existing ones was examined as below:

New: To introduce new model

Improvement: To introduce the existing one but with higher quality.

Additional : To introduce the existing but for adding.

Replacement: To exchange old one for new one.

Others : Other than the above, if necessary.

(iv) Outline of function: Function of equipments, which should be provided.

(v) Points to select the equipment: Important points to select the equipments were examined.

3) Utilization

(i) Objective patients/operational work: Objective patients of the equipment and operationed work were examined.

(ii) Operator/User: Operator or User of the equipment were examined.

(iii) Expected patients/Working volume: Working volume by the equipment per day or per month was calculated based on the present patients.

4) Management

(i) Education: Needs for training were studied.

(ii) Maintenance: Methods for preventive and corrective maintenance were studied.

5) Specification

(i) Installation: Forms of installation for equipments were examined. i.e., on the floor, on the table, and so on. Installed place was also examined.

(ii) Power: Kinds of required power of electricity were examined.

(iii) Supply and Drain of Water: Needs for supply and drain of water were examined.

(iv) Contents and accessories of equipment: Composition of equipments and accessories, which is necessary to operate were examined.

(v) Note and others: Other conditions which should be considered, were examined.

6) Estimated expenditure (Purchase costs for equipment): Estimated costs of equipments were calculated. However the cost was calculated by the price without packing charges and transpotation costs.

1.Internal medicine
2.Pediatric
3.Gynecological
4.Surgical
Orthopedic
5.Ophthalmological
6.Urlogical
7.Otorinolaryngo-
logical
8.other

Figure15.

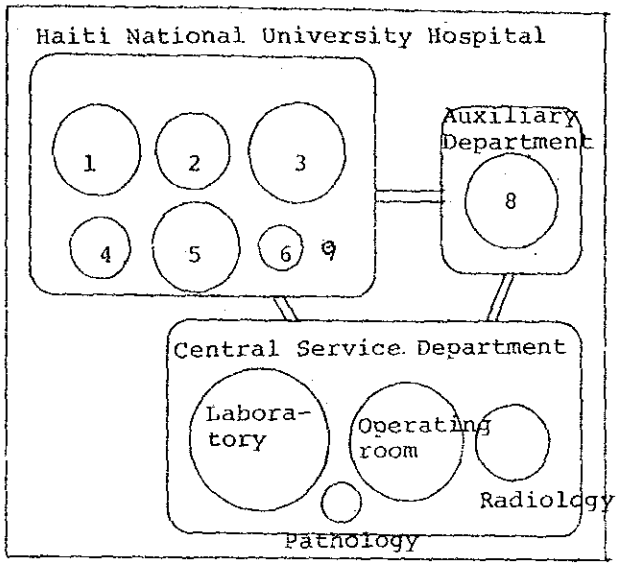


Figure16.

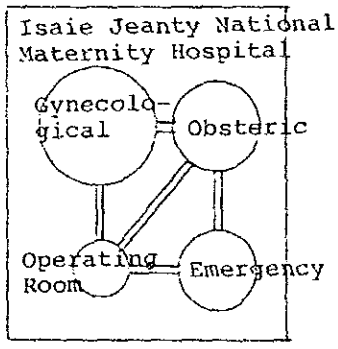
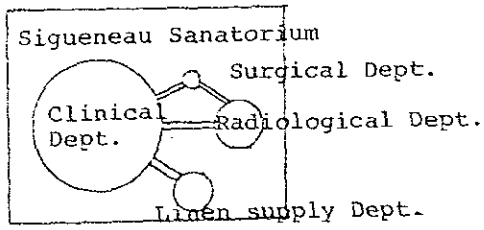


Figure17.



1) Haiti National University Hospital:

1. Clinical Dept.

The equipments especially required for each section were designed.

a) Medicine:

Electrocardiograph, Electroencephalograph, and a complete set of Fiber Scope were listed, in order to improve diagnosis function and educational study.

As to Electrocardiographs, portable types with 3ch pulse monitor were selected, which did not require construction work. And spare electrode and chart papers were attached. As to a set of Fiber Scopes, one each for Esophagoscope, Gastroscope and Colonoscope with light source aparatus were selected.

b) Pediatrics:

For premature and high-risk infants, Incubator, Phototherapy unit, Continuous Suction Apparatus, Nebulizer, Electrocardiograph, and so on and for general pediatrics, Laryngoscope, Ophtalmoscope and Otoscope were selected.

As to Incubators, manual temperature control types were selected, in order not to have cases of babies suffer from any electrical problems.

As to Phototherapy units, movable types were selected and they were composed as a set with eye masks and spare lamp. As Continuous Suction apparatus, 4 sets of ordinal suction apparatus were selected.

As to the Nebulizers, Ultrasonic Nebulizer and stand, Inhale masks, Liquid medicine cups, mouth pieces, and so on were selected as one set. 5 sets of the above were selected.

A set of Portable type (1ch) Electrocardiograph was selected with a cart, spare electrode and chart papers as a set.

As to Laryngoscope and Ophtalmoscope, battery types were selected, which does not require installation work.

c) Obstetric and Gynecological:

For obstetric, Fetal Monitor and Endoscope, for Gynecology Suction apparatus, Electrocoagulation unit, Cryotherapy unit Endoscopes, were selected.

As to Fetal Monitors, movable and relatively simple types were selected, and Line voltage stabilizer were attached in order to avoid fluctuation of line voltage. As to Cryotherapy unit for gynecology, portable type was selected in order to move them easily, and Pressure Regulator, and spare tips were attached.

As to Endoscopes, independent Hysteroscope, Amniscope, Laparoscope and Colposcope, were selected as one set and light sources were attached independently. Added to the above, one set of Lecturescope, Camera and Laparoscope, with light source were attached for educational purposes.

d) Surgical and Orthopedic:

The equipments for Surgical operations were listed in the Operation Dept. Therefore, only Suction Apparatus was listed here.

As to Orthopedics, Stryker Frames and Cervical Traction sets with beds were selected. As to traction sets only 5 sets were selected instead of 20 sets which were requested from the hospital because they have no room for 20 until the new building is completed.

e) Ophtalmology:

The equipments for examination were selected. Number of equipments were adjusted based on the estimated volume of operations. As to Ophthalmoscopes, Retinomoscopes, Exophtalmometers, battery types were selected. As to the equipments for eyesight test and color vision test, Chart Boxes for color vision test, trial lens boxes and trial frames were selected.

f) Urology:

As for urological examination, Cystoscope and Van Buren sound were selected. For Cystoscope, one each for adults and for pediatrics were selected and Cold Light Source and Congulation Unit for Urine Cavity were added.

g) Otorhinolaryngology

As for Otorhinolaryngology testing, Diapason set and Otoscope were selected.

2) Central Service Dept:

For Central Service Dept., centralized equipments, which were used commonly for examination and operation were designed.

a) Clinical Laboratories

For processing specimen, Centrifuges and test pipetters, for biochemistry, water bath unit, Spectrophotometer, Flame-photometer and Electrophoresis Apparatus, for bacillus examination, Bacillus Cultivate Apparatus, for common use of clinical laboratories, Water Purification unit, Analitic balance, Refrigerators, Freezers, Pipett Washers were selected.

Laboratory test apparatuses were affected by fluctuation of line voltage, And then test data drift. Therefore, for such equipments, Line voltage stabilizers should be attached. As to

Centrifuges, auto balance type Centrifuges were selected because of easier operation. Centrifuges consist from floor top type multi-tube centrifuges and table top type small centrifuges.

Manual typed pipetter was selected and Line voltage stabilizers were attached. As to Spectrophotometers, analogue types were selected in order to digital one, and Line voltage stabilizers were attached. As to Flamephotometers, Line voltage regulators, propane gas bombe, air compresser and gas regulator, etc. were attached.

As to Electrophoresis apparatus, existing ones were very old so that full set of equipments for test were selected and Electrophoresis, Densitometer and Line voltage stabilizer were included.

As to microscopes binocular types were selected, althouuugh 3 sets of monocular types and 3 sets of binocular types were requested, because of operational efficiency and little difference in price. Fluorescence microscope was requested, however, it was rejected because its maintenance was so complicated, darkroom was necesssary and circumstances were not suitable.

As to Blood cell counters, RBC/WBC cell counters and Hematoclit centrifuges were selected based on consideration for

consumption reagent, construction, and difficulties of operation. Line voltages stabilizer were attached.

As to Coagulation analyzer, line voltage stabilizer was attached.

As to Bacillus cultivate apparatus, Incubator, CO2 incubator, Anearobic chamber, Anearobic jar, and so on were selected. The apparatuses were temperature control types by Thermostat. As to Water purification unit, Disilator and Apparatus of pressure pump were selected due to low water pressure. On the stage of pre-distillation, Filter and Deionizer to exclude particles and inorganics because of the qualilty of water, as stated before, was relatively hard. As to Glassware washers, simple Pipet washers were selected instead of Automatic type which requested because Pipet washers can be operated without electricity.

b) Pathology:

For pathological examination, basic Binocular microscope and Binocular microscope with Photograph apparatus to take pictures of pathological tissue were selected.

c) Operating room:

Operating room tables, Orthopedic operation room table, Shadowless

lights, Anesthesia apparatuses, Vacuum suction devices, Surgical instruments and Surgical P.A. system were selected in order to replace old equipments or to improve them.

As to Shadowless Light, Stand types were selected, instead of Ceiling types which requsted. Because for Ceiling type, construction work was necessary and wiring on the ceiling was unreliable.

The equipment with non-stop power source apparatus were selected, in order to avoid the trouble by fluctuation and failure of electricity.

As to Anesthesia apparatuses, main apparatuses and Surplus gas suction pumps were selected.

As Equipments for operation, Knives, Forcepts and Bone-saw, etc. were selected as a set. As to Surgical P.A. system which used for recording surgion's explanation and for education of trainee, wireless microphones, Amplifier, Tape recorder were selected.

d) Radiology:

For Radiology, sonographs were selected. A mode type and B mode type were selected separately, instead of A/B/M mode type which was requested, because taking into account difficulties of

operation and prevention of trouble. Camera and Line voltage stabilizer were attached to each one. As to Camera, 35mm Camera was selected instead of Polaroid Camera and decided to select 35mm Camera. Furthermore, Angiograph and Scintigraph which were requested, were not selected, because present facility can not provide space and airconditioning.

3) Auxiliary Department:

Incinerator and Ambulance were selected. As to Incinerator, high temperature type for burning amputed limb and specimen were selected, and which not require additional construction for installation.

As to Ambulance, Ambulance with stretcher and Emergency kit were selected because this hospital is a core hospital in Haiti, and it is quite necessary to transport patients from other hospitals.

List of Basic Design's Outline (Haiti National University)

	Department	Name of Equipments	Quantity
CLINICAL DEPART-MENT	a) MEDICINE	Electrocardiograph Electroencephalograph Complete Set of Fiber Scope	3 sets 1 set 1 set
	b) PEDIATRICS	Incubator Phototherapy Unit Suction Apparatus (Continuous) Nebulizer Electrocardiograph Laryngoscope Ophatalmoscope Otoscope	5 units 3 sets 4 units 5 units 1 unit 2 sets 5 pieces 5 pieces
	c) OBSTETRICS & GYNECOLOGY	Fetal Monitor Suction Apparatus Electrocoagulation Unit Cryotherapy Unit for Gynecology Endoscopes for Gynecology	2 sets 2 sets 1 unit 1 unit 1 set
	d) GENERAL SURGERY & ORTHOPEDIC	Stryker-Frame- Cervical Traction Set Suction Apparatus	8 units 5 units 5 sets
	e) OPHTAL-MOLOGY	Ophthalmoscope Retinomoscope Retinal Camera Unit Exophatalmometer Slitlamp Apparatus Perimeter for Peripheral Visual Field Phoroptor Equipments for Eyesight test & Color vision test	1 set 10 pieces 1 unit 5 units 2 units 2 units 3 units 5 sets

	Department	Name of Equipments	Quantity
1.CLINICAL DEPART-MENT	f) UROLOGY	Cystoscope Van Buren Sound	1 set 1 set
	g) OTHORHINO-LARYNGOL-OGY	Diapason Set Otoscope	3 sets 12 pieces
2.CENTRAL SERVICE DEPART-MENT	a) CLINICAL LABORATO-RIES	Centrifuge Pipetter Water Bath Unit Spectrophotometer Flame Photometer Electrophoresis Apparatus Binocular Microscope Blood Cell Counter Counter for Differential Coagulation Analyzer Stop Watch Bacillus Cultivate Apparatus Water Purification Unit Analytic Balance Refrigerator Freezer Pipett Washer	8 units 1 set 8 units 2 sets 2 sets 1 set 6 units 2 sets 6 pieces 1 set 5 pieces 1 set 1 unit 2 units 3 units 3 units 3 units
	b) PATHOLOGY	Binocular Microscope	4 units

	Department	Name of Equipments	Quantity
CENTRAL SERVICE DEPARTMENT	c) OPERATING ROOM	Operating Room Table Orthopedic Operating Room Table Shadowless Light Anesthesia Apparatus Vacuum Suction Device Surgical Instruments A.P Unit	2 units 1 unit 3 units 3 sets 3 sets 1 set 1 set
	d) RADIOLOGY	A Mode Snongraph B Mode Sonograph	1 set 1 set
AUXILIARY DEPARTMENT	OTHER	Incinerator Ambulance	1 unit 1 set

(2) Isaie Jeanty National Maternity Hospital

1. Gynecology

As to Gynecology dept., Equipments for diagnosis and treatment of patients were designed, which with vaginal erosionis, myoma of the uterus, infectious disease and so on. For Diagnosis, Ultrasonic diagnostic apparatus, radiography apparatus and endoscopes for gynecology were selected. For Treatment, Cautery Irons were selected.

As to Ultrasonic diagnostic apparatus, B mode type and Camera were selected. As to Camera, 35mm Camera was selected instead of Polaroid one in order to the running cost must be minimum because Polaroid film was expensive. And Line voltage stabilizer was attached because line voltage was very fluctuated. Training course of several days for operator was nessesary for this equipment when the equipment is installed. As to Radiography apparatus, All sets for Radiology work were selected, which Radiography shooter, Film cassete, Developping equipments and Film reader and so on. It is desired to have training by technical instructor despached from Japan when the equipment is installed. The present facility needs dark room on the project of the Government of Republic of Haiti for radiological Apparatus. Laparoscope, Coloposcope and Amnioscope and so on, as Endoscope were selected for Obstetric and Gynecology.

2. Obstetric

As for Obstetric Department, Delivery bed and Fetal Monitor were selected for delivery, and for high risk infant, Incubator and Bilirubin-Meter were selected. Fetal monitor is sensitive for voltage fluctuation due to long work as usual. Therefore, Line voltage stabilizer should be included in set. As to Incubator, Manual temperature control type was selected for easy handling and solid in using. As to Bilirubin Meter, capillary type was selected because degree of icterus of newborn and immatured infant could be tested by minimum blood specimen, and without reagent. Capillary were attached with a set.

3. Operation

In order to amplify the present operation room, Operating Room Table (Multi Use), Shadowless Light, Suction Device, Anesthesia Apparatus, Surgical Instruments and Autoclave (electric) were selected. As to Shadowless Light, Ceiling type was not suitable because construction work is necessary and wiring on ceiling is unreliable. Therefore the equipment with non-stop power source apparatus were selected, in order to avoid the trouble by fluctuation and failure of electricity. As to Anesthesia Apparatus, Suction pump for remainder gas was attached with. As to Surgical instruments, Knives and Forceps etc., were selected as a set. As to Autoclave, the present hospital have

not central supply department using old type Autoclave in the corner of corridor, as such, small size Autoclave (electric type) was selected for backup to the present one.

4. Emergency

This hospital is a core hospital of Obstetric and Gynecoloty in this country. Therefore, the hospital requires to have Ambulance for carrying high risk patients from other hospitals. As to Ambulance with Stretcher and Emergency kit were selected. As to Respirator, Respirator, Oxigen tent and Oxigen-bombe were selected as a set.

List of Basic Design's Outline (Isaie Jeanty National maternity Hospital)

	Name of Equipments	Quantity
1. GYNECOLOGY DEPARTMENT	Ultrasonotomograph Radiology Apparatus Endoscope for Gynecology Cautery Iron	1 set 1 set 1 set 5 pieces
2. OBSTERIC DEPARTMENT	Delivery Bed Fetal Monitor Incubator Capollary Bilirubin Meter	5 units 1 set 3 units 1 set
3. OPERATING DEPARTMENT	Operating Room Table Shadowless Light Vacume Suction Device Anesthesia Apparatus Surgical Instruments Atroclave (Electric)	1 unit 2 units 1 unit 1 unit 1 set 1 set
4. EMERGENCY DEPARTMENT	Respirator Ambulance	1 set 1 set

(3) Sigueneau Sanatorium

The hospital was located on the suburbs of the city and so that line voltage was low and fluctured. Line voltage stabilizer should be attached to the equipments, which worked with electricity. Medical materials of minimum standard, were selected in oder to correspond to patients' demand in this hospital because Supply of medical materials are on low level.

1. Medical

Electrocardiograph, Broncho scope and Physical Examination Apparatus, were selected for diagnosis. Suction Apparatus and Medicine were selected for treatment. As to ECG, portable type with Carrying cart and Accessory electrode etc.,were selected. As to Bronchoscope, Broncofiberscope with Light source Apparatus, Lecturescope, Attachment of Biopsy, Gauze and Examination Table for Fiberscope were selected. As to Suction Apparatus, with Tube, Catheter, Absorbent Cotton and Spray gun were selected as a set. As to medicine, Anti-Tuberculosis, I.V.s and so on, were selected as a minimum standard.

2. Radiology

Radiology Apparatus installed in the Sanatorium have'nt

developping function, then Developping Apparatus, Cassette, Firm, and so on, were selected.

3. Operation

Operation Instruments Set and Suture Instruments Set were selected as Surgical Instruments.

4. Linen Supply

Sawing Machine with Linen for patients, were selected because the staff members in this hospital worked for sewing of clothes by manual.

List of Basic Design's Outline (Sigueneau Sanatorium)

	Name of Equipments	Quantity
1. CLINICAL DEPARTMENT	Electrocardiograph Bronchoscopy Physical Inspection Apparatus Vacume Suction Device Medicine	1 set 1 set 1 set 1 set 1 set
2. RADIOLOGICAL DEPARTMENT	X-ray Film Developing Apparatus	1 set
3. SURGICAL DEPARTMENT	Surgical Instruments	2 sets
4. LINEN SUPPLY	Sawing Machine	1 set

6. Maintenance and Management plan

(1) System of Maintenance and Management

Maintenance for the equipments is roughly classified into preventive maintenance and corrective maintenance. Preventive maintenance is classified into Quality control, Clean up, Check-out defacement, Oiling, Replacing worn-out parts and Adjustment, while preventive maintenance should be done for prevention of malfunction and for keeping property function.

It is necessary to be preventive maintenance, daily, weekly, monthly or periodicaly. Either operators of the equipments or other trained persons in hospital should be assigned. The persons who are educated as doctors and as laboratory technicians are able to put the suitable methodology for each equipments into effect, because there is no difference of methodology for Quality control in each equipments and statistical method should be applied. The equipments selected in this plan are as simple and solid as possible, because, they do not need the training for maintenance. Therefore, the persons, who are in charge of handling, or nominated as responsible persons for maintenance can maintain the equipments using the operation manual. At present, Repairing can't be managed in Haiti and,

occasionally the person comes to repair from U.S.A. But national budget for repairing is not prepared. So that, sometimes, a failed equipment is left as it is. Among the equipments of this plan, espesialy the equipments of urgent needs, are selected by considering of the possibility to obtain maintenance suport or repairing staff from U.S.A, or around Central America. In order to keep function and efficiency of the equipments designed in this plan, it is absolutly necessary to establish the system of repairing.

The following two measures should be taken into the consideration. Firstly, a service contract should be concluded which provides periodical inspection of once or twice a year and repairing or replacing the parts. This measure can enlong the life-time of equipments for twice or three times, decrease the accidantal failure and guaranteed normal operation. Secondly, the budget for repairing should be estimated, it will build up a network back up organizations through the agents of medical equipments in Haiti. According to natures of equipments, suitable one between the above two measures should be selected.

(2) Expense for upkeep administration

The expense of upkeep administration is roughly classified into two divisions. One is "persons as a medical resource", who are operators and users, and another is "things" which include reagents, consumables and so on. Concerning to "persons", it is not necessary to increase the persons except in Isaie Jeanty National Maternity Hospital, because of the equipments in basic design are selected as replacements for the old ones, and for ordinary use for doctors and nurses. Therefore, the persons are not necessary to be increased in Haiti National University Hospital and in Siguneau Sanatorium, but in Isaie Jeanty National Maternity Hospital, radiological apparatus is designed, therefore, one radiology technician is necessary. But formally the qualification of radiology technicians are not recognized in Haiti, and usually, the persons, who are trained by doctors, operate the radiological apparatus. For a while, it is desirable to train radiology technician in Isaie Jeanty National Maternity Hospital under the direction of doctors or technicians dispatched from Haiti National University Hospital.

Concerning to "things" it is necessary to estimate as a national budget, for the equipments of this plan. Estimated expenses for reagents and consumables are shown on the following Table 14. And estimated consumption of electricity and water are shown on Table 15.

(3) Expense for maintenance management

The following estimation of expenses for maintenance management should be allocated in the Government of Republic of Haiti. (shown in annual expense)

1) Expense for preventive maintenance

approx. 1,954,000.- Yen

Expense for reagents, daily consumables, consumable parts, washing agents and oils but for responsible persons are not included. (about 1% of whole equipments' price)

2). Expense for service contract

approx. 17,600,000.- Yen

Service contract should be prepared for the equipments which have too many parts, difficulty to adjust, and are of urgent use such as laboratory equipments or radiological apparatuses. The costs include expenditures for periodical inspection and replacing failed parts. This expense is applied to the equipments, total price of that is equal to

60% of whole equipments' price. For contract fee, 10% of the above equipments' price (10% of 60% of whole equipments' price) is estimated and, for travel fee, 5% of the above equipments' price is estimated.

3) Expense for repairing

approx. 3,910,000.- Yen

This expense is applied to the equipments' total price of that is equal to 40% of whole equipments' price.

For expense for repairing, 5% of the equipments' price (5% of 40% of whole equipments' price) is estimated.

Table 14 Expenses for reagents and consumables (estimated)

	reagents	consumables
Haiti National University Hospital	1,827	3,265
Isaie Jeanty National Maternity Hospital	120	608
Siguneau Sanatorium	0	120
Total	1,947	3,993

(Unit in thousand yen/year)

*Expenses were estimated from consumptions based on required amounts of work load.

Table 15 Consumption for electricity and water (estimated)

	electricity (KWH/year)	water (m^3/year)
Haiti National University Hospital	44,304	432
Isaie Jeanty National Maternity Hospital	3,648	0
Siguneau Sanatorium	444	0
Total	48,396	432

*Consumptions were estimated based on required amounts of work load.

7. Implementation Plan

(1) Implementation Body

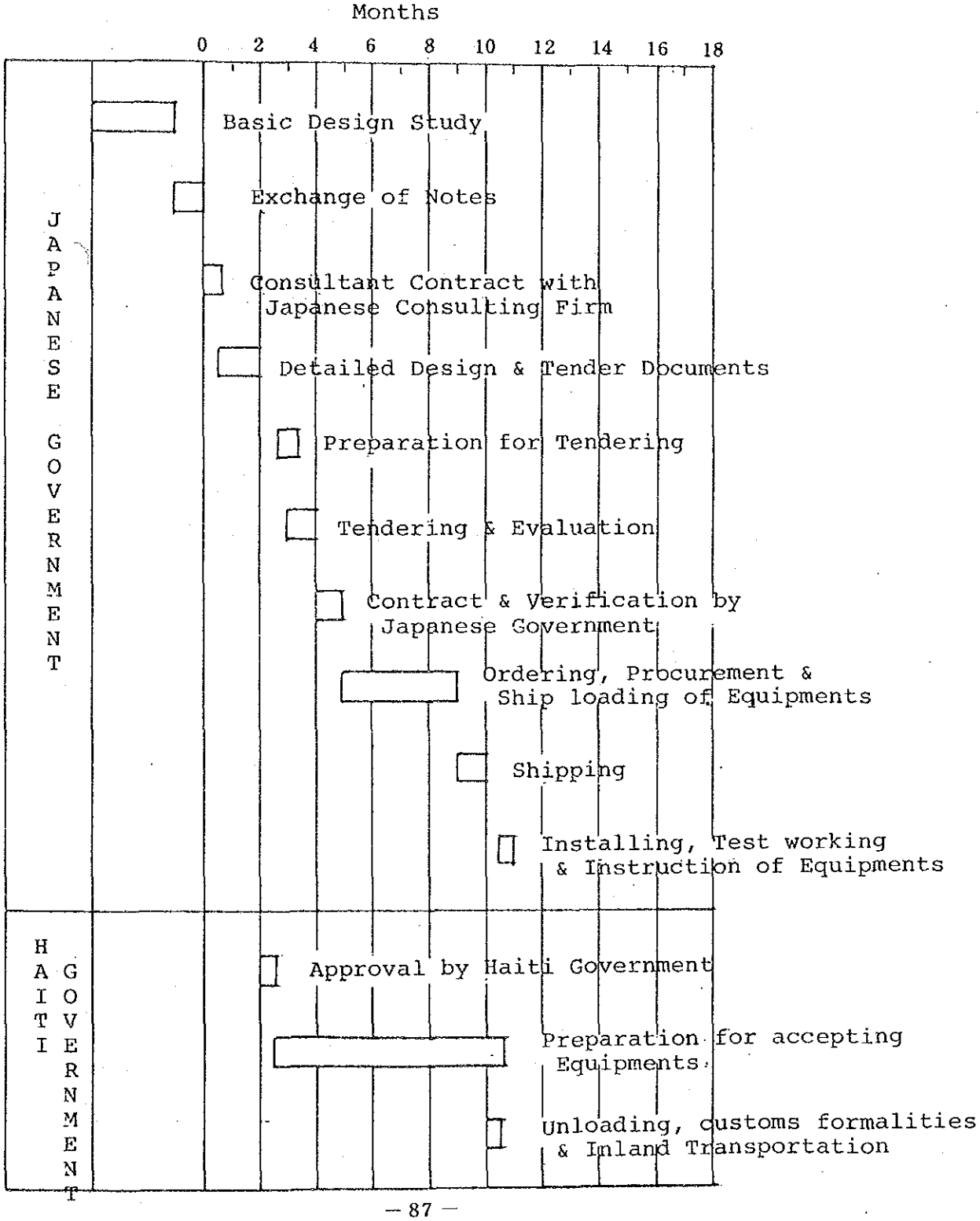
The Ministry of Health and Population, Haiti is the implementation body.

(2) Expense of the Government of Republic of Haiti

Grant aid of the Government of Japan for this plan includes expence for buying equipments, packing fee, transportation fee, dispaching fee of technical instructor (in case the equipments need arrangement of installation). But when the installation of equipments needs a construction of new line for electricity, the construction fee should be born by the Government of Republic of Haiti. And also, the Government of Republic of Haiti should bear the fee of accessory and the cost of shelves for custody of the equipments, or the expence to build the warehous. The construction fee for electricity is estimated for approx. 200,000.-Yen

(3) Implementation Plan

When the project will be implemented following the procedure of Japanese Government Grant Aid, about eleven months are considered to be needed from Exchange of Notes.



8. Project Evaluation

The purpose of this plan is to improve the medical care and health service in Haiti. Project evaluation should be done by comparing contents of implementation plan with the clarified necessity of the project and its effect by implementation. As a evaluation of the condition of medical care and health in Haiti, the shortage of quantities of medical supply is firstly pointed out. The shortage of medical facilities are serious, but the more serious is the shortage of medical personnel, physicians, nurses, and so on. Against these problems, it is important and effective to put the following counter measures into effect simultaneously. The facilities, practising clinical education and training for medical personell, should be improved. At the same time, regional medical facilities, supply the place to prctice for trained medical personel.

Under the above circumstances, the Procurement Project of medical equipments will be implemented, for two medical educational core hospitals, Haiti National University Hospital and Isaie Jeanty National Maternity Hospital and for the regional core tuberculosis sanatorium, Siguenean Sanatorium.

Through the observation and the survey on the facilities, the study team confirmed the contents of requests and designed to provide for Haiti National University Hospital, the equipments for surgical operation, radiology, laboratry, urology,

pediatrics, surgery, orthopedic surgery, gynecology, opthalmology, otorhinolaryngology, pathology, and internal medicine. For Isaie Jeanty National Maternity Hospital, the equipments for gynecology, obstetorics, operation and emergency and for Siguneau Sanatorium, the equipments for treatment, diaghosis radiology, surgical operation and linen supplies.

The contents are composed of equipments at a minimum which enable the Government of Republic of Haiti to achieve their plans as above stated. By supplementation of these equipments, the following effects will be brought.

(1) The activity of medical care and health is amplified by training of medical personell.

(2) The medical level in Haiti becomes higher by the improvement of medical equipments in each facilities.

(3) It is possible to supply medical service of the higher quality to more people than ever by the improvement of the function of treatment, diagnosis, laboratory and operation in each facilities.

It is obvious that by these effects, the improvement of medical care and health system will be promoted and the conditions of medical care and health will be improved remarkably. Besides the costs for maintnance management and operation, which are covered by the Government of Republic of Haiti, are not too heavy and considered to be appropriate, taking into account the effects, as above stated.

9. Conclusion and Recommendation

As stated in the chapters from 2 to 8, the study team confirmed the contents of requests of the Government of Republic of Haiti through the survey on the spot. Then, the study team analized the conditions of medical demand and the medical supply in Haiti and presented the basic design of this plan in chapter 5. As described in the preceeding chapter, it is obvious that by the implementation of this Procurement Project, the shortage of medical supply in Haiti will be improved and the improvement of the medical care and health system will be promoted by the positive activities of trained medical personnel in the future. For the implementation of providing the equipment,the Government should take measures to secure the budget for reagent, consumables, consumption of water and electricity, maintenance and repairing and so on. In this point a great effort of the Government of Republic of Haiti is desired. Premising the installation, under the present conditions of facilities, the solid equipments are selected. However, it is still apprehended that the present conditions inside are not enough adequate to the installation of the equipments, considering without air-conditioning system, and so on. Therefore, it is expected that the rebuilding plan of facilities would be promoted and the new equipments could operate under the adequate condition. The project will become more effective and significant, when technical

training for medical personnel is planned in parrallel with the procurement project of medical equipments, so that the improvement of medical personnel in quality and quantity is promoted.

ANNEX DATA

(1) Member List

1. Tadashi HIGUCHI, M.D.: Leader

   Researcer, Dept. of Medical Care Administration, National Institute of Hospital Administration, MHWF

2. Susumu INADA: Grant Aid

   Grant Aid Div.,

   Economic Cooperation Beaureau, MFA

3. Yoshihisa WATANABE: Hospital System Engineer

   Institute of Hospital System Development

4. Hideto KUSHIRO: Redical Equipment Engineer

   Institute of Hospital System Development

5. Kiyoshi KOMIYA: Facilities Engineer

   Institue of Hospital System Development

(2) Schedule

1984

July 8 (Sun.) The team leader, Dr.HIGUCHI and 4 members arrived in Port-au-Prince.

July 9 (Mon.) Observation and Survey on Signeneau Sanatorium

July 10 (Tue.) Courtesy visit to JAPANESE Embassy
Discussion with the JAPANESE ambassador
Courtesy visit to the Minister of Health and Population
Observation and Survey on Haiti National University Hospital

July 11 (Wed.) Observation and Survey on Isaie Jeanty National Maternity Hospital.
Discussion with the Ministry of Health and Population.
WATANABE and KOMIYA collected references.

July 12 (Thur.) Discussion with the Ministry of Health and Population.
Visit to St. Francois Hospital (Dr. HIGUCHI, WATANABE, KUSHIRO, KOMIYA)

July 13 (Fri.) Discussion with the Minister of Health and Population

Sign on the Minutes

Discussion about the list of requested equipments with the Medical Director of Haiti Natiional University Hospital

Visit to a private laboratory (WATANABE, KUSHIRO,KOMIYA)

Report to the JAPANESE ambassador

July 14 (Sat.) The team leader, Dr. HIGUCHI and 4 members left Port-au-Prince.

(3) Interviewed Persons

1) The Ministry of Health and Population

Dr. Robert Germain	Minister
Dr. Muller Garnier	Secretary of State
Dr. Francisque Milord	Director of the Cabinet of Minister of Health and Population

2) Haiti Natiional University Hospital

Dr. Alix Adam	Medical Director
Dr. Valme	Assistant Medical Director

3) Sigueneau Sanatorium

Dr. Akiko Sudo	Medical Consultant
Sr. Jany Grandoit	Administrator

(4) Minutes of Discussions

MINUTES OF DISCUSSION ON THE PROCUREMENT PROJECT OF MEDICAL EQUIPMENT IN THE REPUBLIC OF HAITI

In response to the request made by the Government of the Republic of Haiti for the Procurement Project of Medical Equipment (hereinafter refered to as «the Project»), the Government of Japan through Japan International Cooperation Agency (JICA) has dispatched a Basis Design Study Team headed by Dr Tadashi HIGUCHI, Researcher, Dept. of Medical Care Administration, National Institute of Hospital Administration, Ministry of Health and Welfare, (hereinafter refered to as «The Team») to conduct the Basic Design Study on the Project from July 8th to July 14th, 1984.

The team has carried out a field survey, had series of discussions and exchanged views with Haitian Government Authorities concerned with the Project.

As a result of the study and discussions, both parties have agreed to recommend to their respective Government to examine the result of study attached herewith towards the realization of the Project.

Port-au-Prince July 13, 1984

Tadashi Higuchi

Tadashi HIGUCHI
Team Leader

Muller GARNIER
Secretary of State for Public Health

ATTACHMENTS

1.- The objective of the Project is to provide necessary medical equipments in the hospitals, described in ANNEX I.

2.- The Japanese Study Team will convey to the Government of Japan the desire of the Government of Haiti that the former takes necessary measures to co-operate in implementing the Project and provides necessary equipment within the scope of Japanese economic cooperation in the grant form.

3.- The Government of Haiti has understood Japan's grant AID system explained by the Team which includes a principle of use of Japanese nationals or Japanese juridical persons for the implementation of the Project.

4.- The Government of Haiti will take necessary measures such as listed in ANNEX II on condition that grant Assistance by the Government of Japan is extended to the Project.

ANNEX I

1.- State General Hospital

2.- Isaie Jeanty Maternity Hospital

3.- Sigueneau Sanatorium

ANNEX II

1.- To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A.

T. H.

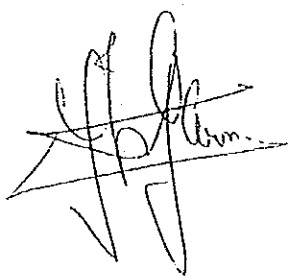
(1) Advising commission of A/P

(2) Payment commission.

2.- To ensure unloading tax exemption and customs clearance at port of disembarkation in the Republic of Haiti.

3.- To accord Japanese Nationals or Japanese juridical persons whose services may be required in connection with the supply of the equipment under the verified contract such facilities as may be neces - sary for their entry into Haiti and stay theirin for the performance of their work.

4.- To maintain and use properly and effectively that the equip-ment provide under the grant.



T. H.

(5) Conditions of Supplied Water and Electricity

1) Conditions of Electricity

Haiti Natl. Univ. Hospital

A 130V SAG
0014 CYCLES
A 130V SAG
0023 CYCLES
A 132V SAG
14:10:00

0033 CYCLES
A 132V SAG
13:56:33

0002 CYCLES
A 130V SAG
0027 CYCLES
A 132V SAG
13:42:26

A 0080V IMPULSE
13:32:57

0021 CYCLES
A 132V SAG
13:30:54

0005 CYCLES
A 131V SAG
13:30:36

0015 CYCLES
A 131V SAG
13:11:01

A 0056V IMPULSE
13:08:14

A 0052V IMPULSE
12:56:29

0001 CYCLES
A 130V SAG
12:55:33

A 0056V IMPULSE
12:33:32

A 0056V IMPULSE
12:25:25

A 0052V IMPULSE
12:13:05

A 0084V IMPULSE
12:12:39

A 0056V IMPULSE
12:12:30

A 0068V IMPULSE
12:02:53

A 0056V IMPULSE
11:36:40

Isaie Jeanty Maternity Hospital

A 102V AVG +
01:09:25

A 0076V IMPULSE
00:59:33

A 097V AVG -
00:57:27

0023 CYCLES
A 091V SAG
00:57:23

A 102V AVG +
00:46:39

0026 CYCLES
A 101V SURGE
00:46:25

A 097V AVG -
00:35:28

0023 CYCLES
A 092V SAG
00:35:22

0024 CYCLES
A 096V SAG
00:35:09

A 102V AVG +
00:28:55

A 0056V IMPULSE
00:27:38

A 0064V IMPULSE
00:26:50

A 0060V IMPULSE
00:25:27

A 0056V IMPULSE
00:25:20

A 0056V IMPULSE
00:24:25

A 0052V IMPULSE
00:22:11

A 0052V IMPULSE
00:22:03

A 0056V IMPULSE
00:21:42

A 0060V IMPULSE
00:21:35

A 0056V IMPULSE
00:19:40

Sigueneau Sanatorium

A 096V SURGE
A 089V AVG -
0002 CYCLES
A 088V SAG
0003 CYCLES
A 088V SAG
0002 CYCLES
A 088V SAG
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A 088V SAG
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A 088V SAG
0014 CYCLES
A 087V SAG
0002 CYCLES
A 088V SAG
0004 CYCLES
A 088V SAG
0004 CYCLES
A 088V SAG
11:36:13

A 094V AVG +
0100 CYCLES
A 095V SURGE
A 089V AVG -
0052 CYCLES
A 087V SAG
0002 CYCLES
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0002 CYCLES
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0024 CYCLES
A 087V SAG
11:34:16

A 094V AVG +
11:34:13

0038 CYCLES
A 095V SURGE
11:34:08

0081 CYCLES
A 092V SURGE
0001 CYCLES
A 084V SAG
0002 CYCLES
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0001 CYCLES
A 085V SAG
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A 085V SAG
0002 CYCLES
A 085V SAG

2) Conditions of Water

Item	Haiti Natl. Univ. Hospital	Isaie Jeanty Maternity Hospital	Sigueneau Sanatorium (1)	Sigueneau Sanatorium (2)
Turbidity	0	0	0	0
Colour	0	0	0	0
Smell	0	0	0	0
$KMnO_4$	2	3	4	2
PH	8.4	8.2	8.0	8.2
NO_2	0	0	0	0
NO_3	2.0	0.8	1.0	1.2
NH_4	0.5	0.5	0	0
Remained Chlorine	0	0	0	0
General Bacillus	+++	+++	8	0
Colon Bacillus	+++	+++	+++	±
Hardness	300	350	300	450
Cu (mg/l)	0	0.01	Bad specimen	0.29
Zn (")	0.08	0.05	"	0.03
Fe (")	0	0	"	0
Pb (")	0	0	"	0
Cr^{6+} (")	0	0	"	0
Scianide (")	0	0	"	0
Cl^- (")	30	20	"	9.8
Hg (")	0	0	"	0
Phenole (")	0	0	"	0

(6) Collected References

HAITI

Les Editions du Pacifique

HAITI by Selden Rodman

The Devin-Adair Company

JICA