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21715

INSTALLATION OF A PILOT WATER TREATMENT AT THE
HOSPITAL DONKA (C.H.U.), CONAKRY



XD9700051

SI/GUI/94/801

REPUBLIC OF GUINEA

Final Report: Findings and recommendations*

Prepared for the Government of the Republic of Guinea
by the United Nations Industrial Development Organization
acting as the executing agency for the United Nations Development Programme

Based on the work of Mr. József Éhn, Consulting Engineer
and Dr. Sándor Szabó, Solid waste adviser

Project Manager: Mr. Issam Miqdadi, Chemical Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited

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1. Introduction

The Ministry of Power and Environmental Protection, Republic of Guinea requested UNIDO assistance to provide technical services to solve the sewage treatment problem at the central hospital of Conakry, the capital of the Republic of Guinea.

Based on an agreement reached by the Parties, the experts were assigned to prepare the installation of a **pilot equipment** appropriate to the quality of hospital waste water, then to install and commission the equipment. The official language of the Project was French.

Since few experience and information was available at UNIDO on health conditions in Guinea, it was decided to include an Engineer Consultant and a Pharmaceutical-Medical professional in the team of the first fact-finding and problem identification mission.

Mr. József Éhn, solid and liquid wastes handling expert and Dr. Sándor Szabó, Chief Pharmacist, who have demonstrated their expertise with references of past experience gained in developing countries were fielded accordingly.

2. Fact-finding mission

During the site visits and consultations in December 1994, the experts have conducted detailed and thorough explorations, **based on direct experience** with the public health situation and technical equipment at the central hospitals of Conakry (DONKA, IGNACE DEEM), and on **information received** on the situation in the capital and in the interior of the country.

In the interest thereof they have contacted all local bodies and agencies associated with public health (water- and sewer utility companies, public cleaning company, leaders of special health programmes, environmental and health authorities, etc.) and have studied at the agencies responsible for physical planning, the urban development plans of Conakry, which form the foundations of all infrastructural, wastes collection and management concepts.

From the general environmental review and the detailed explorations conducted at the central hospitals, the experts **concluded the following:**

2.1 The capital of the Republic of Guinea has witnessed a population explosion especially after 1958, the year of independence (then 78 000 inhabitants).

Over the past 35 years approximately 1.2 - 1.3 million people moved to approximately 100 km² town area from the interior of the country, encroaching upon even areas designated for public use. Overcrowding, spontaneous, uncontrolled development and high population density have presented **virtually unmanageable health problems** to the central government and municipal authorities plagued by a general shortage of funds.

The hospitals and the health authorities encounter tremendous difficulties in meeting the exponentially growing demands for their services. The annual GDP of USD 500/capita

coupled with the absence of domestic industrial infrastructure with an economy based overwhelmingly on exports of industrial raw materials (bauxite) and agricultural products provide a limited income for financing imports.

Among the basic infrastructural services, **the water supply system** built and being expanded with World Bank assistance is the only service that may be considered as operational. However, this fact has resulted in a rapid increase in the generation of untreated sewage leading to environmental pollution.

The town built on a peninsula extending into the Atlantic Ocean has a sewer network (built in the early years of the present century) in the original core, which constitutes about 10 -12% of the town area. The poor condition thereof is hardly suited to normal operation.

The rest of the expanding town area is unsewered and most of the latrines are emptied manually into open storm drains with the contents being scoured to the sea by storms in the rainy season.

Industrial and oil wastes are disposed of in natural depressions or discharged directly into the sea. Along the full 80 km long shoreline of the peninsula, **the sea is polluted** to the extent that makes it unsuitable for bathing. Presently, neither the town nor the central hospitals have any sewage treatment facilities.

Municipal solid waste is collected irregularly, containers are left without emptying for long periods and uncontrolled waste dumps are common sights along the streets, which serve often as playgrounds for the children and thus increasing health risks and consequently demand for health care is growing.

With the aim of remedying this situation, the World Bank has launched a programme, the feasibility study of which was completed under the PADEULAC (Programme d'amélioration de l'Environnement Urbaine et de l'Assainissement de Conakry) programme. Arrangements for financing actual design works and subsequent extremely expensive construction are still outstanding. **Spontaneous and uncontrolled expansion** of the capital presents a steadily growing number of obstacles to the implementation of a viable infrastructural network. The sanitary landfill in which communal, industrial and hospital wastes are deposited, is uncontrolled and has no engineered protection. It constitutes a source of pollution to ground water and the sea. Furthermore, diseases and epidemics are spread through scavengers posing a permanent risk to public health.

The Republic of Guinea is unable to solve these cumulated health problems **from its own resources**.

3. History of hospital reconstruction and the experiences gained at two central hospitals in Conakry

3.1 Of the two central hospitals in Conakry, the **hospital IGNACE DEEN** built around the turn of the century was restored between 1984 and 1986 with financial assistance from the European Community.

In the interest of controlled wastes disposal:

- The sewer network on the hospital site was rebuilt.
- Septic tanks were built at the sewer outlets. However, no sewage treatment plant was built and the recipient of untreated sewage is still the sea through direct discharge in the vicinity of the shore.
- An advanced solid waste collection system comprising collecting bins and roller-mounted containers was also introduced under the project, to serve the incinerator built on the hospital site.

The rigid-wall plastic containers have become useless and broken owing to careless use. Hospital solid waste is transported in miscellaneous vessels, mostly to the containers of communal wastes and only a small part of the hospital solid waste is incinerated (if fuel is available to heat up and operate the incinerator). Containers full of waste remain often for several weeks in the hospital yard, decomposing under the tropical temperatures at a high rate and thus posing a continuous health risk and nuisance.

Ineffective handling and removal of the hospital wastes and mixed disposal of infectious and communal wastes are **presently unsolved problems**.

3.2 The university research hospital **DONKA** was built in the 60's in the form of multistory buildings which are inappropriate under the particular climate. The rooms of the hospital are obsolete, poorly equipped and the sanitary conditions are highly objectionable. The pumps feeding the water tanks on the roof were inoperative at the time of the first visit, tap water was available only on the first floor and water to the wards and operating theatres on the upper floors was carried in buckets.

The communal and hospital wastes were deposited in the open yard and removed at irregular intervals. **No paved roads existed in the hospital area** between the buildings, which hampered considerably traffic and supply during the rainy season. Sewers were silted up and the manholes were open with their covers broken. They were filled with debris and refuse, hence conveyed the impression of an inoperative network.

Reconstruction work on the hospital was started in 1993. Of the US\$ 17.1 million total cost, approximately 50% were contributed by the Saudi Development Fund, 38% by the Islam Development Bank and 12% by the Republic of Guinea. Completion is presently scheduled for December 31, 1996.

Under the reconstruction programme, an incinerator of hospital wastes was also installed and commissioned by the French company ESACO, supplier of the hospital equipment. **Not included in the reconstruction programme** were the supply and mounting of bins and technology for collecting hospital solid wastes. A facility for treatment of hospital effluents was not included either.

During the first visit, it was **realized** that the problems of wastes collection and handling must be addressed globally with due regard to the priorities and availability of funds.

As a first step, **two separate programmes were formulated** and a proposal was submitted to modify the original objectives of the UNIDO technical assistance programme. The funds available for the installation and pilot operation of a small sewage treatment plant far from the real capacity would not have solved the problem of wastewater treatment at the hospital. Any effective improvement of environmental conditions can be expected only from a sewage treatment plant capable of handling continuously the sewage flow from a 600 bed hospital.

On the grounds of the field experience detailed in the foregoing, first priority was accorded to solid wastes collection at DONKA hospital. It was considered imperative to improve conditions at the hospital site, both within and outside the buildings. The incinerator scheduled for commissioning at the end of 1995 was available and funds could be secured for an at least 6-months supply of packaging and transport material under the UNIDO programme. The solid wastes collection programme was termed **Programme 1**.

The funds needed for the manufacturing, transport, mounting-operation of the 200 m³/d capacity compact biological sewage treatment plant capable of handling the effluents from a 600 bed hospital exceeded by far the UNIDO financing possibilities under the present project. For this reason, as the outcome of consultations with the Guinean Authorities and the competent officers of the DONKA Project, a proposal was adopted to prepare a tender for the sewage treatment plant and to start parallel thereto funding negotiations between the Government of Guinea and UNIDO, and between the Government and the Saudi Development Fund and the Islam Development Bank supporting the restoration of DONKA hospital on the **possibilities of a joint financing arrangement**.

Provided that an agreement is reached, sewage treatment could be solved under **Programme 2**, in the framework of a new supplementary project. The installation of a definite sewage treatment facility - in a manner acceptable to the representatives of the Government - was referred to as **Programme 2**. The local authorities consider it essential but its implementation depends on the arrangements and time of financing.

In that case, **UNIDO technical assistance** would comprise the contribution of consultants for preparing the construction drawings, tendering, tender evaluation, proposal for the selection of the contractor, supervising installation of the facility and training of operating personnel. The costs of this "technical assistance" have been estimated at approx. US\$ 250,000 which would include also a two-week training of a local Consultant named by the Government of Guinea at the site of the company supplying the equipment, to gain practice in the operation of similar types of equipment (this latter service could be included in the terms of delivery).

4. Funding initiatives and negotiations

Report No.1 (Inception Report) was submitted in ten copies by the experts in March 1995, to UNIDO Headquarters, Vienna. The date set for completing the programme was the end of December 1995.

No comments have been received. A one-week series of consultations has been conducted by the expert in January 1995.

4.1 First split mission

At the closing consultation in June, an agreement was reached that the Guinean Government would request UNIDO to provide the funds needed for Programme 2, i.e. for preparing and implementing the installation of the sewage treatment plant, and to contact for this purpose the organizations funding the reconstruction project, including potentially the World Bank financing the PADEULAC Programme.

Parallel thereto the Undersecretary of State, Ministry of Power and Environmental Protection, Republic of Guinea, has agreed - during the hearing accorded to the expert - to contact on behalf of the Government the funds and banks financing the DONKA reconstruction programme.

The UNIDO expert was asked by the Deputy Director of the Ministry of Environmental Protection to forward a corresponding request personally to the UNIDO Headquarters, Vienna (**Annex 1 - letter in French**). The expert had compiled a report on these consultations, which was forwarded by the Project Manager to the Director of the UNIDO Development Finance Institution (**Annex 2**).

At a personal meeting on July 5, 1995, Mr. Loeser has emphasized, that the initiative must be taken by the Guinean Government in the form of an official request and that UNIDO would be willing to participate in financing Programme 2 to the extent of providing technical assistance, but not in the installation of a total cost of approximately US\$ 500,000 facility including technical assistance and supervision during installation.

4.2 Second split mission (October 1995)

Owing to communication difficulties and the termination of the UNIDO project at the end of 1995, a field supervision became necessary on the transport and acceptance conditions of the collection bins of hospital wastes delivered in the meantime.

The work of reconstruction progressed at a slower rate during the rainy season. The Guinean Party has agreed to accelerate the work and to provide the local financing related to the equipment delivered.

That time, **no local governmental initiative was taken** towards UNIDO or other sources of financing in connection with Programme 2. On the other hand, the Guinean Party has repeatedly asserted its intention to introduce sewage treatment and promised urgent steps to convene the parties interested in financing. All this was laid down systematically in the minutes of the closing consultations, which was forwarded by the expert on December 5, 1995, in French and English to the Project Manager (**Annex 3**).

The letters of the two competent Ministers of the Guinean Government, the Ministers of Power and Environmental Protection and Public Health, together with the covering letter by the Conakry Director of UNIDO arrived on January 4, 1996, at UNIDO Headquarters, Vienna (**Annex 4**).

Up to the end of February 1996 **no further developments took place** concerning financing Programme 2, which means that owing to coordination problems the implementation of the programme was postponed to some unspecified future.

5. Summary report on field consultations of the Consultant

The Consultant completed four (4) field missions, which **proved necessary to execute his assignment**.

Problems of **communication** were encountered throughout the assignment in contacting the Ministry of Power and Environmental Protection and the Ministry of Public Health as well as the local counterpart and manufacturers.

All field inspection visits and consultations included :

- a complete review of the contact arrangements related to the assignment,
- a review of reconstruction work on DONKA Hospital,
- consultations with the contractors, the Project Manager and the Chief Architect,
- meeting with DONKA Hospital and Government representatives

to the depth needed for the successful completion of installation of the equipment supplied by UNIDO, and training.

The proceedings at each of the four series of consultations were laid down in minutes documenting the views adopted jointly upon proposals by the Consultant and the next tasks. These minutes in French are the most important annexes to the final report.

The main subjects of the consultations in the field were as follows:

5.1 December 1994

Comprehensive data collection, site inspection and establishment of contacts, taking water samples with the analyser equipment provided by the Consultant and detailed consultations at the central hospitals in Conakry, at the DONKA university hospital and the IGNACE DEEN hospital.

5.2 June 1995

The key issues of a one-week mission were the discussion and adoption of the proposals contained in the Inception Report submitted in March 1995. It was agreed on this occasion to establish the **collection system of solid hospital wastes** under the UNIDO Technical Assistance Contract and to introduce the measures needed for its operation and to take parallel thereto preparatory measures for the operation of the facility handling the effluents from the DONKA hospital, which is currently under modernization and reconstruction. The 350-400 m² large area

to be reserved for the compact treatment plant was located on the **layout drawings**, together with the connection points of water and power supply. The schedule for the installation of UNIDO supplied equipment was also drawn up.

Consultations were also started on the **funding possibilities of Programme 2** with the hope that effective progress can be made by the end of the year.

5.3 October 1995

The mission was necessary to check the progress achieved against the schedule adopted in June 1995.

The Chief Architect (Mr. Papier) and the Project Manager (Dr. Kouyate) assisted this inspection visit. The work was found to lag behind the schedule agreed upon in June. It was agreed to make up for the delay to enable installation in 1995.

It was confirmed again that the **customs and port duties must be paid by the local authorities**. Relying on the guarantees recorded in the minutes, immediate steps were taken at the end of October towards delivery of the collecting bins and the equipment purchased by UNIDO arrived in a 40-foot container on November 22, 1995 at Conakry port.

5.4 January 1996

Owing to the Islamic Summit held in Conakry in December 1995, the national boundaries were closed, hence the final mission had to be postponed to January 1996.

The primary objective of the final mission was to prepare and conduct training and to commission the solid wastes collection chain.

Thanks to the support received from the hospital authorities, training was accomplished in two stages with a large and interested audience. **The use of the collecting bins was also demonstrated** together with the representative of the equipment supplier, the ENVIRONMENTAL Co. Ltd.

Pilot incineration of the hospital wastes already collected in the bins, was also envisaged as the closing item on the programme of the second training day utilizing the incinerator that was supplied by ESACO Company. However, the transport roads for the roller mounted containers in the hospital area were still unpaved, hence the whole procedure could not be started up.

The closed rooms agreed **upon previously for the collecting containers** in each building presented serious problems. The plans were modified interim by the project leaders and consequently three closed sheds of 6 m² floor area each had to be built in the vicinity of each hospital block in replacement of the rooms lost by these modifications. According to the draft designs made by the Consultant, the total costs thereof were estimated at US\$ 6,000, which the

local authorities found difficult to procure. The representatives of UNIDO have reasserted that all local construction and infrastructural costs have to be borne by the local authorities.

Eventually, it was agreed that outstanding construction works (road network, buildings) should be completed by March 31, 1996. The completed building should be commissioned and occupied by that date.

It should be noted that the supplementary hospital budget needed for future **replacement of destroyed bins** and for **operating the incinerator**, was a crucial issue throughout the consultations, but especially at the final meetings. Although the importance of commissioning the system was recognized and supported by all participants, it was apparent that funding will play a decisive role in sustaining it even in the capital of the country. (The collecting bins of the incinerators commissioned in the hospitals of the rural towns are - unfortunately - inoperative virtually without exception, owing, first of all, to the lack of funds and fuel.)

6. Opportunities for local manufacturing materials and equipment supplied by UNIDO

Beginning January 1995, the local Consultant and later also the UNIDO expert have explored continuously the opportunities of **local manufacturing** at, and in the vicinity of Conakry. The eventual contract for the delivery of cardboard boxes evolved in part as a result of these consultations. In the international practice, infectious hospital wastes are collected in hard-walled, polyethylene bins, or double walled, lined corrugated cardboard boxes of special design.

Plastic vessels are manufactured by the state-owned SOGUIPLAST company in Conakry, using imported granulates and pressing dies. In principle the company would be ready to tool up for manufacturing the special collecting bins. However, owing to the **small number of bins, they would be very expensive** to produce and the fact that the polyethylene bins **represent high value** to the overwhelming majority of the population, their use for the intended purpose cannot be guaranteed. There is a high possibility that **contaminated bins will be used for storing food** and selling food in the market.

Corrugated cardboard boxes are manufactured for local use and for export, by the privately owned SOGEPACK public limited company sited outside the capital. For starting production based on the samples provided by the Consultant, the company demanded delivery of pressing dies. An offer thereon was forwarded to Conakry while the compilation of the definite offer is the task of the counterpart.

On the basis of the foregoing, a decision was taken on the delivery of boxes and bins of the type and material indicated in **Annex 5 (packing list)** which would cover the six-month need of DONKA hospital operating at full capacity. However, since the hospital will only be commissioned in March 1996 and will operate only at roughly two-thirds of its capacity, the boxes supplied will be enough to cover the need of the hospital for 9 months, i.e. until the end of 1996. In these estimations it was presumed that the distribution, supervision, collection and

safe disposal of boxes are carried out in compliance with the **handling instructions compiled under the present UNIDO programme.**

From the previous discussion, it is concluded that in less developed countries, waste packaging materials alone represent considerable value and hence **widespread awareness campaigns are needed** to convince the employees that their safe disposal together with the wastes collected in them is of public health interest.

In these countries, serious efforts are believed necessary to start manufacturing of boxes and packaging materials required for safe handling of hospital wastes. Awareness campaigns are necessary to sensitize decision makers to the importance of including costs of waste collection and handling as part of the budget allocated for hospital operation.

7. Practical experience gained with local training of hospital personnel and commissioning

The early distrust experienced from hospital management and doctors responsible for the various wards in the initial stages of the project dissolved gradually in the course of repeated contacts, consultations and discussions on different problems.

The scepticism showed by hospital personnel is understandable in view of the grave financial difficulties under which the hospitals and health care institutions in the country operate. These difficulties are caused in part by the meagre allocations from the central budget but also could be attributed to lack of organization, corruption and mainly to the absence of a widespread social insurance system.

The social insurance network covers presently only a fraction of the Guinean population and is therefore unable to operate the health care institutions. The central budget is thus the main source for hospital financing, supplemented by occasional international aid and direct payments by patients. This, however, would impose an unbearable financial burden on the large majority of the population.

Notwithstanding these dire conditions, the people of Guinea are very friendly and open-minded if the importance of introducing collection and safe disposal of "**valueless**" wastes is made clear enough to them.

A crucial issue and objective of the entire project was **to explore the impact of unsafe handling of waste on public health**, including infection risk posed by hospital waste stored under tropical climate on the hospital yard, on the streets for weeks with a high likelihood of being spread by rodents and in municipal waste dumps with the consequent pollution of the shores and water of the Atlantic.

Training and pilot incineration under the project was followed with great interest by all attendants. In an ideal situation the system could have been commissioned the next day. The obstacles thereto and the conditions thereof have been described in previous Chapters 5 and 6, respectively.

8. Project documentation

Under the Project, an Inception Report and a Final Report were compiled.

The Inception Report presented the experiences gained during data collection and field inspection visits, together with the references on which the proposals of the Consultant were founded.

The programme approved during the first split mission was followed by the announcement of the **restricted tender**, which was evaluated by the UNIDO Purchase Department with due regard to the recommendations of the Consultant.

Following the second split mission, preparations were made for accepting and transporting equipment to the site and for organizing **local training**.

This work included correspondence, minutes and **reporting missions** to the Backstopping Officer. The Final Report summarizes the events in the following documents:

- Document 1:** General review of the study (with annexes)
- Document 2:** Operating instructions on the use of the bins and containers intended for the selective collection of hospital wastes (Programme 1)
- Document 3:** Terms of References for supplying and installation of a hospital wastewater treatment plant
- Document 4:** Letters of the Guinean Government Officials for obtaining supplementary funds prior to announcing the tender of Programme 2 (wastewater treatment facility implementation)

The foregoing documents in French are supplemented by the present summary Report in English.

9. Potential application of project experience in the Republic of Guinea and other less developed countries

The project was of a pilot character. Experience gained from the project is suited to arrive at long-term conclusions therefrom, which are not confined to Guinea alone but **can be generalized for the less developed countries.** These **conclusions** are summarized below:

9.1 Major towns in LCDs, in particular those situated on the coast, have encountered over the past few decades virtually unmanageable **urban development problems.** The development plans, which took a few years to prepare, became obsolete almost as soon as they were completed. There is no legislative-ordinance background to enforce them. Traditions and

unclear socio-economic and ownership conditions present unsurmountable obstacles to any zoning efforts.

9.2 **No social insurance system is operative** in most of the LCDs. Owing to high rate of unemployment and low wages, no enough income is generated, such that regular social insurance contributions could be collected at the prevailing high birth rates.

9.3 Some hygienic traditions are still observed in the rural and less densely populated communities. The majority, however, have collapsed under the chaotic administration of the crowded metropolitan conditions. The people resign themselves in apathy to the **omnipresence of rodents, lack of sewerage, garbage filled streets** and the overflowing waste collection containers left unattended often for months.

9.4 In view of this situation, similar conditions in hospitals are understandable but these are believed to be the very places where a reversal of these dire conditions should be tackled. The competent leaders of state administration should be made to realize that the cost of sanitary development projects would be offset several times by the savings in health care.

9.5 The anomalies in medicine supply (lack of refrigeration, uncontrolled sales of expired medicine, etc.) tend to unsettle the faith of the public in the importance and reliability of the health care system.

10. **Recommendations for the implementation of hospital waste collection streams in less developed countries**

From the efforts made at the central hospital of Conakry, the following general conclusions emerge for LCDs:

10.1 The public health importance of introducing selective collection of hospital wastes should be incorporated in **education curricula** and emphasized and supported in the practice of **central budget allocation** alike.

10.2 **Regular awareness courses** should be organized for the personnel of health institutions to sensitize them to the importance of minimizing and eventually eliminating the health risks posed by hospital waste.

10.3 Separate handling of hospital waste should be **addressed adequately in the media**, in particular on television.

10.4 In raising public awareness to the importance of **handling hospital and particularly infectious waste separately**, special attention should be devoted to cleaning public areas, since this would have an educational effect on society.

10.5 **International financing organizations and monetary institutions** should devote greater attention to the rational use of loans. There is a number of oversized, energy consuming devices, which are unsuited under the prevailing conditions.

10.6 The habits, traditions of the population and the possibilities **of local manufacturing and replacement of damaged collecting bins** should be taken into consideration.

10.7 The leaders of health institutions should enforce strict compliance with, and supervision of, the use and maintenance instructions for **waste collection and transport**. To prevent misuse, they should realize that this is a hazardous operation, but if waste is handled properly several pathways of human exposure can be eliminated.

10.8 **The funds needed for selective wastes collection** and for replacement of damaged bins should be made available.

MINISTRY OF POWER
AND ENVIRONMENT

No. 1583/MEE/CAB

Conakry, November 6, 1995

Subject: Technical Assistance for
Sanitary Improvement of
the DONKA Hospital in
Conakry

to Mrs.
A. Tcheknavorian,
Directress Principal of the Industrial Sectors
and Environment Division
A-1400 Vienna, Austria
through the Minister of
Planning and Cooperation

Dear Directress,

In the matter of elimination of the hospital wastes in the UHC of DONKA, we have to present our deep gratitude for the contribution of your Institution to the Republic of Guinea with the Project SI-GUI-94-801. This assistance contribute to the success of the investment of restoration in process since 1993, with joint financement of the Saoudi Development Fund, the Islam Bank of Development and the Government of the Republic of Guinea. As a matter of fact, these works to be finalized before the end of 1996 didn't cover the environmental aspects, that's say the evacuation of the solid hospital wastes and the treatment of hospital waste waters, which run off at present directly in the sea without any treatment, in tattered canals.

The ONUDI Project envisaged at the first time the implementation of a pilot waste water treatment plant, which program has been later divided in two separate ones, as consequence of the local surveys and investigations made by the international Consultant and the several workshops and meetings held with our Technicians and Responsible Persons of the Restoration Project in the Donka UHC:

1. collection and transfer to the incinerator of solid hospital wastes
2. establishing a compact waste water treatment plant for the capacity of 600 beds at the final phase of works.

The first program develops under satisfactory conditions. Owing to the many discussions held with the relating parties, this Program No. 1 may be operational before the end of the present year.

Which concerns the Program No. 2, the first request has been addressed to the UNIDO for obtaining a complementary financement from 300 to 400 thousands U\$. Simultaneously several initiatives were encouraged by the Donors of the Restoration Project to support an eventual intervention by UNIDO for cooperation.

These movements didn't bring any result until now.

The Government of Guinea consider the implementation of these both Programs as of prime importance for environmental aspects. The Government is ready to supply all support for the establishment and operation of the W.W.T.P.

So we would be obliged for your kindness to take the required contacts with the Donors of Restoration Works and eventually with the World Bank for the cofinancement of the Program No. 2.

This Program concerns the supply and the implementation of a compact waste water treatment plant with a capacity of 200 m³/d to be realized during 1996, foreseeable target date of the Restoration Works. The complementary technical assistance budget requested from your Institution would include the detailed study, the purchase, the transport at the implementation of the assembled equipments, as well as the training of a Guinean Technician at the Contractor and at home.

Expecting a favourable follow up,

Your sincerely

Dorank Assifat Diasseny
Minister

MINISTRY OF PLANNING AND
COOPERATION
THE MINISTER

Conakry, November 22, 1995

to Mrs.
A. TCHEKNAVORIAN
Directress Principal of Industrial Sectors and
Environmental Division
A - 1400 Vienna, Austria

Dear Directress,

I have the honour to refer the enclosed letter No. 1583/MEE/CAB of November 6, 1995 signed by the Minister of Power and Environment awaiting your further dispositions in the subject of technical assistance to Sanitary Improvements at the DONKA Hospital in Conakry.

Expecting your favourable reception

Your sincerely

Received
January 04, 1996

The Minister
Michel Kamano

UNIDO Director in Guinea

december 8, 1995

Mrs A. Tcheknavorian-Asenbauer
Director Principal
ISED/OD
UNIDO, Vienna

DPP/147/95

Subject: Project SI/GUI/94/801 - Effluent treatment, DONKA Hospital

Dear Mrs Tcheknavorian,

Attached please find an official letter in which the Government of Guinea requests from UNIDO supplementary technical assistance to the construction of a compact sewage treatment plant for the effluents from the DONKA University Hospital Centre (UHC).

It should be made clear that under the project mentioned above UNIDO has intended originally to establish a pilot plant for the treatment of effluents from the DONKA UHC. Following consultations between the competent local instances and the UNIDO Consultant charged with project implementation, it was agreed to split the project into two sections:

1 - A first section aimed at collecting and transporting to the incinerator of the solid hospital wastes. This section is funded and implemented completely by UNIDO.

2 - The object of section 2 is to establish a compact treatment plant for the effluents from the various wards of the aforementioned hospital, which will be implemented in 1996 for an estimated cost of USD 400 000 and the financing of which is the subject of the present request. The Backstopping Officer of the project at Headquarters is Mr. Zoltán Csizer (OSD/ADV).

The Government requests further UNIDO to intervene at the Saudi Development Fund and the Islam Bank of Development in support of co-financing section 2. It should be remembered that these two Institutions finance jointly the on-going restoration works at the DONKA hospital, of which the aforementioned two sections form a supplementary part.

Information as soon as possible on the reactions to this request would be highly appreciated.

Yours sincerely

The Director for Guinea and Mali

Massata Cissé

REPUBLIC OF GUINEA

Ministry of Power and Environment/Ministry of Public Health

"WASTES MANAGEMENT AT THE DONKA HOSPITAL"

The participants of the meetings between June 19 and 27, 1995 were as follows:

Ministry of P/E: **Mr. Claude Gérard Coker, Dep.Natl.Dir. Env,**
 Mr. Abdoulaya Camara, Consultant, NDA

Ministry of Health: **Dr. Lamine TOURE, Natl.Dir./Public Health**
 Dr. Sekou CONDE, Natl.Dir./Welfare
 Dr. Mamadou BALDE, D.G. Donka UHC
 Dr. Morissanda KOUYATE, Project Manager

It should be noted that the UNIDO Consultant was granted an audience by Dr. Osmane Bangoura, Secretary General, Ministry of Health.

Aim of the UNIDO mission:

Following the inception visit to the site in December 1994

- presentation of the report on Stage I for comments or approval within the shortest possible period of time (in the absence of comments received not later than July 20, 1995 at UNIDO Headquarters, Vienna, the report and the conclusions thereof will be regarded as approved of).
- drawing up plans for implementing selective collection of hospital wastes, depending on the progress of restoration work on the related structures and services (Programme No.1).
- signing a memorandum with the local authorities concerned with planning the UNIDO contributions envisaged for 1995, taking into account contributions to be provided locally (items 2.1 and 2.2),
- identification of the modes of contact with the Donors of the on-going restoration works, in order to facilitate contacts between the UNIDO Financing Institutions with these Organisations to find supplementary funding for the sewage treatment project at the DONKA UHC (Programme No.2).

RECOMMENDATIONS AND DECISIONS

1 - Regardless of the delay relative to the targets set forth in December, 1994 in planning the implementation of the works directly connected to Programme No.1 (commissioning the incinerator of hospital wastes), UNIDO is requested to start up the latter before the end of 1995. This recommendation is the subject of a request accompanying the present memorandum.

UNIDO technical assistance budget so that the program can be implemented during 1996 together with the restoration works. The increased technical assistance budget requested from your Institution would cover the studies, the purchases, the transport and the mounting of equipment, while the Civil Engineering works would be executed under the hospital restoration project according to the technical instructions of your Consultant.

Although we are willing to implement all measures needed to complete Program No.1 before the end of the current year, taking into account unforeseen events, it is requested to examine at your earliest convenience the possibility of rescheduling the budget available under the program No.1 for the year 1996 and of increasing this budet to allow completion of the two programs during 1996.

Expecting your favourable decision we beg to remain, Mr Director General, yours very sincerely

Conakry, June 27, 1995

.....
GERARD COKER
Deputy National Director

PROTOCOL

of the UNIDO Mission to CONAKRY, Republic of Guinea
October 22 to 27, 1995
(Translation adopted from the French original)

Subject of the mission:

Defining the conditions of the implementation of the hospital wastes collection and disposal program in the DONKA University Hospital Center (CHU) (Project UNIDO SI-GUI-94-801)

Organisations consulted:

- National Environmental Protection Directorate, represented by Mr. Med. Lamine Boumbouya (MEE- Government Project Manager)
- National Public Health Directorate, represented by Dr. Med Lamine Touré, National Director
- National Directorate of Health Establishments, represented by Dr. Sekou Condé, Director
- Management of the DONKA CHU, represented by Dr. M. Kanfory Touré, Deputy Director General (MS - Project Beneficiary)
- Restoration project of the DONKA CHU, represented by Dr. Morissanda Kouyate, Project Manager
- UNIDO, Directorate for Guinea and Mali, represented by Mr. Massata Cissé, National Director
- Guinea Packaging Company (SO.GE.PAC,Plc)

Mission aims:

1. – Acceptance, unloading and removal from Conakry Port of sanitary equipment contributed by UNIDO and thus exempt from customs and taxes.
2. – Identification of the contaminated sites for the installation of the mobile containers which form the hospital wastes collection points at seven (7) centres distributed over the DONKA CHU
3. – Checking the conditions of container transport up to the point of front loading into the incinerator
4. – Preparation of training the medical and nurse personnel of the DONKA CHU in three successive groups over five working days during the week starting with December 18, 1995, including the preparation of operating instructions.
5. – Starting domestic production at SOGEPAC to ensure long-term supply to the DONKA Hospital.

Decisions taken:**Item 1:**

- The Consultant and his Counterpart have agreed on the route and the necessary time for **unloading and transporting the material** from Conakry Port to the site of installation. On request, UNIDO has agreed to furnish technical assistance in order to accelerate the operation by securing the services of UNDP at Conakry.

In a meeting convened by the Secretary General, the Minister of Energy and Environment - in cooperation with the Minister of Public Health - has agreed to make **all the necessary arrangements to deliver the material** from Conakry Port to the site by the end of November, but not later than December 10, 1995, further to budget all expenses including those of unloading, removal and the costs of shipping services.

Item 2:

- **The shelters to be provided** for the mobile containers which form the collection points in each building are required to meet the following conditions:
 - access by an at least 800 mm wide door,
 - easy transport of the trolleys over paved routes,
 - tiled floor and a washable coating on the walls up to 1.50 m height for easy cleaning,
 - natural ventilation or air conditioning,
 - at least 5 to 6 m² floor area.

The foregoing collection points are envisaged as follows:

- Paediatrics Department (operative by March, 1996)
- Nutrition Center (available)
- New Maternity Department (operative by December, 1995)
- Central building (surgery)
- Dermatology, infectious diseases (operative by June, 1996)
- Psychiatry Department (operative by June, 1996)
- Admission building (operative by March, 1996).

The network of transport routes will be upgraded by December, 1995, but the asphaltic pavement will not be placed before May, 1996.

For equipment acceptance and storage a yard of 25-30 m² area shall be provided.

Item 3:

- Transport of the containers to the incinerator depends on the **accessibility conditions of the transport routes**. At the entrance to the incinerator the front flight of stairs shall be replaced by a ramp not steeper than 15% (to be checked at the site). An air conditioned masonry chamber of 10 m² floor area shall be

attached to the wall of the shelter, in order to protect the waiting loaded containers. Fro container washing a water tap shall also be provided together with the removal of the effluents. It is presumed that smoke washing equipment and a container comb-bar lifting device with lever controlled discharge will be installed at the incinerator.

Item 4:

- Training of the personnel named by the Deputy Director General shall follow a method agreed upon with the management of DONKA CHU. Operating instructions will be compiled and made available for discussion to the medical and nurse staff. It will be finalized after the contemplated training over the week starting with December 18 this year.

Item 5:

- The SO.GE.PAC was approached by fax to present a pro-forma invoice (samples were made available).

The present report is a continuation of that done on June 27, 1995. The signatories thereof are advised to discharge the responsibilities assumed by them in order to complete in good and due form the Stage 1 of the Program before the end of this year.

Conakry, October 27, 1995.

Signed by the representatives of the organisations listed in the foregoing and the UNIDO Consultant, Mr. József Éhn. (See on the attached in French)

MINUTES

UNIDO Mission at Conakry, Republic of Guinea, January 08 to 16, 1996.

Subject: Project SI/GUI-94-801, Implementation of the final stage of the program: "Collection and Removal of the Hospital Solid Wastes at the Donka UHC. Terminal meeting.

Participants:

- M.Mohamed Lamine Doumbouya, Deputy National Director of the Environment (MEE/DNE), Project Manager designated by the Government
- Mr. Mohamed Lamine Touré, National Public Health Director (Ministry of Health)
- Prof. Mamadou Diouldé Baldé, Director General, Donka UHC
- Dr.Morissanda Kouyate, Manager of the Donka UHC restoration project
- Mr. Joseph Sylla, Section Head, Urban and Rural Pollution Control (MEE/DNE)
- Mr.Massata Cissé, Director UNIDO,Bureau for Guinea and Mali at Conakry

Mission program:

1. Identification of the hospital wastes packaging material and transport equipment, supplied by UNIDO Headquarters under Order No. 15-5-4433L, to meet the essential requirements of a 600-bed hospital for a period of operation of at least six (6) months.

Conclusion:

- The properly classified and labelled material was received by Mr.Siba Koulemou, Biomedical Engineer, Chief of Hospital maintenance Service, Donka UHC, Conakry
2. Resuming negotiations with S.O.G.E.P.A.C. (potential local supplier of corrugated container board boxes), presenting all models, together with the pro-forma invoices of the cutting templates and folding equipment. To these latter the transport costs to Conakry port were added for enabling the company to compile the final offer to the Donka UHC.
 3. Identification of the wastes collection points in the operating and new wards, in accord with the provisions laid down in the minutes of June 27 and October 27, 1995.

Conclusion:

The convenient rooms were selected for installing the containers according to the drawing enclosed. Owing to the absence of available rooms, special shelters have been envisaged at the facilities listed below:

- Maternity ward commissioned recently,
- Infant Nutrition and Health Institute (INSE),
- Five-floor central building, to be restored in the second stage of the works.

The arising costs will be born by the Government of Guinea (Restoration Project, Donka UHC and INSE). The cost estimates prepared by AFRICOF will be reviewed before construction by the technicians of the restoration project.

4. Training course for the medical and paramedical staff of the Donka UHC:

The Course was held in the presence of the representative of the Supplier, Mrs.Kanfi-Horvath. The participants were divided into two groupes (altogether 120 persons) according to the instruction of the Director General of the Donka UHC.

The lecture was followed by the demonstration of the use of material and safety clothing.

Taking into consideration the comments received from the staff on a draft document distributed, definite maintenance instructions containing all provisions and safety measures will be made available in 20 copies to the maintenance officer of the hospital for distribution of the heads of the wards concerned.

5. Conditions of implementation:

- Completion of paved transport roads
Target date: March 31, 1996
Responsible: Restoration Project Manager
- Availability of rooms and shelters for the installation of containers
Target date: March 31, 1996
Responsible:
for the existing buildings: Donka UHC and INSE,
for the buildings under restoration: Restoration Project Manager
- Receipt and distribution of the maintenance instructions. Target data of the UNIDO Consultant: January 30, 1996

- Introduction of a distribution system to avoid wastage of material
Responsible: Donka UHC
Note: The use of material supplied by UNIDO will become possible after the completion of the paved transport routes only.

- 6.
- Follow-up activities of the Local Consultant to be assigned for the implementation of the No.1 Program:
 - Visit to SOGEPAC (Coyah, Km 39) to collect the pro-forma invoices based on the outcome of the recent negotiations
 - Regular inspection of compliance with the conditions of implementation mentioned under para.5,
 - Information of the Ministers and Institutions concerned about any difficulty or anomaly encountered.
 - Monitoring the preparations for Program No.2.

For more effective supervision of the implementation of Stage 1 (Program No.1) it is necessary for MEE to confirm Mr.Camara Abdoulaya, Local Project Consultant, for the coordination of the various activities.

For Stage 2 (Program No.2) it is considered advisable to proceed with the assignment of the Local Consultant and to draw up his job description and remuneration.

- 7.
- Annual renewal costs of expendables (especially designed cardboard and plastic boxes):
- 4 and 10 litre boxes, 800 each
 - 20 litre box
 - 40 and 70 litre plastic bags, 5000 each
 - Special 30 litre plastic collectors for the operating theatres, 600 pc.

Total sum envisaged: FRG 6.5 million

It should be noted that according to international standards, the daily amount of hospital wastes was estimated for 600 beds assuming a rate of 200 g/bed per day, giving 120 kg of wastes daily. This corresponds to three - four charges of the incinerator. The fuel oil for the incinerator will be provided by Donka hospital. For this end the exact data on the consumption of the incinerator will be provided by the Restoration Project.

- 8.
- Requesting the Government of the Republic of Guinea to activate Program No. 2 (construction of the compact treatment plant for hospital sewage):

in accord with the requests expressed in the letter No. 1583/MEE/CAB, of November 6, 1995, Minister of Power and Environment, and received at UNIDO Headquarters, Vienna on January 4, 1996.

The parties concerned agreed to step up their efforts at the Donors of the Restoration project and at UNIDO with the aim of obtaining co-financing for the Implementation of Program No.2 before the end of 1996. For this end the Minister of Health (the beneficiary of the project) will intervene energetically at the Donors. The Minister of Power and Environment (the Executive Agency of the Government for the successful Program No.1) will insist, on his part, at UNIDO. Coordination will be ensured by the National Environmental Directorate. It is noted by the parties concerned that the tender documents and site selection of the treatment plant were prepared duly by the UNIDO Consultant.

Conakry, the 19th of January, 1996

Signatures

MINISTRY OF POWER
AND ENVIRONMENT

REPUBLIC OF GUINEA
Work-Justice-Solidarity

NATIONAL DIRECTORATE
OF THE ENVIRONMENT

Conakry, June 27, 1995

No. 165/MEE/DNE

THE NATIONAL DIRECTOR
United Nation Industrial
Development Organisation

The Director General
Industrial Chemistry Branch

Vienna International Centre
1400 - Vienna, Austria

Subject:

Technical assistance to Sanitary Improvements
at the DONKA Hospital in Conakry

Mr. Director General,

In connection with the Project aimed at the disposal of hospital wastes at the DONKA UHC presently under reconstruction, which pose a grave threat to public health, sincere gratitude is expressed to your Institution for the assistance provided to the Republic of Guinea under the Project SI-GUI-94-801.

The UNIDO Consultant charged with technical assistance under the Project has recognised at the site the necessity of solving two problems simultaneously:

- 1 - Disposal of the solid hospital wastes
- 2 - Treatment of the contaminated effluents, which are presently discharged to the sea without any treatment.

In the course of the discussions during the inception mission of the Consultant, we have taken the liberty of notifying you about our wish to find a complex solution to these problems. According thereto and to the conclusions of last December, the program of selective collection and transport of solid wastes has been scheduled for the year 1995 (Program No.1), while the implementation of the sewage treatment plant for the year 1996 (Program No.2), before the termination of the restoration works, for which strengthening of the UNIDO budget is necessary.

All arrangements have accordingly been made on our level to complete the works of mounting, connection, conservation of the rolling containers and on the air-conditioned chamber by the dates established. The Civil Engineering works will be executed according to the technical agreements reached with the Restoration Project. The equipment for collecting and transporting the hospital wastes will be delivered under the UNIDO Technical Assistance Project.

It should be noted that the Government of Guinea is ready to provide all support to the implementation of the treatment plant which is essential to manage the effluents from the DONKA hospital (Program No.2). We request your therefore to consent to strengthening the

2 - The Restoration Project, together with the Responsible Person of the hospital will make available to the UNIDO Programme No.1 the following facilities:

2.1 - One 8 - 10 m² storage chamber for the collection containers of packaged solid hospital wastes at the following wards:

- Surgery
- Infectious diseases
- Psychiatry
- Maternity
- Pediatrics
- Nutrition
- Entrance building (treatment of out-patients)

2.2 - One room air conditioned to 10-15 deg.C in the vicinity of the incinerator to store the full containers up to the time when their contents are dumped into the furnace. Before the furnace a paved yard will be built with a drain ditch to the sewer network. A water tap with a flexible hose will be installed for washing the containers. The works listed above will be additional items.

The network of transport roads for the hospital wastes will be built in two stages:

- the existing routes to the functioning wards,
- development parallel to the relocation of the wards.

3 The competent authorities are asked

- to ensure the availability of qualified personnel (physicians, nurses, chemists) for training scheduled in mid-December, 1995. A detailed program will be distributed one month in advance to minimise the necessary attendance time.

- to make the necessary arrangements for transporting the material supplied by UNIDO and to exempt these from any tax and duty.

4 The Guinean authorities strongly request preliminary training for the person nominated to supervise Programme No 1 in the country of the selected Supplier of the equipment.

5 They request further increasing the UNIDO budget for completing the hospital wastes programme by installing a treatment plant, which is essential for the effective handling of the contaminated wastewaters, during the year 1996, by the end of the on-going works.

Done at Conakry, June 27, 1995

Signatures